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Developing a multisensory methodology to explore older people's landscape experience in Australian aged-care facilities

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(Accepted 10 September 2021; first published online 25 October 2021)

Abstract

This paper aims to develop a sensory methodological framework to explore older user's landscape experience. Applying empirical experience in Australian aged-care facilities, it addresses a methodological gap in the current literature to help move beyond the current taken-for-granted approaches such as interviews, cognitive mapping, behavioural observation and visual methods. We propose a more holistic method which enables the exploration of older people's *in situ* environmental experience. The multisensory framework we propose here is based on the first author's doctoral fieldwork experience that took place in two aged-care facilities in Brisbane, Australia. Findings suggest this framework facilitates an understanding of users' olfactory, auditory and visual responses to the physical environment, and promotes a deeper engagement with the landscape. We argue that this is essential to promoting good landscape design which genuinely connects with older people's needs.

Keywords: sensory; multisensory methods; aged-care; older people; go-along; digital storytelling; landscape experience; garden

Introduction

The person who just 'sees' is an onlooker, a sightseer, someone not otherwise involved with the scene. The world perceived through the eyes is more abstract than known to us through the other senses. (Tuan, 1974: 10)

People explore a space by using all their senses. As we walk through an environment, we see colours and shapes, smell fragrances, feel textures and hear sounds. People experience a place via visual as well as body movement (Hamilakis, 2014). Our bodily engagement of a place reflects our sensory perception of a place (Rainbird, 2008). This is especially true as a person's landscape experience

is a mixture of various sensory engagements and interactions in a space, using all sensory faculties such as smell, hearing, touch, visual and taste. Therefore, in order to better understand people's experience of place, it is important to include people's sensory response to place. This complex experience requires a methodology that is able to capture people's spatial sensory interaction. This study sheds light on lessons learned from fieldwork experience which led to the development of a multi-sensory framework to explore older users' landscape experiences. What we learned from the field work was the lack of appropriate approaches that offer flexibility and openness to engage older residents' voices in aged-care facilities, in particular in the exploration of older people's relationships to their outdoor landscape environment. The key focus of our study was to propose an innovative methodological framework that addresses the current research gap.

A need to reconsider innovative approaches in research practices

People's perception of a place involves bodily engagement within the space, which develops complex feelings and encompasses all the senses interacting with the space. However, the current conventional methods overlook people's landscape experiences in a sensory way; Sooväli *et al.* (2003) argue for the urgent application of a multiplicity of methods that assist in the exploration of people's sensory engagement of a space.

Interviews are frequently used in research to explore people's landscape experience (Sooväli *et al.*, 2003; Van den Brink and Bruns, 2014). In interviews, researchers set the research agenda, usually asking questions in a structured or semi-structured way. Although an interview is convenient and relatively straightforward to implement, there are also several limitations. The most obvious one in regard to landscape is that the landscape is missing from the research experience. Landscapes can be discussed in an interview, but they are also then abstracted from the research process. We learn how people talk about their experiences of landscape without the presence of the landscape. In addition, Groot Kormelink (2020) suggests interviewees might offer 'socially desirable' answers in this context. According to Diefenbach (2009: 880), there is also the potential for unconscious bias which can disrupt the authenticity of findings.

Influenced by environmental psychology, cognitive mapping as a research tool has also been applied to explore designers' understanding of people-place relationships. According to Downs and Stea (2017), cognitive mapping enables people to reconnect cognitively with their spatial understanding and process spatial information about a specific environment. It has been commonly used in decision making in a design process. One of the advantages of this method is that decision makers can make design choices based on meaningful data created by participants or stakeholders. It is also a way to understand people's perception because cognitive maps encompass participants' spatial experiences and histories. While the process of mapping visually represents the perception of space from each individual, Soini (2001) suggests this method has a limited view of the relationship between humans and the environment. She suggests that mapping is a subjective process, with outcomes related to an individual's viewpoint. Tuan (1974: 209) criticises the indirect relationship to people's sensory experiences during the creation of a map based on an imaginative effort and memories, rather than reality. To understand people's

experience of a specific place, especially a landscape environment, a certain level of physical reality and fact checking are critical. Cognitive mapping therefore has limitations in understanding specific physical information about an environment.

