# Smooth Sailing? Autoethnography of Recreational Travel by a Blind Person

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We present an autoethnographic study of an independent blind traveller, Kate. It recounts her preparation for a 28-day cruise and then her experience onboard the ship. Her planning notes, field notes and travel diary were analysed in terms of five main themes: information access, orientation and mobility, tools and technology, cultural and societal issues, and person-centred issues. This analysis provides a deeply personal account of the barriers–in particular information access, orientation and mobility and staff attitudes–that she faced, as well as the skills and tools that she used to overcome these. A particular focus is Kate's use of technologies to access visual information and the provision of accessible maps and models before the trip to help her build a cognitive map of the ship's layout.

## 1 INTRODUCTION

Cultural life, as defined by the United Nations Convention on the Rights of People with Disabilities [1], is an important part of any person's citizenship. This includes recreational travel and tourism. However, a disproportionately small number of people with disabilities participate in mainstream tourism [21]. The uncertainty of independent travel and restricted access to information for planning and during travel are particular barriers to travel by people who are blind or have low vision (BLV) [22] [21] [23] [27] and studies have found that BLV people travel disproportionately less than people with most other kinds of disabilities [31].

This paper presents the accounts of an independent blind traveller, Kate (first author), in the form of an autoethnographic study. Such studies focus around the experiences of a single individual and provide a richer, more personal perspective. They seem particularly well-suited to studies involving disability because of the huge variety of abilities and personal experiences in the disability community and the power of individual narratives to dramatically illustrate inequity. The purpose of this study was to explore the difficulties faced by blind travellers and the various strategies used to resolve these. A particular focus is the use of different technologies and tools.

Kate is a 63-year-old blind person who loves to travel and explore new environments and situations. For much of her adult life she has spent her holidays travelling around her home country and, on a few occasions, gone on overseas cruises. The trip that is the focus of this study was a 28 day cruise around Australia. Kate took the cruise with her husband, who is also vision impaired. Just four days into the trip it was cancelled because of concerns about the emerging COVID-19 pandemic [2]. Her account covers a two year period: preparation for the trip, the trip itself as well as dealing with the sudden change of plans as the result of the cancellation. Her travel diaries, notes and field notes were analysed in terms of five themes: information access, orientation and mobility, tools and technology, cultural and societal issues, as well as person-centered issues relating to Kate's skills and attitudes.

To the best of our knowledge, this is the first autoethnographic study of a BLV traveller. Key contributions are:

- Kate's individual experience provides a valuable update and complement to previous investigations into the motivation, experiences and barriers to BLV travellers previously identified in [22] [21] [23] [27].
- Detailed analysis of the technologies and tools that Kate used when planning the trip and then on the trip. This has not been a focus of previous studies and demonstrates the crucial role that assistive technologies play in travel by BLV travellers.
- Case-study in the use of accessible maps and models for orientation and mobility training as preparation for recreational travel.

This research highlights the difficulties that BLV travellers face, and the positive way in which technology is helping to alleviate some of these barriers. It also raises important considerations for the travel industry regarding technology and the need to equitably support BLV travellers.

## 2 BACKGROUND

### 2.1 Recreational Travel & Tourism

Until relatively recently, recreational travel and tourism has largely ignored the needs of travellers with disabilities. This has been particularly true for people with vision impairments; an attitude common in the general public is that blind people cannot benefit from visiting new locations as they cannot see the attractions, e.g. Packer et al. 2007 [22], Packer et al. 2008 [21].

Yau et al. 2004 [36] introduced a five stage model of the steps in travel for people with disabilities. This was based on interviews with 52 participants from Hong Kong who either had visual impairments or mobility difficulties. It highlighted the importance placed by participants on detailed analysis and planning before travel to ensure that hotel accommodation, tours and transportation are accessible. It also indicated that in the actual trip there were many compromises such as paying for more expensive hotels that were more accessible, not taking some tours or paying locals to provide assistance.

In a follow-up study Packer et al. [22] described the environmental barriers to travel identified in these interviews. Participants frequently preferred to travel with friends or family without disabilities to provide a sense of security and source of assistance during the travel. Participants first identified barriers to individual mobility, transport, buildings and tourist attractions. These included poor lighting, lack of auditory elevator cues, similar sized money, etc. However they then identified attitudinal barriers as being more critical because if staff were helpful then most physical or systems barriers could be overcome. Access to reliable information before the trip and during the trip was also seen as essential. Limited information prevented some participants from travelling or led to such a bad outcome that future travel was rejected.

Packer et al. [21] held focus groups with 40 people with vision impairments from Australia about their travel experience. Like sighted tourists, they talked of 'sightseeing' and of 'seeing' places. But they also discussed how their tourist experience was quite different because of various barriers facing them. The first was the need to 'manage the tourist experience' by ensuring that the trip was thoroughly planned and that they had access to sufficient information to ensure their safety and security. They identified the following barriers: difficulty in accessing information prior to departure and then on the trip; navigation of the physical environment; difficulty of travelling with a Guide Dog; and the knowledge and attitudes of others. Travellers who did not appear 'blind' were more likely to experience negative attitudes, so a key question for many was whether to disclose that they were vision impaired.

Benefits and barriers to tourism for BLV people were also investigated in Richards et al. 2010 [27]. BLV travellers spoke of the pleasures and benefits of travel away from home. They spoke of social interaction, warmer climates, relaxation, a change from their routine environment and the experience of new countries and cultures. Barriers were grouped into individual, social and environmental. Individual barriers included emotional, psychological and (in)dependence issues. Vision impaired participants felt disregarded and ignored. They disliked being treated as a homogeneous group rather than as individuals. The individuality of vision impairment and coping strategies was emphasized. Societal barriers were due to a lack of staff awareness, training or knowledge, attitudes of friends and family, stereotyping and inequitable policies. Environmental barriers included difficulty of navigation and physical travel and information access before and during the trip. Like Packer et al. 2007, staff awareness was regarded as more important than environmental barriers.

Poria et al. [23] conducted a survey of 15 Israeli BLV travellers, finding similar issues to Richards et al. [27]. The survey focused on hotel accommodation, flights, restaurants and museums. Respondents spoke of the need for reliable flight information and the fear of missing information about changes in flight schedules. Most flew with a sighted companion. They spoke of the difficulty of identifying room numbers in hotels and criticised accessibility and difficulty of navigation in the public spaces of hotels. Staff behaviour was a cause for concern: overly helpful and intrusive staff and lack of training in how to help. They also indicated that staff, much like the general public, often assumed they had hearing and cognitive disabilities.

