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Chapter 11: Virtual and Imaginative Mobility: how do we bring the outside indoors and what happens when mobility is no longer available?

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Running header: Virtual and imaginative mobility

Abstract

There is clear and robust evidence of the importance of going outdoors to the health and wellbeing of older people. However, modern technologies have enabled more and more of the outside world to be brought inside. Though, it can be hypothesised that this is a poor substitute for literally being outdoors, little is understood as to why this is, not how much of the outdoors could be re-presented indoors to give benefits. This chapter briefly gives examples of how new technologies can bring the outdoors inside and potential advantages of doing that to help older people stay connected to other people and the outside world. It highlights what is still missing from literally engaging with the outdoor world, for example the social connection with other people, random-chance encounters with others, over reliance on visual representation and a lack of control. The absence of the mundane in many of the re-presentations of the outdoor world is also evident and this appears to be important in literal interactions with the outside world. Nevertheless, there appears to be great promise in connecting people to the outside world without literally having to go outdoors, especially for those with mobility impairments who are unable to get out and about.

Key words: Technology, virtual reality, environment, ageing, older people, mobility.

1. Introduction

We live in a 'hypermobile' society where high levels of mobility are needed in order to stay connected to communities, friends and family and to access shops and services which have become dispersed across space. Being mobile is linked to quality of life (Schlag et al., 1996). In particular, giving up driving in later life has repeatedly been shown to be related to a decrease in wellbeing and an increase in depression and related health problems and feelings of stress, isolation and also increased mortality (see AAA Foundation, 2015 and Ormerod et al. 2015 for overviews). Older people are more likely than other age groups to have to reduce mobility which can result in spending more time closer to the home and for some becoming 'housebound' in later life is a reality (Musselwhite and Shergold, 2013). Previous research suggests housebound older people not only value social connections but also view connections with nature as being very important (Dowds and Masthoff, 2015).

2. Outdoor space and health and wellbeing

Research has long shown a positive relationship between greenspace availability and peoples' health and wellbeing (De Vries, et al., 2003; Maas, et al., 2006; Maas, et al., 2009a,b). Contact with nature provides restoration from stress and fatigue (Hartig, 2007; Morita et al., 2007). Recent projects have collected continuous objective data, for example Galvanic Skin Response (Jones et al., 2016) and EEG (Tilley et al., 2017; Neale et al., submitted), and have found differences in neural responses to different types of environment. Research has shown that older people experience varying moods, measured as levels of "excitement", "engagement", and "frustration", in different urban environments whilst walking (Tilley et al., 2017). EEG and GSR suggests that older people experience increased arousal in busy streets of mixed use compared to green space (Jones et al., 2016; Tilley et al., 2017). The increased traffic and noise contribute to stress, whereas greenspace offer relief and recovery, which fits restorative environment theory (Tilley et al., 2017; Neale et al., submitted). Much of the research suggests direct contact is important, though what happens to people when they have mobility issues and can't always access the greenspace? Older people are more likely than other age groups to have to reduce mobility, spend more time in the home and neighbourhood and in some cases result in becoming 'housebound' in later life (Musselwhite and Shergold, 2013). Is a view enough to link greenery to positive health and wellbeing? People tend to state preferences for views that have greenery, especially plants and trees associated with them (Kaplan and Kaplan, 1989; Ulrich, 1983 Park and Mattson, 2004, 2008, 2009). Similarly, reduction in stress symptoms arises when people

have natural views compared to urban views, whether in reality or on videotape (e.g. Hartig et al., 2003; Ulrich et al., 1991). The view of natural elements (garden or landscaped areas) from home contributes to residents' satisfaction and mental well-being (Kaplan, 2001). In addition, in a seminal piece of work, people recover better from surgery if they had a view of trees outside their window compared to view of a brick wall (Ulrich, 1984).