There is an increasing number of studies that have applied participatory visual approaches in the exploration of a place (Schumann *et al.*, 2019). This approach is based on two theoretical frameworks: lived experience and participatory traditions (Dennis *et al.*, 2009). Methods such as 'photovoice' enable participants to identify and take photographs of their neighbourhood or place, describe the images to create a narrative, and then map the photographs and narratives to present their experience to decision makers (Miller *et al.*, 2019). Unlike other spatial exploration methods which are predominantly led by designers (Clements and Dorminey, 2011), participatory visual methods encourage user participation and empower users who otherwise may not be heard. Observation is one of the techniques that is frequently employed within this method. Pope and Allen (2020) state that observational methods have the advantage of understanding people's behaviours in the context of their environment. This method facilitates rich insight and an avenue for researchers to understand the spatial affordances of a physical environment. However, even with these benefits, participatory visual approaches do not holistically explore a user's sensory interaction and responses in the environment. People's sensory response to the world includes more than merely sight as 'seeing does not involve our emotions deeply' (Tuan, 1974: 10).

Since a landscape experience encompasses various senses, it is important to explore people and place relationships from a sensory perspective. Reflecting on limitations of interviews, cognitive mapping, behavioural observation or a solely visual approach highlights the insufficient information about people's senses and their sensory relationships with place, and can lead to bias about the perception of a space.

In recent years, research has applied innovative methods combining visual and multisensory approaches to engage participants in various contexts. For example, Powell (2010) developed mapping as a multisensory research method to explore the sense of place of a world heritage site. In the study, Powell utilised the lived experience of social, cultural and political issues related to place to investigate a culturally diverse community's perception about a specific place. Sensory ethnography is another methodological approach used to study people's sensory experiences in diverse research contexts (Pink, 2011a; Harris *et al.*, 2020). This approach has the benefit of gaining sensory knowledge of people's perceptions about particular research targets. Drawing upon a multisensory mapping project, Kale (2019) explores how refugees in New Zealand develop attachments to places, and how this process influences their health and wellbeing. In Kale's research, multisensory and emotional experiences about the space were discussed to provide insights about research participants' perception. To encourage inclusive participation, Gerstenblatt (2013) combines collage portrait and narrative to create a multisensory interaction in the research process. These methods acknowledge the multisensory nature of human experience and are inclusive to all voices.

One commonality of sensory-focused methodologies is conducting research *in situ*. May and Lewis (2020) suggest the importance of conducting research *in situ* in exploration of environmental experience. Their research highlights the

importance of being within the place to enable detailed descriptions of embodied experiences by research participants. Conducting research using *in situ* approaches can record participants' sensory engagement in the place, as senses can mediate experiences (Rodway, 1994). Harris and Guillemin (2012) suggest embedding sensory awareness in the research process to discover more detailed information of research participants. Sensory exploration adds value to understand people's spatial experiences in everyday contexts (Paterson, 2009). Therefore, there is a need to reconsider innovative approaches in research practices to include the sensory exploration of people's landscape experiences.

A need to explore older people's sensory experience of the landscape

When it comes to engaging with users, it is important to note the power of selected methods. The current understanding of the user's landscape experience, especially older people's experience in outdoor spaces, such as gardens in aged-care facilities, is still limited. Orr *et al.* (2016) highlight the paucity of research about older people's sensory engagement with nature, suggesting more research is needed because 'sensory experiences were important for making them feel connected, being part of "ordinary life" and even belonging to the wider world' (Orr *et al.*, 2016: 12). Research about older people's sensory abilities in domestic space has also been long neglected (Webb and Weber, 2003).