Thus, prior research has identified reasons for travel as well as barriers based on the individual travellers attitudes or fears, barriers arising from other people's attitudes or behavior and policies, and environmental barriers to access. However, the role of technology was not explicitly considered in these studies. Furthermore, this research is now a decade old and one might hope that changes in policy, increased awareness of disability, as well as new technologies such as mobile phones or crowd sourced information may have alleviated some barriers to travel. We address these issues in our study.

Two recurring themes are the difficulty of travel in an unfamiliar environment and the difficulty of accessing information when planning the trip and then when travelling. More generally, independent travel [7] [29] and access to information [34] [33] are regarded as two of the most important issues for vision impaired people, affecting educational and employment opportunities as well as quality of life [14]. As a result, assistive technologies and tools have focused on these tasks. We now provide a brief review.

## 2.2 Independent Travel

We have seen that navigation of unfamiliar environments is a significant concern to vision impaired travellers. For instance, participants in [21] were concerned about finding their way and also about injuring themselves because of uneven surfaces, stairs or overhanging dangers. They stressed the importance of a thorough orientation to indoor and

outdoor environments whether travelling alone or with others. Guerreiro et al. [9] focused on the issues faced by BLV visitors to new airports and the accessibility challenges that lie within.

Orientation (knowing where you are and the route to your destination) and mobility (ability to move safely through the environment) training is an essential skill for vision-impaired people [35]. Generic O&M skills are now widely taught and these are crucial for independent travel. They require a lot of practice and confidence to support independent travel in general, let alone recreational travel especially overseas.

For those with severe vision impairment the most common tools used when travelling are:

- Guide dog: this is an obstacle avoiding mobility tool as well as orientation tool if the dog is familiar with the environment
- Cane: long canes can detect obstacles and uneven surfaces
- Electronic obstacle detection: hand-held devices, such as the Miniguide use echolocation (sonic beam) to detect objects in front of the user, using vibration to indicate how far away the object is.
- Auditory cues: sound can be used to identify and locate landmarks such as a busy road while differences in the sound of the cane tap and echolocation provide information about the immediate environment and obstacles
- GPS: in the last decade GPS apps on the mobile phone or dedicated GPS devices have become commonly used for orientation
- Companion: a sighted friend, family member or support worker can provide guidance, particularly in an unfamiliar environment

In order to prepare for independent travel at a new location it is common for vision-impaired travellers to work towards building a cognitive map of the location, often with the aid of an O&M instructor. This helps to reduce anxiety about travel. Preparation is typically based on a combination of guided visits to the new location, natural language description of the environment and landmarks and exploration of tactile maps of the new location.

The most common ways of producing a tactile map are by printing a raised line drawing on swell paper or embossed paper, moulding a plastic sheet using thermoforming, or creating a simple model by hand, for instance by using Lego blocks. More recently, researchers have investigated the use of 3D printed models. 3D printed models have the advantage that they cost only a few dollars to print (about the same as a raised line drawing) but because of their three-dimensional nature are better suited to showing locations in which relative height is important [10]. Studies have shown that they are preferred to tactile maps, allow for more understandable icons and symbols and are more engaging and memorable [3] [10] [11].

## 2.3 Access to Information

Limited access to information was also identified as a primary concern or barrier to travel. For instance participants in [21] study noted that accessing information prior to departure was often difficult and, in many cases, required people with vision impairment to rely on their travel companion to do the initial information gathering and planning. Once travelling they also found it difficult to access information about the attractions at a destination, accommodation services, transport services, restaurant menus, and safety information such as location of fire exits.

Blind people can access online materials using screen reading software and electronic braille displays. In theory, web materials including images and videos should be designed so that their content is accessible to people with vision impairments but in practice the majority of websites do not meet the Web Content Accessibility Guidelines (WCAG 2.0) and even those that do are still frequently inaccessible [24]. The situation is no better for tourism and travel provider

websites [17]. People with low vision can use image magnification to access online content, although sometimes this is not effective because of colour, contrast and complexity.

Magnification also allows people with low vision to access printed materials but for people who are blind, access to printed materials is more difficult. Text can be transcribed to an accessible format, usually braille, or scanned and provided as digital text. Printed graphics can either be described or presented as a tactile graphic. However this requires the accessible materials to be prepared ahead of time by expert transcribers, which is expensive and time consuming.

Special purpose text-to-speech scanning machines are also used. Some are scanning devices connected to a computer, while others are stand alone solutions. Larger machines scan a page at a time while smaller hand-held scanners require the user to run the scanner along a line of text. Examples include the Read Easy Move 2 and Pearl Camera. While these are suitable for home use, their size and fragility make them impractical for use in a travel setting. More recently, OCR with text-to-speech is available as mobile apps KNFB Reader and limited picture and signage recognition with TapTapSee.

In practice, however, when travelling the most common way of accessing printed materials and other information available in the physical environment is for a sighted person to describe the information. Such a description might be provided by a sighted companion, service provider or, more recently, by a remote human assistant through crowd sourcing apps such as the volunteer-led BeMyEyes or the paid service Aira.

A variety of digital devices are used for note taking and general information provision. These include specialist devices like the Polaris and BrailleNote Touch notetakers that are electronic braille keyboard and displays, as well as commodity devices such as mobile phones, tablets, laptops and computers. There is a preference for Apple products because of their more consistent support for blind users [18]. Voice-activated personal assistants are increasingly used as general-purpose information interfaces [25].

## 2.4  Autoethnography

We use autoethnography to investigate the experiences of blind travellers. As distinct from ethnography, autoethnography is a qualitative research method in which the participant becomes the researcher and uses self-reflection and field notes to explore his/her personal experiences [5]. Both ethnography and autoethnography allows HCI researchers to understand how technology is used in the real world. While ethnography often investigates groups or communities, autoethnography focuses on the experience of a single individual. This can lead to a deeper empathic understanding of the user's experiences, at the possible expense of generalisability. However, the autoethnographer's personal 'story' is not disconnected from the social and cultural contexts in which it occurs. Rather, the individual, social and cultural are tied together to produce a complex and multilayered recount of reality [6]. The HCI field has started to use autoethnography, e.g. [20] [4] [26] [8]. It moves beyond usability or functionality and can reveal a much deeper, far more personal response to technology, such as in [30]. For instance in [15] Lucero examines the impact of long-term mobile phone detox on his social life, work, safety and navigation.