Little research has been carried out that examines what elements of the natural environment are important. Musselwhite (submitted) in his work with housebound older people, suggests that the movement element of a view compared to a still-picture, creates a series of rhythms of interaction, between the ordinary and everyday and unexpected changes due to forces outside of individual agency, including strong winds or unexpected road or building works. This variety is important, and random, unpredictable unmanageable, unexpected variety set against a back drop of ordinariness and everyday appears vitally important to the observer. The importance of microscopic nature of elements come across, that the minutiae of detail begins to get noticed as the scene becomes more familiar. Kaplan and Kaplan (1989) developed a theory that suggested people prefer natural scenes that are coherent (unified as a organised whole), legible (extent to how far it can be read and explored without seemingly getting lost), complex (greater number of different elements) and contain mystery and intrigue (contains more information than is visible at present, so long as it does not pose a danger). These preferences are largely found across different contexts and with people with different backgrounds, though there are some notable age differences. Older people have been found to display relatively low preferences for very wild natural landscapes which it has been suggested is to do with their greater vulnerability to potential dangers of wilderness areas (Van den Berg and Koole, 2006). Gehl (2011) suggest that a view from a window in an urban or semi-urban area can enable people to feel a sense of belonging and participation, even at a distance, which is very important for people who cannot physically engage.

Rowles (1978) discusses how many older people become prisoners of space, where physiological decline and economic deprivation coupled with a rapidly changing society, can see older people physical, socially and psychological withdraw. Time spent at home indoors increases in older age: 80% of a day for those aged 65 and over; and 90% for those aged 85 and over (Handler, 2014; Help the Aged, 2006). Sadly, 9% of older people feel trapped in their own home (TNS Loneliness survey, 2014) and 6% of older people (nearly 600,000) leave their house only once a week or less (Age Concern and Help the Aged, 2009). Unsurprisingly, 12% say they feel cut off from society (TNS Loneliness survey, 2014) and 30% say they would like to go out more often (TNS Loneliness survey, 2014). These figures may well increase, the number of people with a mobility impairment in England

is expected to increase by nearly 50% in the next 15 years (Handler, 2014). Older people then reconstruct their world and have deep attachment around a very local space, in many cases, for those very immobile, this is the immediate home environment. Connections to further away places become difficult to achieve in a physical and literal sense, often replaced through recollection, remembrance and imaginative connections (Parkhurst et al., 2014). This may be done through reminiscing, using objects, artefacts and photographs, for example (Rowles, 1978). Technology can support such connections too, telephones, television, radio and also computers can help maintain connections to places now distant (Dowds and Masthoff, 2015).

3. Technology to mimic going outdoors

Musselwhite and Haddad (2010) propose a three tier model to explain older people's motivations for mobility and travel in later life. At the primary level, called the utilitarian level, mobility fulfils practical needs, the need to travel to and from places in order to fulfil obligations at these locations, to visit friends, family, to use services and shops, to visit hospitals. This level also notes the importance of achieving this mobility as cheaply, comfortably and with minimal exertion as possible. Once this has been satisfied, people are motivated by psychosocial needs associated with mobility, for example, by the need for independence, identity, roles and impression management; that being mobile can define something about the person themselves. Finally, a third level, sees older people's mobility motivated by aesthetic needs, for example the need to visit somewhere simply to see, sense, feel or experience mobility or travel itself and be mobile for its own sake, in that there is no direct tangible outcome other than pleasure. Because it is seen as non-vital travel, this level of need is often referred to as discretionary mobility or travel (Parkhurst et al., 2014). However, research has hinted that such discretionary travel is very important for health and wellbeing and actually is far from discretionary (Musselwhite, 2017; Musselwhite and Haddad, 2010; Musselwhite and Shergold, 2013).

Technological interventions for people with mobility problems tend to concentrate on the utilitarian level. For example, provision of formalised timetable information, directions and fare for public transport users, the use of e-shopping or telehealth or telecare to reduce physical journeys out of homes to shops, services and hospitals. However, there is a need to consider how technology might embrace other elements of mobility that are lost when someone is immobile, how it might help meet psychosocial and aesthetic needs for example.

Mobility creates both an immersive relationship of the self in an outside world, and a relative disposition of the self to a world outside. This relationship is both geographical but also emotional and psychological in nature. As such, it fosters a sense of belongingness to the wider social and geographical world. Mobility also enhances social connectivity through a social and geographical co-

presence with others. Mobility affords a randomness that is missing in static or narrated interaction; the scene is live and a balance of not knowing against expectation is noticeable. Finally, mobility also fosters a kinaesthetic experience, of being mobile and experience and feeling mobility (Clayton and Musselwhite, 2013). How might we enable people who are unable to get out and about experience this level of interaction?