Research suggests that older people like to be involved in the decision making of their living space (Oswald and Wahl, 2013). However, for many aged-care facilities, participation is limited. Boldy *et al.* (2010) suggest the lack of voice for residents in aged-care facilities. Developing a methodological framework that enables users, especially older users, to voice their opinions about the environment becomes important in research in aged-care environments. Wennberg *et al.* (2018) suggest the crucial application of inclusive research methods to engage older research participants and incorporate their voices.

Furthermore, it is increasingly important to understand various users' experiences, especially the outdoor environment for older people (Sugiyama and Ward-Thompson, 2007). Discussion on older people's agency and the meaning of their living environment draws attention to older people's landscape experience (Bhatti, 2006). Orr *et al.* (2016) suggest the importance of understanding older people's sensory experience in order to enrich everyday life and maintain a sense of self for the older population. There are some positive contributions to quality of life if we understand older people's sensory spatial experiences (Parker *et al.*, 2004). Outdoor environments such as gardens provide opportunities to engage with nature as well as to receive therapeutic benefits (Ward-Thompson, 2011; Tsai *et al.*, 2020). This also reflects the importance of having a holistic sensory understanding of older people's environmental experiences. Therefore, there is a need for fresh thinking and new methodologies which value older users' multisensory exploration in a place.

Methodology

In this paper, we consider users' sensory experience to expand our understanding of residents' landscape experiences. We ask: what are the appropriate methods that

assist in furthering our understanding of older residents' engagement of their outdoor living space? In order to answer this question, we combined a series of methods which we believed to be contextually appropriate for both the topic and the participants. A qualitative methodological framework was applied to support the exploration and investigation of research participants' landscape experience. This research is not seeking to 'validate' a new methodological framework. Rather, our interest here is to provide a critical reflection of the fieldwork experience. We draw on the three methods used in the research: unstructured interviews, go-along video-recording and digital storytelling.

While each method has its advantages and disadvantages, the chosen three methods complement each other in exploring participants' landscape experiences sensorily. Part of the purpose for this paper is to remind future researchers that there are innovative approaches which acknowledge participants' decisions on what they feel most comfortable with during the research process. Despite the fact that conventional methods, such as interviews, still have a sound basis in this type of research, we actively explored approaches that would provide a more in-depth understanding of participants' sensory experiences with an intention to remain curious about all possibilities. The rationale for combining the three methods as a multisensory methodology is to allow choice, openness and flexibility for the participants. In our view, the framework gives power back to participants to decide the space where they want to have a voice and to be able to be in the environment at the same time that they talk about that environment.

Caveat

In this paper, the term 'landscape' and 'garden' are used interchangeably. Landscape is seen as the physical outdoor setting for residents' dwelling, as well as an extension of residents' homes. Within the context of aged-care facilities, a landscape can refer to a garden space, a formal garden such as sensory gardens or healing gardens. As our research interests are developed from a phenomenological understanding of the various relationships between people and place, the terminology referring to a space would be relative depending on each individual's interpretation. The research is an analysis of how individuals experience space now and in the past, using the relationship between 'people' and 'place' to unfold the process of landscape experiences.

Research process

A combination of purposeful sampling along with snowball sampling were used to recruit research participants at each site. The first author started with an initial consultation with the management as gatekeepers from each aged-care facility to express our research intention and gain advice on recruitment of residents and staff. After several potential participants were identified by the staff, the researcher was introduced to the residents. Simultaneously, recruitment flyers were included in the monthly newsletters and placed on noticeboards within the facilities. Staff members who were available and volunteered to be part of this research were recruited. After initial interviews, the researcher asked participants to introduce

other residents if they knew anyone who might be interested in participating in this research. The majority of the research participants were recruited via the first few interviewees from their social network. Some participants opted out as a result of time clashes with their other commitments.