The use of autoethnographic methods in the disability domain is rare. One study presents the experience of a profoundly deaf higher education student and his use of assistive technologies [16]. Another is an initial evaluation of Augmented-Reality for real-time-captioning by a person who is hard of hearing [12]. Another study [34] details how lack of access to print materials affected the life of a print impaired South African disability researcher. Most closely related to the current paper is an autoethnographic study detailing the recreational travel experiences of a traveller who is hard of hearing [13]. It details how deafness impacts his travel experience including social interactions, navigation as

well as his experiences with different technological aids. To the best of our knowledge this is the first autoethnographic study investigating the experiences of a blind traveller.

Like [13] we believe that autoethnography provides insights that are not possible with most other HCI methodologies. We believe it is a particularly useful tool for research into assistive technologies. Unlike, say controlled evaluations of new technologies, it focuses on a person who happens to have a disability, rather than on disabled participants who happen to be people. By focusing on the individual and their abilities it forces a much richer heterogenous understanding of disability. This is vitally important: people lumped together as BLV, for instance, have very different experiences and abilities. Understanding this will lead to more personalised and useful assistive technologies [13]. Originating in the social sciences, autoethnography naturally fits with a social model of disability in which disability is understood in terms of inequities imposed by society. As such, this can also complement ethnographic work such as [32] that seeks to understand how BLV people understand their abilities in different contexts. But, because of its focus on the individual, it escapes the straitjacket of the British social model allowing a more nuanced understanding of disability as both a social construct and also in terms of individual abilities [28].

## 3 METHODOLOGY

### 3.1 Recording Process

While this is an autoethnographic account of Kate's travels, it is the work of a group of researchers. The work has been led by Kate, and is an analysis of her travel journals. The four other researchers have been involved throughout the process, both prior to Kate's trip in providing accessible orientation and mobility materials, and also during the data analysis and reporting process.

Data collection began prior to Kate's trip. As Kate is a thorough planner, she kept notes throughout the investigation and booking phase. Once the decision to undertake an autoethnographic study was made (two months before the trip), a more formal approach to taking notes was undertaken. Kate summarised and reflected on her experiences researching and booking the trip, and then began recording field notes for the final preparations and the trip itself.

The field notes were a combination of factual reporting and reflections on the experience. The field notes not formally formatted, and were in the form of a holiday diary. The notes also included photos of the trip. The photos were not taken especially for the autoethnographic study; when travelling Kate usually takes photos to share with friends and family. Approximately 19,000 words were collected across two Google Docs.

Supporting these travel diaries was a 3,000 word document of Kate's general reflections on travelling. This included highlights of previous trips, and importantly insights into Kate's motivations for travel, including her attitudes, confidence and tools used.

As an external check for validity [15] [13] Kate shared her diary with her husband, daughter and a girlfriend, all of whom are vision impaired and have previously travelled with her, to confirm that her account aligned with their experiences.

### 3.2 Thematic analysis

The field notes were analysed by three members of the research team: Kate and two other researchers. To begin, a set of themes were developed by Kate and one other researcher, based on an initial reading of the notes. This included six main topics with sub themes within each. A sample of the notes were analysed using the themes to establish their suitability. While the main themes were appropriate, the sub themes within proved too narrow. As such, the first pass of analysis

was reduced to using the six main topics. These were: Activities; Information Access; Orientation and Mobility; Tools and Technology; Cultural and Societal Issues; and Person-Centred Issues (Kate's Skills and Attitudes). The Activities theme was later removed from reporting, as its main content was encapsulated and placed in greater context within the other five themes.

After formalisation of the themes, the two travel diaries were independently coded by the three researchers. Differences were discussed and all coded extracts then organised for sub theme identification. The initial sub themes were used, but analysis was not constrained to these. No formal logging of theme counts or agreements was done, as many passages encompassed multiple themes, which would sometimes lead to slight differences in coding. Discussion between the three researchers involved in the analysis, including the traveller, was conducted to ensure agreement on the classifications and that there was no misrepresentation of Kate's perspectives. Emerging from this analysis were thematic and narrative threads within each main theme for discussing Kate's experiences.

## 4 TRAVELLER AND TRIP BACKGROUND

This section is written in the first person from Kate's perspective.

### 4.1 About Kate

I have been vision impaired all my life and attended a specialist school for blind children. I possess many skills that enable me to assess situations and find solutions for difficulties. Some of these skills include: good orientation and mobility; excellent communication; good self-advocacy; good technological ability; and importantly a bright and positive attitude.

As an adult I have always enjoyed traveling and exploring new places: starting with small trips around my local environment and extending to train trips around my home country as well as overseas cruises. This travel has always been via public transport and with my vision impaired partner.

*4.1.1 Motivation.* There are many reasons why I love to travel: meeting new people; experiencing new places; interacting with new environments; feeling the ambience of the environment; and learning new things. I have been fortunate to have travelled around much of my home country by train, bus and plane. Every place has its own ambiance - the sounds, smells, atmosphere and people. It is for this variety of environment and experience that I love to travel. New experiences are important, and travel lets me engage at many levels, both intellectually and sensorially.

Cruise ships offer unique aspects to travel. I enjoy being able to settle in one room; having access to food and entertainment on board; being able to explore different ports; and utilising my independence. From an independence point of view, cruises are great because you are always on the ship. You can orient yourself and gain an understanding of the ship environment. It normally only takes a few days to work out the most important things: where your cabin is; where you can find food; the bar that has the quizzes; the main theatre; and where your favourite musician is playing.

### 4.2 Overview of the Trip

Planning for the trip started several years earlier after reading details of a 28 day cruise around Australia. After booking, pre-planning commenced to obtain access to key information such as maps, menus, trip notes and shore tours. As my husband, who has severe vision impairment, and I were travelling alone, extra work was put into the pre-planning. On previous cruises I had been accompanied by a companion with significant vision. To support the independent travel,

part of the orientation and mobility planning was the construction of bespoke 3D printed maps of the ship (discussed in Section 5).

The cruise began in Sydney and was intended to be a 28 day trip around Australia, stopping at many ports along the way. My husband and I made our way to Sydney, flying from our home city in order to commence the trip.