We can bring visual pictures to people to help them see worlds they cannot otherwise physically traverse. People can walk along routes they cannot reach through google streetview, now also encompasses many walks not just streets and roads. There is an element of control, of mastery, to the user, if the internet connection is strong enough, allowing you to move along the road, street or path as if you are mobile. But essentially they are a collection of photos where the weather and light stays the same and the trees don't move, for example. Railway carriage mock-ups are found in care homes. "Passengers" can sit and watch the world go by through a window to the outside utilising video footage, complete with having afternoon tea served at their table, all without physically leaving the care home – see <https://www.youtube.com/watch?v=ppmA809yJhQ> . Live webcams allows less control but are essentially more realistic, a snapshot of what is actually happening in the world right now. The advantage of choosing the ordinary or mundane or something spectacular is available here. Watching ordinary or mundane everyday life is growing in popularity with the advent of self-broadcasting websites such as Periscope, the live feature on facebook and via [Twitch stream service](#). A very popular channel on Twitch is watching people doing arts and crafts live. Perhaps the future will have a mass joined up arts or crafts movement with people in separate locations connecting, potentially bringing together their efforts to make a large piece of artwork. Sense of mastery and sense of purpose both at play, without the need to leave the home.

The emphasis on bringing the outdoors in is often on the visual. However, this is at the expense at other senses. The importance of sound is often cited in description of beauty of a scene. The importance of recreating the sound should not be underestimated. Still Walks (see <https://stillwalks.com/>) are a collection of walks in beautiful locations. Although a collection of photographs, the emphasis is on getting the photo right and also on the accompanying sound, the crunching of leaves underfoot as if walking, the birds in the trees, the rain on the muddy ground and so on. Touch is extremely important and is a sense often forgotten. Ultra-haptic technology is being developed to aid people to feel an environment as if it is real – to experience the feeling of a cold metal bar or pushing against something heavy, for example (see <https://www.ultrahaptics.com>). Virtual environments have an opportunity to bring these elements together, perhaps with further senses. The PEL lab (<http://www.cardiffmet.ac.uk/news/Pages/Cardiff-Met-develops-world-first->

[synthetic-reality-laboratory.aspx](#))at Cardiff Metropolitan University is re-creating beach scenes, complete with artefacts of the sea to recreate smell and tactile feeling – seaweed and sand, for example. Similar projects looking at emotional response to tourism using virtual reality to eliciting and measuring emotional responses to nature are taking place at Griffith University, Australia. Acoustics are dealt with, the sound of the sea, the wind on the face using fans, sunshine using lighting, rain using sprinkler systems. But what we still don't know is how important all these elements are to people. Do we need to be going so high-tech? Do we need the sound and the scene to be faithfully recreated and re-presented to as high a standard and as high-a-fidelity as possible? Would something more low-tech do? A speaker that simply played bird song? A basic webcam that helped show scenes from outside? Cathy Treadway and her team at Cardiff Metropolitan University's Centre for Applied Research in Inclusive Arts and Design have developed technology-enhanced sensory textiles to be used in the care of people living with late-stage dementia. One of these ludic artefacts resembled the Aberglasney House's gardens, a favourite place for one of the participants living in the latter stage of dementia. The textures and sounds including a variety of birdsong, sounds of wind in the trees and gurgling water in a stream, helped him and his wife experience "going for a walk together" at his bedside using the blanket. (see <https://theconversation.com/how-designing-smarter-textile-tech-can-help-people-living-with-dementia-59503>).

There are also playful or ludic technologies for bringing the outside world in. The work of Bill Gaver offer a fascinating insight into how technology can be used to re-situate the self to the outside without recourse for utilitarian purpose. For example, [video window](#), where a camera is poitioned high up on a home and the projected live video shown in the home, offering a different perspective on the outside world not previously seen directly from the home. [The drift table](#), gradually shifts around the British landscape and zooms in and out depending on how much weight is applied. The [plane tracker](#) device allows people in the home to take a journey on an aeroplane and follow the journey from start to finish. The [local barometer](#) sends situated adverts from places downwind of the home, a strong breeze sees adverts from further away than a light breeze. All playful and fun, these interactions bringing the outside world indoors offer a chance for people to engage, interact or emotional connect to the outside world in a different way than normal.

4. Conclusion and where next?

In a hypermobile world where we value and champion extensive mobility, how will it feel to be one of the many older people who spend over 90% of their time in the home environment? How do we help them feel or experience mobility when literal mobility may be restricted or impossible? What is important to individuals and how might we reproduce this utilising technology? How might we

measure the success of such technologies? I am lucky enough to be working with a group of academic, charities, social enterprises and businesses looking into answering these questions. If anyone would like to be involved or has anything to share then do contact me.

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