Our primary interest was to connect with residents on their terms. The only limitation to that commitment was a result of not including residents with dementia or other severe illness. This research followed the National Statement on Ethical Conduct in Human Research in Australia. We received approval and applied the protocols to work with research participants. This application was approved by our institute. Data in this research were drawn from 40 participants (35 residents and five staff). Among these 40 participants, 12 of them self-selected to engage in all three methods. Participants' involvement in the research was entirely voluntary. After the initial interview, some participants chose to continue and some chose not to.

Typical case sampling was applied in the site selection process. Typical case sampling is a way to sample purposefully in qualitative research (Coyné, 1997). In Australia, the majority of aged-care facilities are low-rise facilities (Hargraves, 2014). Using typical case sampling as an approach, two sites were chosen and are referred to as 'Grevillea Grove' and 'Villa Eucalyptus' in this paper to preserve confidentiality. Tables 1 and 2 show the characteristics of the research participants and the two research sites.

Unstructured interview

We initiated research fieldwork using unstructured interviews with participants. This method was applied to establish relationships. According to Gill *et al.* (2008), unstructured interviews are more suitable when significant 'depth' is required in the research. People's sensory responses to the environment incorporate deeper meanings influenced by the culture or the society (Geurts, 2003). In order to understand residents' sensory engagement in a space, applying an unstructured interview method is helpful to explore deeper meanings reflected upon participants' environmental behaviours. According to Czarniawska (2014), unstructured interviewing provides opportunities to sample dominant discourses. We gathered general ideas about how residents perceived spaces in the aged-care facility and the way they used it on a daily basis. An unstructured interview means interview questions were neither pre-planned nor standardised. Interviewees in this research were involved in a 15–30-minute unstructured interview.

Go-along video-recording

After the initial unstructured interview, every participant was invited to take part in a go-along video-recording. The participants self-selected, and made their own decision whether they would like to continue their involvement in this research or not. Each go-along session was conducted within the specific section of the outdoor environment identified by individual participants to facilitate their sensory engagement with their immediate surroundings. Some chose to conduct go-along video-recording in their own backyards and some took a walk around the facility

Table 1. Characteristics of research participants

Name	Aged-care facility	Age	Status
Rose	Villa Eucalyptus	83	Resident
Billy	Villa Eucalyptus	78	Resident
Joy	Villa Eucalyptus	87	Resident
Kathy	Villa Eucalyptus	73	Resident
Frank	Villa Eucalyptus	73	Resident
Sandra	Villa Eucalyptus	n/a	Staff
Sally	Villa Eucalyptus	n/a	Staff
Nikita	Villa Eucalyptus	n/a	Staff
Anne	Villa Eucalyptus	77	Resident
Daisy	Villa Eucalyptus	82	Resident
Liz	Grevillea Grove	70	Volunteer
Paula	Grevillea Grove	72	Resident and volunteer
Brian	Grevillea Grove	93	Resident
Judy	Grevillea Grove	75	Resident
Brenda	Grevillea Grove	78	Resident
Thea	Grevillea Grove	84	Resident
Gill	Grevillea Grove	70	Resident and volunteer
Aaron	Grevillea Grove	30	Staff
Kevin	Grevillea Grove	79	Resident
Evelyn	Grevillea Grove	76	Resident
Amy	Grevillea Grove	n/a	Staff

Note: n/a: not available.

to discuss the overall landscape. During the walk, participants were asked to take the camera and comment on the environment. The first author asked questions related to their comments while in the garden. The whole process took approximately 30 minutes.