After leaving port, the cruise travelled clockwise, heading from Sydney to Melbourne, where the ship docked. We elected not to go onshore as Melbourne is familiar to us. The ship then went south to the state of Tasmania where it made a stop in the city of Burnie, where again we decided not to disembark. The trip was scheduled to head further south to Hobart, and after a stop there, travel along the South Australian coast and around the country, terminating back in Sydney. However, after stopping in Burnie, we were informed that due to the impact of COVID-19, the cruise ship would be visiting Hobart (where we went ashore), and then return to Sydney with the remainder of the trip cancelled.

During the trip back to Sydney, alternate flights were arranged. On arrival back at Sydney, we flew back to our home city, with the remainder of the holiday postponed indefinitely.

### 4.3 Choice of Tools and Technology

Based on my previous travel experiences and general independence in mobility, I carefully considered what aids and tools to take and use on the trip. These aids and tools related primarily to orientation and mobility, as well as for information access.

The following tools were taken: canes; hand-held electronic obstacle detector (Miniguide); braille notetaker (Polaris); smartphone (iPhone); laptop; voice recorder; and various headphones. The canes and Miniguide were to assist with mobility. The Polaris, laptop and iPhone served multiple purposes. They facilitated information access, keeping travel notes, and provide entertainment such as games and talking books. The iPhone also could be used for taking photos. It is worth noting that the iPhone, Polaris and laptop rely on internet access. I planned to not use the expensive access to an intranet provided by the cruise ship but instead use my normal mobile service when the ship was in port.

Several technologies that I usually heavily use did not get taken on the trip, mostly for logistical reasons. These included the large and heavy braille display and bulky Read Easy scanning and reading machine. Similarly, my barcode scanner was not taken, as it is something that takes up space that was not an absolute essential.

I also knew I could rely on two human aids throughout my trip and I put things in place to ensure I had access. The first was the use of Aira, a remote human assistant enabled through my smartphone. They would be able to provide support in real-time for information access or unexpected situations. Secondly, we knew we could obtain the services of a local support worker to guide us at our points of call recruited through an online on-demand disability support service.

My previous travels also influenced one unique, unsophisticated item: a plush toy. Experience had shown that cabins typically do not have any raised markings of any kind to read the cabin number. Therefore I travel with a small Guide Dog puppy (plush toy) to hang on the handle of the cabin door. It also serves as a gift to the cabin steward at the end of the trip.

One key omission was my Guide Dog. I thought that little advantage was to be had regarding ship orientation and mobility, given it was also a new environment for him, so as such he was not taken. Previous travels have also brought some levels of frustration, as everyone wants to pat the dog and make a fuss, detracting from his usefulness as a guide.

## 5  TECHNOLOGY EXPLORATION: ACCESSIBLE MAPS

Like other BLV, travellers Kate put in considerable effort to prepare herself for travel in the unfamiliar environments she would encounter on the trip.

### 5.1  Creation of accessible maps and design feedback

Kate wanted accessible maps in order to familiarise herself with the ship layout both before and during her trip. Print maps were available on the cruise ship website for sighted passengers, however a request for tactile equivalents was denied by the cruise operators. Kate then approached our research team, who were able to trial a variety of approaches to providing access to the information given in the print maps.

The creation of the accessible maps differed from the usual transcription process in that there was direct and continued communication between Kate and the producer (a member of the research team). Usually, all materials are produced in one format and supplied at once as a finished product. In this instance, a variety of formats were used, which were then customised to Kate's specific requirements. Suggestions for improvements were quickly incorporated into the next iteration.

*5.1.1  List format.* As a first step, a text list was created detailing every level of the ship open to passengers and the public areas on that level. In a second iteration, the list was adjusted so that items were listed in order from bow to stern, with an indication of which side of the ship they were on. The primary purpose of the list was to enable Kate to choose which decks and features were most important for production in a tactile format, as well as giving basic information about the other decks. However, Kate found that the list was useful in itself, giving a reasonable level of information about the decks that would not be produced as tactile maps.

*5.1.2  Tactile graphics.* 2.5D tactile graphics were based on the print maps. Patterned fill and braille labels were added and the graphic was printed on microcapsule paper. The first tactile map produced was very complex with deck area, indoor areas and many small areas with labels. Even though it was split into two A4 pages, it was difficult to read: "The textures are very similar and not easy to discern". The next two tactile maps were simplified, using fewer textures and with labels for only the essential areas. These maps were easier to read.

*5.1.3  Laser cut.* The same CAD drawings created for the 2.5D tactile maps were also used as the basis for a laser-cut map of deck 5. This map was constructed from a thick cardboard base in the shape of the midsection of the ship, a layer of 1mm thick felt for floor areas accessible to passengers, and thick cardboard shapes for important features. Glitter foam was used to indicate lifts, and stairs were constructed from ascending strips of sticky foam. Sticky braille labels were attached to the top of the map where they would fit. Additional braille labels and a tactile key were attached to the underside of the map. The laser cut map is not as visually attractive but was much more tactually distinct than the 2.5D tactile maps. "It's great having something three dimensional, that your fingers can walk around."

*5.1.4  3D map and model.* 3D printing was utilised to create a 3D map of level 12 (the floor Kate's cabin was on) and a 3D model of the ship as a whole. The 3D map of level 12 included only the central area accessible to passengers, with a footprint of 19×4 cm. Internal buildings - the cabins at one end and services at another - were raised by 8.6mm, with a bump added on top of Kate's cabin. Other key features were indicated with 3D icons decided in consultation with Kate: toilets for the public bathrooms; tall hollow rectangles for the lifts; a low relief oval and circle for the swimming pool and spa; a hand for the nail salon; a champagne bottle for the bar; and an icecream cone for the ice cream store. These
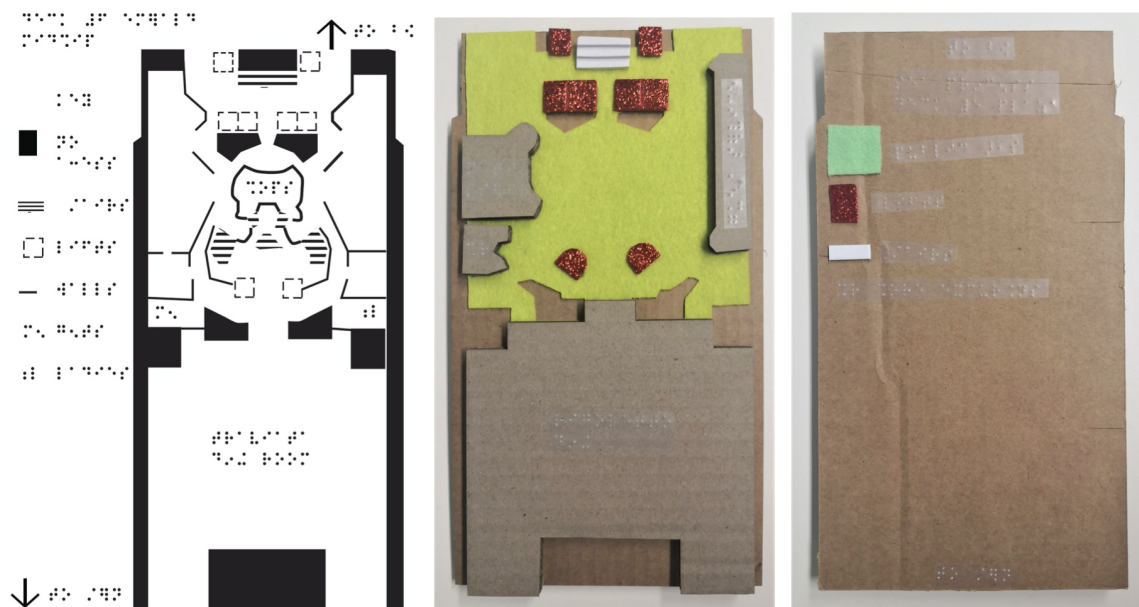
Fig. 1. 2.5D tactile map of deck 6 and laser cut map of deck 5 (top and underside)

icons ranged in height from 2.3 to 22mm. The deck area was indicated by a straight line texture. Sticky braille labels were attached to the underside of the model. The cabin and elevators were highlighted with fluorescent paint for visual contrast for use by Kate's husband. "Although the model is quite small, there is enough definition for me to be able to easily work with it."
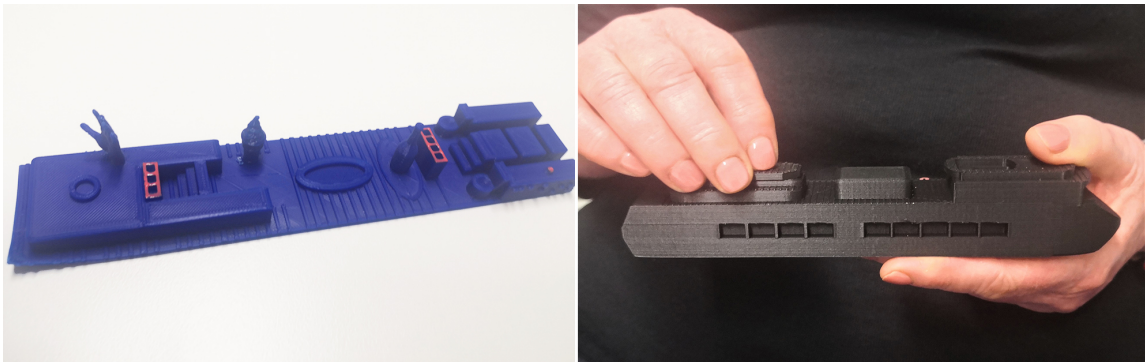


Fig. 2. 3D printed map of deck 12 and model of whole ship

The 3D printed model of the whole ship was created for two purposes. Firstly, it would give the shape of the ship. Kate had already commented that the tactile graphic had given her knowledge of the ship outline that she could not gather from walking along the (limited) public access areas. The ship as a whole is an impressive visual that cannot be accessed tactually at full scale. Secondly, the whole ship map would depict how the top outdoor decks fit together.

Features such as canopies and pipes were omitted to reduce complexity. Deck areas were again indicated by a straight line texture and swimming pools were sunken.

## 5.2   Use of accessible maps

Kate was able to build up her knowledge of the ship layout throughout the process of choosing and creating the accessible maps.

> *"This list has been a great benefit, giving me an idea of all the features of the ship and the level on which to find them. This list has also given me a method of starting to create a visual map in my head of where to look for things."*

Despite having very limited experience with braille and tactile graphics, Kate's husband also looked at the maps in all formats and was able to use them to get a sense of where things are.

Kate continued to pick up and explore the maps in the lead up to the trip. The maps were also useful for route planning: *"After exploring the model for a few minutes I was able to work out a route from our cabin to the bar, pool and salon."*

Kate took the maps with her on the trip. The robustness meant that they could be easily packed and used without worry they would be damaged or lose their efficacy. They were consulted sporadically during the trip to support orientation (and for tactile pleasure), although this was not often as Kate had already built a strong cognitive map:

> *"Not used other maps since 10/03/2020 when used Deck map to find dinner. I admit to often going back to the 3d models just because I like the feel of them. Also think I spent so much time looking at them at home that I had built up a really good picture of where things were."*

However, difficulties arose when the map did not include enough detail (stairs and doorways), when furniture and other unmarked features obstructed pathways, or when several restaurants shared the same space without demarcation.

> *"I looked at the map and planned a route directly from the lifts to the dining room. This didn't work because the whole centre of this area (shown on the map as 'public access') is actually a big fountain and a lot of chairs. I actually discovered it is better to walk around the starboard side of this area in front of the Guest Services desk to reach the restaurant."*

## 6   THEMATIC ANALYSIS AND DISCUSSION

Thematic analysis of the notes taken during preparation and on the trip uncovered five main themes: Information Access; Orientation and Mobility; Tools and Technology; Cultural and Societal Issues; and Person-Centred Issues.

## 6.1   Information Access

Kate required access to three main categories of information: pre-trip planning information (itineraries etc.); maps and plans; and daily updates.

Pre-trip planning was supported by the tools that Kate would use under normal circumstances at home. As such, access to basic web-based information could be achieved with a relative degree of success. The company website was reasonably accessible, therefore obtaining general trip information was satisfactory. However she had a strong preference for engaging with people either face-to-face or on the phone. She found that it helped with not only getting specific information easily, but also being able to notify the company of her vision impairment and being provided with contact information to obtain extra assistance.

> *"I'm a little old-fashioned and prefer to speak to people over the phone. For me, this has the advantage that I am speaking with an experienced consultant who knows a lot of additional information that is sometimes hard to pick up from the internet, especially when you are using screen reading software."*

A support worker helped with booking some of the tours and printing the appropriate documents and attaching tags to the luggage.