By exposing research participants to a specific space to discuss their landscape experience, it facilitated the spatial interaction and sensory awareness which helped in generating feedback. This process gave participants a voice to describe their living environment. The go-along method is person-centred and place-focused as it explores how research participants' 'everyday lives are rooted in the use of space and places' (Flick *et al.*, 2019: 802). Instead of using only audio, video-recording was combined in the go-along session. It has advantages of representation of residents' real experiences to discover landscape values and meanings attached to a place (Bergeron *et al.*, 2014). According to Pink (2011b: 602), 'the act of taking a photograph involves the convergence of a range of different social, material, discursive, and moral elements in a multisensory environment, rather than being a solely

Table 2. Characteristics of the two research sites, the residents and the staff

Type of care home	Building design	Location	Garden facilities	Residents	Staff
Villa Eucalyptus:					
Private corporate chain, 134 beds, dual registered to provide independent living and low-care assisted living	Purpose-built (1990s) complex, one level for independent living, two floors for assisted living building	Urban, located on a busy road, good local facilities (bus, train and close to shops)	Entrance garden and linear garden at the rear. Accessible garden area via ground floor to independent living	Low physical and cognitive needs. Interview residents between 70 and 85 years old	Some hands-on and involvement of manager, standard hierarchies
Grevillea Grove:					
Not-for-profit run, 128 beds, registered to provide independent living, low-care assisted living and nursing home	Purpose-built (1990s) complex, one level for independent living, assisted living and nursing home	Suburban area, in residential area	Accessible garden area to independent living. Enclosed sensory garden to assisted living and nursing home	Low physical and cognitive needs. Interview residents between 75 and 92 years old	Involved and hands-on manager, standard hierarchies

visual process'. The method provided a way to obtain first-hand insight about residents' sensory landscape experiences. Rather than relying on participants' memories to recall an experience in a different space, go-along video-recording situates research participants within the landscape, surrounded by sensory stimuli such as smells and sounds, which facilitates participants' awareness and interactions.

Digital storytelling

The final method applied to enhance the multisensory investigation is digital storytelling. A digital story is a two-to-three-minute video with 10–20 still images, accompanied by a first-person narrative as a voiceover to tell a personal story. De Jager *et al.* (2017) discuss the benefits of using digital storytelling as a research method as the ability to represent participants' sensory experiences. Digital storytelling is often facilitated in a workshop format, during which participants learn the skills of telling their own stories. Through story circles facilitated during digital storytelling workshops, participants are able to consider the topics/themes and reflect on their own feedback and personal experience with certain issues. In our research context, participants were asked to reflect on their experience of the garden space in their aged-care facilities. However, organising a time when all participants were available was challenging. Therefore, we had to modify the workshop format to a one-on-one style process. Gubrium (2009) recommends that researchers who apply digital storytelling as a research tool should be flexible if participants cannot commit to a concentrated period of time. The whole story-making process took an average of three to five visits to the facility. Research participants prepared their scripts and images about their stories. The majority of participants were willing and able to use a camera. Therefore, most photographs were generated by them. However, there was one participant with minor visual impairment for whom the first author assisted with holding the camera, recorded the voiceovers and helped create the storyboard. Once those components were collected for all participants, the first author completed the post-production stage, compiling the images and voiceover into the two-to-three-minute videos, and presented draft videos to participants for revision.

Digital storytelling is an effective method to represent people's complex experiences (Floch and Jiang, 2015) that results in the creation of stories. Overall, 12 stories were created during the research process. Tangible data such as images, text (scripts) and final videos were rich with meaning and provided important insight for the research. These 'sensory data' (De Jager *et al.*, 2017: 2574) provide contextual information and contribute to the understanding of research participants. In this research context, digital storytelling is applied as a narrative method to explore insights of residents' personal experience, memories and personal history. Stories were collected using an oral history interview style during which residents described their landscape experiences. According to Ritchie (2014: 19), oral history 'collects memories and personal commentaries of historical significance through recorded interviews'. This style enabled in-depth data collection about the lived experience. Narratives about a place explore stories hidden on the experiential dimension of the environment and illustrate how an environment may be expressed by social, cultural, ecological, historical and political voices.

Data analysis

Data gathered from unstructured interviews, go-along video-recording and digital stories were transcribed and extracted for analysis. Thematic analysis was applied as a way to analyse data. According to Clarke and Braun (2014: 23), 'thematic analysis is a method for identifying and interpreting patterns of meaning across qualitative data'. We created and defined various categories based on the data and developed an appropriate coding system. After all data were coded, coding memos were used to describe each theme. Memo writing helped define categories between coding and write-up, which later became part of the description of each theme.