However, two concerns with future access arose. The first was that there was a lack of clarity as to what information would be available in an accessible format during the trip. While some assurances were made regarding important daily information, it was unclear to what extent other incidental information would be accessible:

> *"Upon writing to this office I have received assurance that menus for our cruise will be provided to us in electronic format. It is unclear whether other documentation will also be available."*

The second main concern related to orientation and mobility. As part of the planning stage, Kate looked to familiarise herself with the ship layout. However, the request to obtain maps in an accessible format was unsuccessful, and casually disregarded by staff as a *"wonderful idea that I can suggest to our management"*.

As discussed in the previous section, Kate worked with other members of the research team to construct bespoke accessible maps and plans. These were used in preparation for the trip, in order to build up a cognitive model of the ship. Given their robust nature and relatively small size, they were also taken on board to be referred to when needed. This was especially useful given the lack of accessible maps provided by the cruise company.

The third category of information was that provided by the ship's crew on a daily basis. This typically took the form of a daily newsletter delivered to the passengers each evening. An accessible version could be made available at the ship internet cafe upon request. It would also be made available on a USB drive for Kate's access on her own equipment, however it took 3 days before that promise was actioned. Access to other ad-hoc information was also variable, and often not provided. Requests were either ignored, or there simply wasn't an alternate format available:

> *"The Access Office didn't even acknowledge the fact I wanted the bar lists, the TV information, the contents of the stateroom information pack. These things were completely ignored."*

A particular dilemma for Kate was that it was not always obvious what information was being made available to the other passengers. Without knowing this she could not self-advocate for provision in an accessible format. This was particularly evident when the trip was changed from its original plans as a response to the COVID-19 crisis and critical information was shared about obtaining revised flights home and possible compensation.

> *"A letter was sent to each guestroom with details of what they needed to do to get home. Also delivered was an access code for each person in the stateroom to get 100 minutes of free internet access. Because these were pieces of paper our steward didn't deliver them, because he had been told earlier not to give us any papers."*

In fact, Kate first found out about new flight arrangements and the provision of free internet time for passengers to rebook by overhearing other passengers talking about it. This demonstrated a particular lack of robustness when it came to the tour company's ability to provide accessible information and support all passengers' individual needs in unforeseen and unusual circumstances.

## 6.2 Orientation and Mobility

As indicated above, accessible maps and plans were not made available by the tour company. Instead, these were constructed by the research team. These proved vital, not only for developing a cognitive map of the layout of the ship, but also for building confidence in Kate for the trip.

Confidence was a common theme throughout the travel diaries, and it had the potential to be impacted in a number of ways. However, this theme was strongest in relation to orientation and mobility whilst on the trip, both on the ship and onshore. While there was confidence to do some exploring, it was still acknowledged that *"I don't think there will be many times I will be exploring unfamiliar surroundings alone".*

The preparatory materials were of great importance for building up reliable cognitive maps that would be drawn upon whilst on the ship, allowing Kate to navigate around the ship as she wished. Indeed, one activity Kate was keen to do was explore:

> *"One of the things we would like to achieve on this cruise is to attempt to walk around the outside of the ship – as far as the public areas allow."*

A formal ship tour was provided, with Kate asked to 'self-identify' at guest services. Because of having access to the accessible maps prior to the trip, Kate did not feel that there would be much benefit to the tour.

On the whole, members of the ship's crew and other passengers were very helpful, and even though Kate was confident and well prepared, human guides were still required at times. Despite having a strong cognitive map, she still found herself disoriented at times. This can be common for many passengers, as large cruise ships often have complex layouts with many levels and a reliance on stairwells for moving between levels. Her task was compounded by the lack of accessible orientation and mobility signage on board. While tactile markings and other accessible signage is often present in day-to-day environments, such as office buildings and public spaces, it was lacking on the ship. This was an experience Kate was unfortunately familiar with, and she had her own tactile marker, the plush toy, to attach to her cabin door.

It was with regards to ship mobility that some issues emerged regarding the nature of the help being provided, and Kate experienced conflicting emotions regarding assistance. As she describes:

> *"On this cruise we sat at a dining table that was up one step. It took at least three nights before the staff would let me step down the step without trying to lift me down. I just had to keep repeating, every night, that the cane would show me the step."*

This is a theme explored more with regard to Cultural and Societal Issues.

On the whole, it was seen that airlines appear to have a more formal set of processes when it comes to supporting people with differing needs. Airline staff met Kate at check-in and supported her through to boarding the plane. Even though this is typically the case for airline travel, it can still be challenging. As Kate found:

> *"I had expected that we would find airport security staff floating around near where the bus pulled in, but I was wrong. We wandered around for a few minutes, asking for assistance, getting directions."*

On reflection, Kate believed that her guide dog may have been a benefit for the trip.

> *"Because I had some time with the maps of the ship before the cruise and because I had the maps with me, I wonder whether a guide dog could have been some benefit. Certainly walking around crowded decks, picking my way through tables and chairs and finding lifts and stairs could be easier with a dog."*

| Tool / activity | Internet/ intranet | Comp, printer + screen reader | Braille notetaker (Polaris) | Digital recorder | Smart phone & apps | Remote human assistant (AIRA) | Support worker | Other passengers | Staff | Cane | Maps/ Models |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-trip planning | X | X | X | | X | | X | | X | | X |
| Record of trip (diary, photos) | | | X | X | X | X (for photos) | | | | | |
| Travel to/from ship | | | | | X | X | | X | X | X | |
| Travel on ship | | | | | X | X | | X | X | X | X |
| Onshore excursion | X | X | | | X | | X | | X | X | |
| Onboard activities (recreation, wellbeing, food/drinks) | X | X | X | | X | | | X | X | | |
| Daily news (newsletter) | X | X | X | | | | | | X | | |
| General Info (intranet, TV guide, info, cruisecard, safety) | X | X | | | X | X | | X | X | | |
| Menus | X | | X | | | | | | X | | |
| Rescheduling information | X | X | | | | | | X (over-hearing) | X | | |

Table 1. Activities and associated tools and technologies

While the dog may not have helped with general orientation around the ship or on shore, as Kate suggests, it may have helped with general mobility and helping navigate within cramped spaces.