Codes were iteratively refined and categorised based on the topics of content. Qualitative coding is a process by which researchers can identify data that are relevant to specific ideas or are examples of more general ideas or themes (Lewins and Silver, 2007). As the data included rich details about landscape experiences, an iterative process of thematic coding was needed. According to Boyatzis (1998: 29), 'there are three different ways to develop a thematic code: (a) theory driven, (b) prior data or prior research driven, and (c) inductive or data driven'. We followed the third method and developed the codes based on data.

According to Lewins and Silver (2007: 84), 'the general principle underlying inductive approaches to coding is a desire to prevent existing theoretical concepts from over-defining the analysis and obscuring the possibility of identifying and developing new concepts and theories'. Three steps of this inductive coding process were taken: open coding, axial coding and selective coding. Open coding is normally at the beginning of the first round of data and the purpose is to conceptualise and categorise data (Boeije, 2010). In order to reduce the massive amount of various types of data from the fieldwork, the first author selected one of the interviewees' data from three methods in the first open coding step. The aim of this step was to generate conceptual codes from the data (Punch, 2005). While codes were generated, a memo related to each code was created to describe and replace the first themes and sub-themes identified. Finally, data were coded into three different but interlinking themes about how this multisensory framework contributes to the understanding of aged-care residents' perception about their living environment.

Findings

A person's landscape experience should encompass multisensory exploration, bodily engagement or disengagement, and emotional connections to a place. The findings include three key themes that highlight the value of a multisensory methodology to understand more fully how users experience the physical environment. The first theme, multisensory exploration, suggests how a multisensory framework is helpful to obtain varied sensory information. The visual sense was dominant, yet data also revealed strong insight from smells and sounds that more fully described residents' landscape experience. The second theme, bodily engagement and disengagement, relates to the feedback about the physical environment. Through these critical lenses, residents identified engaging and disengaging elements in the garden area. The final theme, emotional connections, focuses on

applying multisensory methods to engage research participants' emotional connection to the space. Multisensory methods help to further investigate residents' attachments to and meanings of the environment. This theme describes how personal meanings of the gardens were connected to the research participants. This approach enables residents to express their significant memories while reflecting on the current environment.

Theme 1: Multisensory exploration

A multisensory method not only represents visual aspects of the landscape experience, but also sound and olfactory aspects. For example, Paula's (a resident from Grevillea Grove) comment about her olfactory and tactile senses in garden spaces of Grevillea Grove not only shows her body movement and interaction in the garden but also her thoughts at that specific moment when she was experiencing the landscape. Being able to touch and smell herbal plants with strongly scented leaves and hairy texture enhances her landscape experience in the garden:

The sensory garden has lots of salvias, things that you wrapped in your hands and you could smell. Smelling was more the sense. But when I go round I do pick some of the things and I will rub them in my hand and get them to smell them. Or I'll rub the lamb's ears [*Stachys byzantina*]. They're just a nice fluffy furry sort of leaf. (Paula, go-along video-recording)

Situated data collection in the garden means research participants can experience the garden elements directly by using their senses such as touching the texture of plants and the smell of the scent from flowers. Their instant reaction reflects users' authentic responses to the landscape. These sensory experiences and reactions are generally not easily recorded in a text format. A multisensory approach reveals all the detailed interactions between residents and the landscape. Gill is a volunteer of the dementia unit in Grevillea Grove. In her digital story, she described the importance of colours, bird sounds and scents in the garden in residents' everyday sensory experience:

Colour is important as it catches their [residents with dementia] eyes initially, especially when sight is impaired. And then when buds are forming, we subsequently follow up and watch for the flowers to open into full bloom. The native bird-attracting plants often allow us to stop and watch as birds extract the nectar, which is always a delight to them ... Scents or perfume of a plant will recall memories and they will tell how mum or dad grows these, speaking as if though they are still in that moment. (Gill, digital story transcript)

A multisensory investigation also allows the researchers to visualise the residents' detailed observations of plants in the garden. Sensory data such as the colours of flowers, the texture of plants, shapes of plants and various shades of green have been captured in go-along video-recording. Villa Eucalyptus resident Sandra used to be a painter. She enjoyed looking around while taking a stroll in the pathway garden of Villa Eucalyptus. In her go-along video-recording, she demonstrated

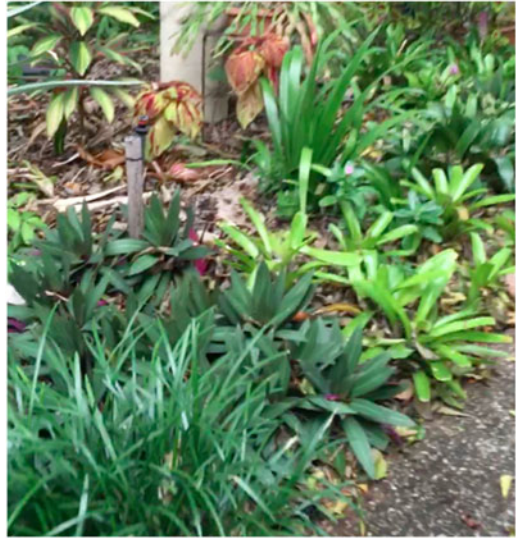


Figure 1. Sandra's view of different shades of green (screenshot from Sandra's go-along video-recording).

how she appreciated the colours and shapes of a plant (Figure 1). Even though there were only green colours, she enjoyed the various shades of green:

Even in that leaf you can see so many colours if you look at them. They're not just green leaves ... See how light it is there and light there and dark there? (Sandra, go-along video-recording)

A multisensory method generates not only sensory data, it also allows residents to express their thoughts and perspectives while experiencing a space. Daisy is one of the residents in Villa Eucalyptus. She described a rich sensory engagement in the garden and commented:

Yesterday during the storm, I sat out on my balcony. The rain was coming in, drifting in and I just sat there. I become part of the tremendous anger. The storm is a wonderful experience, watching the great gum trees out there, swung in the wind. (Daisy, interview)

Multisensory engagement in the Villa Eucalyptus vegetable garden involves growing and harvesting the vegetables from the garden and preparing the food for consumption. Residents in Villa Eucalyptus enjoy the harvest from the garden on their plates:

We've got all types of things here. We've got an herb garden. We've actually planted an herb garden. We've got a worm farm ... Sometimes we've got a few little tomatoes and things like that. If you go around there's rosemary in all sorts of parts of the property, because in those little dry areas rosemary grows quite well. (Sally, interview)



Figure 2. A view from a lounge chair in the dementia unit (screenshot from Paula's go-along video-recording).

Theme 2: Bodily engagement and disengagement

A multisensory approach also provides insight into the need for diverse sensory stimuli in garden design. Some residents have sensory challenges. Joy is slowly losing a sense of smell as a result of Parkinson's disease. By situating the go-along interview in the garden, Joy identified that the perfume from flowers was missing in her landscape experience:

This is a sad thing as you get older, and maybe with Parkinson's, you lose a sense of smell. It's very disappointing. So I wish there was more perfume that I could smell. (Joy, go-along video-recording)

A multisensory approach also opens up the discussion *in situ* when residents' visual engagement is disappointed and compromised. For example, Paula (who volunteers her time to help out in the dementia unit) commented on the window view from the dementia unit. She used the camera to show what residents with dementia can see from a wheelchair (Figure 2). The view from the seats in the dementia unit was obscured, symbolically as well as physically communicating that this garden was 'not for them'.