## 6.3   Tools and Technology

As described earlier, Kate uses a wide variety of tools, and had to decide which technologies to take on the trip. This decision was not simply based on what was needed but also on the weight and size of the equipment. Technology can be a considerable part of a person's luggage when travelling, and for someone who relies on assistive technologies this can be even more so (as described in section 4.3). While not just due to assistive technologies, checked baggage limits were of concern. Kate noted, *"Our next curve ball for the morning was our checked-in luggage. Both our cases were over the 23kg limit"*

Table 1 shows the tools and technologies that Kate used during planning and on the actual trip. It turned out that the Miniguide was not used because of the need to have a spare hand, tricky when travelling with luggage. Some technologies served specific or even new purposes when used in a travel context. For example, the braille notetaker proved important for engaging with other passengers, it being used for playing games such as 'Scattergories'.

The smartphone was an integral, all purpose technology that was used for multiple tasks including information access, taking photos to send to friends and family as well as orientation and mobility onshore with GPS. It was used to finalise arrangements with a support worker hired through Hireup for the onshore trip, provided entertainment in

down times and the use of a real-time remote assistant (Aira). This was of assistance in the unfamiliar environments Kate found herself in on ship and on shore. Kate also made use of TapTapSee on one occasion to identify the correct side of the Clean My Room sign. However Kate was careful to only use the remote assistant when the ship was in port because here she had cheap, reliable internet access through her usual provider:

> "As a lot of people got off the ship we did some exploring. Part of our purpose was to find the salon and to find the ice-cream place. Using the knowledge from our 3D print of our deck, we knew the two venues were at the stern end and on the port side. We walked all the way to the stern, found a couple of possible places, but were not exactly certain. As we were in port, I was able to get my real-time assistant (Aira) to help us locate the two venues."

Lack of cheap internet access impacted Kate's use of her tools. This was especially proven toward the end of the trip when plans were changed and alternate arrangements needed to be made. An unfortunate consequence of this was a significant charge by Kate's mobile phone provider for times when internet access was required and the internet access provided by the travel provider was slow, intermittent and not enough for what was required.

### 6.4 Cultural and Societal Issues

A number of cultural and societal issues emerged from Kate's travel diaries. The most dominant theme related to how Kate's blindness was considered by travel staff and other passengers, especially in regards to Kate's independence. In general staff and passengers were very helpful. There could at times be extremes, with some people offering 'too much' or imposing help, while at other times there may be little to no support at all. This is exemplified in one particular situation:

> "On one day of the cruise I had gone to one of the bars to speak with the Future Cruise staff. As I was leaving I started to head slightly in the wrong direction. The staff member helped me find the correct way and I started to walk off. The man from the couple behind me said something about offering to help me. His wife said: "no, she doesn't like being helped". I turned back to her and said that I don't mind being helped but that I was OK because I had a good idea of where I was going. Her husband came and walked with me to the stairs and I thanked him."

Regarding more formal support offered by the travel company, help came in a very 'generic' manner. For example:

> "I was then advised I should consider wheelchair assistance at the ship terminal. [...] I'm blind, not having walking difficulties."

Similarly:

> "Our cabin Steward introduced himself to us and was very pleased that we had received the large print newsletter."

In a number of examples, the support afforded to Kate gave the impression that all disabilities were treated in the same manner, suggesting a lack of awareness. It suggests a lack of training about how best to support different abilities or lack of consideration as to what advice may be suitable.

> "When getting on and off the shuttles the crew have a tendency to almost lift you bodily, with two or three people on each side. I have had great difficulty explaining that, if they let me use my cane and just direct my left hand where to find a hand hold, I am able to step on and off the shuttle just like anyone else. I have never been able to successfully get this message across."

Also present were some automatic behaviours that are inappropriate for blind people. For example:

> *"Our cabin steward, for instance, seemed to have trouble for a few days about us not being able to see. Eventually he worked it out and would warn us if he had his trolly in the passage. Other staff had trouble, for example when I asked for my bottle of wine to be brought from one restaurant to another, the waiter showed me the bottle to make sure it was the right one."*

Both ship staff and passengers lacked a general awareness of the role of the cane and its use:

> *"Another area where language and communication was difficult was when trying to explain not to take my arm that has the cane in it because the cane is acting as my eyes."*

Issues around equity were also evident. While they were few, there were examples of clearly discriminatory practices. The clearest examples concerned the extra-curricular activities afforded to the passengers. There were on shore tours and programs that imposed very specific requirements that were inequitable:

> *"... at least two tours in Cairns had 'special provision' that stated that blind and deaf people would not be permitted on the tour without a 'carer'. This was extremely distressing... I asked about whether we could arrange for a companion to come on the tours with us. I was advised that they don't allow for companions to assist on shore tours."*

This led to key activities simply being unavailable to Kate and her husband (and any passenger with a vision impairment).

Such examples can lead to increased anxieties or feelings of distress and are of significant importance to any travel provider. During this trip, fortunately, Kate was able to organise her own paid help to support orientation and mobility on shore, which she used Hobart. This helped provide a rich experience whilst on shore, visiting key places of interest, with the help of a local. While this was able to provide Kate with the experience she was hoping for, it is disappointing that such support was available through the tour organisers.

## 6.5 Person-Centred Issues

Aligning strongly with a number of the previous themes are those issues relating to Kate's personal experiences, skills and attitudes.

The desire to be well prepared was strong throughout the early travel notes, especially with regard to orientation and mobility. Kate is a confident traveller, however she still exhibited caution and a strong desire to be well prepared. In particular, the maps and models helped her build a cognitive map of the ship's layout, providing her with confidence in her ability to find her way. It was noted in the diaries that when support would not be available (such as a support person), some reluctance began to creep in:

> *"My feeling is that I'm quite nervous about this first venture [cruise] without either my dog or the support of someone with considerable vision. I guess I'm being over cautious and putting a lot of things in place that may not be necessary."*

Preparation also extended to choice and use of technology, and indeed Kate's comfort with different technologies also provided confidence:

> *"... grateful that I have a reasonable grasp of technology. It would be really frightening to have to rely on others to conduct all these transactions for you."*

As discussed earlier, Kate exhibited a strong preference for engaging with people either face-to-face or on the phone. There did, however, exist an acknowledged internal conflict and competing emotions, between wanting to accept support when offered, but also valuing independence. This was evident within the theme of orientation and mobility, but was broader than this and also occurred when accessing general information on a day to day basis. At times, some reluctance would creep in regarding asking for help:

> *"I felt quite a bit of anxiety and frustration having to go several times to the Guest Services to try and get the newsletter on my USB. I felt as if I was pestering and nagging, but I had been promised them by the Access Office and I just wanted to make it happen."*

The need for strong self advocacy skills also emerged. This was particularly the case for projecting independence and also highlighting to others when interactions were inappropriate or offering 'generic' disability support. While this need was present throughout the trip, there was also a reflection that self-advocacy needs to be conducted with courtesy and a willingness to negotiate:

> *"One thing I try very hard to do is not shun any assistance and I always try to show appreciation. I also don't have any expectation of assistance or demand more than people are prepared to offer willingly."*

## 7 DISCUSSION

We now discuss the issues raised in the last section in a broader research context and also in the context of the travel industry.

### 7.1 Cultural Societal Issues

As was found in [22] [21] [27] [23] other people's attitudes, in particular those of staff, played a critical role in Kate's travel experience. There continues to be a lack of awareness by some staff of the need to provide assistance that supports independence and takes account of the individual traveller's abilities and desires, e.g. the offer of wheelchair assistance at the ship terminal, trying to lift her up the step at the restaurant or providing large print materials when electronic format was specifically requested. It is likely that cultural stereotyping of disability plays a role in this [19]. Clearly, there is still a need for disability awareness training of travel staff. More generally, travel operators need to consider equitable access to travel activities such as tours. It is not acceptable (and likely in breach of Australian anti-discrimination laws) that Kate was not permitted to participate in some on-shore activities.

### 7.2 Information Access

Generally, Kate was provided with adequate access to information before the trip. Notable exceptions were the inability of the cruise company to provide an accessible plan of the ship's layout or to clarify how she would be given access to incidental information such as the room guide. In this regard, Kate's experience compares favourably with the experience of BLV travellers a decade before [22] [21] [27]. However once she was onboard the cruise she found it difficult to access information, which was only slowly provided in an accessible format or not at all. This was a particular issue when it came to information about the cancellation of the trip and the procedure for rescheduling flights.

### 7.3 Orientation and Mobility

Orientation in new environments was clearly a concern for Kate, as it is for other BLV travellers [22] [21] [27] [23]. The provision of maps and models of the ship was clearly worthwhile. Access to the maps ahead of time enabled Kate

to build a cognitive map of the ship before travel and gave her the confidence to independently explore areas that she had avoided on previous trips. Close consultation between the map user and producer minimised the amount of work required and allowed for a high level of customisation. The laser cut and 3D printed maps were particularly engaging, allowing Kate to build a cognitive map while exploring the maps for pleasure. However, the usefulness of the maps was limited by the amount of information made available by the company and the impracticability of site visits. Kate's experience suggests accessible maps (or at least the digital content required to create them) should be routinely offered to BLV customers by travel providers as preparation for travel.

### 7.4 Tools and Technology

Like many BLV people, Kate uses a wide variety of tools. Some such as a cane and guide dog have been used for many decades. Others such as smartphones with GPS and remote human assistants such as Aira are recent innovations and were not available to the BLV travellers interviewed in earlier studies [22] [21] [27] [23]. These have greatly improved information access and orientation and mobility support and have undoubtedly made it easier for BLV travellers. In particular the smartphone fulfilled a wide variety of functions. However, some of the tools are heavy and bulky, meaning that because of weight limitations on her baggage Kate could not pack everything she routinely used at home. This is an equity issue; baggage limits should be increased if required. Furthermore, many of these tools require internet access. Internet access is expensive and slow on board a ship. Again, this raises an equity issue.

### 7.5 Person-Centred Issues

Kate's account clarifies her reasons for travel–new experiences, cultures, intellectual and sensory stimulation. She highly values the ability to travel independently. Kate's experience makes it clear that a high-degree of confidence, self-advocacy and resilience are required if you are a blind traveller even when taking a structured package tour. In this case it was particularly important because, unusually for a BLV traveller [36], Kate was not travelling with a sighted companion. Self-confidence was crucial. Kate's confidence was built up by thorough planning and preparation including the use of maps and models to build a cognitive map of the ship. Confidence leads to strong self-advocacy skills, also essential for independent travel. This, however, comes with conflicting emotions between wanting to accept support when offered, but also valuing independence. Resilience is also crucial; the ability to repeatedly ask for materials in an accessible format or to hire one's own guide for onshore activities.

## 8  CONCLUSION

We have presented an autoethnographic study of a blind independent traveller, Kate, detailing planning for the trip and her cruise around Australia. We analysed her planning notes, field notes and travel diary in terms of five main themes: information access, orientation and mobility, tools and technology, cultural and societal issues, and person-centred issues. Like previous studies into the barriers facing BLV travellers, we found access to information, particularly on board the ship, was difficult. This was compounded by the staff's lack of disability training.

In common with other BLV travellers, Kate prepared meticulously before her travel. Maps and models of the cruise ship created for Kate prior to the trip proved invaluable, allowing her to create a cognitive map of the ship's layout and providing her with the confidence to explore the ship once onboard.

A particular focus of this study was Kate's use of tools and technologies. She used a wide variety. One of the most important travel aids was her smartphone. It was used for multiple tasks including information access, taking photos, orientation and mobility onshore with GPS and accessing support workers and real-time remote assistants. Of course,

more traditional technologies such as a cane were also important as well as specialist tools like a braille notetaker. However, her extensive use of tools raised equity issues regarding baggage weight limits on aircraft and affordable access to the internet when travelling.

A limitation of the study is that the original 28 day trip was reduced to nine days because of COVID-19. However, the nine day cruise covered all of the major kinds of events that would occur if the trip was longer: travel to and from the ship, finding one's way around the ship, activities onboard, and an onshore excursion. The cancellation also provided insight into how well information about unexpected events is communicated to BLV passengers. We hope that Kate's account will help assistive technology researchers to more deeply understand the difficulties that BLV travellers face and the positive way in which technology is helping to alleviate some of these barriers. It also raises important considerations for the travel industry regarding technology and the continued need to equitably support the individual needs and abilities of BLV travellers through appropriate awareness and training. Finally, we hope this research will inspire other blind people to travel: Kate's experience illustrates that barriers can be overcome and that travel is an enriching and enjoyable experience.

## ACKNOWLEDGMENTS

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