...you come and sit down here ... but what do I see? Concrete tubs, don't I?
(Paula, go-along video-recording)

Paula requested the need for a more complex landscape, with talking points to engage with residents with dementia (Figure 3):

...that wall over there it's just blank ... They [the dementia residents] are virtually looking at a blank wall in those rooms. (Paula, go-along video-recording)



Figure 3. The view to the outdoor space from the dementia unit (screenshot from Paula's go-along video-recording).

A multisensory approach invites candid responses from residents when they are physically in the environment. In particular, when interviewees were directly exposed to the environment, they would be able to comment openly on what they experienced. For example, a plant can be associated with a bad sensory experience in the landscape. The issues of poor plant selection invite unwanted guests from nature which is a concern for residents' interaction in the garden. Frank's comment shows the environmental design creates an unpleasant auditory sensory experience when palm trees were chosen:

The palm trees are a pain, they really are useless. Why they plant the palm trees ... God knows! All they do is drop fronds all over, they have to be picked up endlessly. And of course, when they seed, the bats come in. We got a big bat cohort here ... dreadful things. They come in and they sit in the palm trees chatter away all night. Make terrible noises. (Frank, go-along video-recording)

Similar feedback about the same types of plants also came from a different aged-care facility. Judy from Grevillea Grove thinks the incorrect choice of plants results in visual disengagement which inevitably compromises her sensory experience:

I think it's wrong to plant these palms. Older people aren't any good at clearing and keeping them trimmed. (Judy, go-along video-recording)

A multisensory approach can also show if the environment is welcoming bodily engagement or the opposite in the current garden design. For example, accessibility issues create residents' disengagement to the outdoor environment, which leads to a nicely designed sensory garden completely idle in the aged-care facility. Grevillea



Figure 4. View of the sensory garden and the ramp.

Grove has its own dedicated sensory garden. However, not many residents discussed the benefits of the sensory garden because of the lack of usage. Stairs to the sensory garden are one of the biggest issues as there are different levels to navigate. Although there is a wheelchair ramp, it is still hard for a resident without any assistance, not to mention those who live in assisted living or dementia units. Paula's perspective as a volunteer also identified the limitations of the current design landscape. She identified the accessibility issues for residents with dementia (Figure 4). When I asked her about the frequency of garden usage, she replied:

Not too often. Some because it's not 100 per cent confident because it's on a slope ... there's a ramp but ... It's too steep. (Paula, go-along video-recording)

Theme 3: Emotional connections

Multisensory methods are highly engaging which can be effective at gaining emotional insight from research participants. Immersing residents in the garden while conducting data collection allows fragrances from the flowers in the garden to stimulate memories. Gill described her experience of walking in the garden with residents who have dementia:

Scents or perfume of a plant will recall memories and they [residents with dementia] will tell how mum or dad grows these, speaking as if though they are still in that moment. (Gill, digital story transcript)

A multisensory method provides a way to explore special meanings of a place to its users. Conducting go-along video-recording in the garden can bring back

memories and invoke emotions. Kevin was a shy resident from Grevillea Grove. He did not talk much in our first few interviews. Kevin and his wife Mary were the founders of the Queensland Hibiscus Society. Their life together included a shared interest in hybridising hibiscus plants. A type of Hibiscus plant, *Hibiscus rosa-sinensis* cultivar, also known as Ken-Mer Rhapsody is an award-winning tropical hibiscus named after them. After Mary passed away, their friends gave him three Ken-Mer Rhapsody shrubs and planted them in Grevillea Grove in memory of Mary. In his story, he discussed three hibiscus plants and the special memories attached to them:

Mary and I, we were very close ... The hibiscus was brought down here in memory of Mary because she owns it ... Even today, being a resident at Grevillea Grove, I am able to go to one of the gardens and tend to a bush of my hibiscus, Ken-Mer Rhapsody. Picking the flowers brings back lovely memories of my dear wife Mary. (Kevin, digital story transcript)

Kathy from Villa Eucalyptus also discussed a similar rationale of why she likes gardens in her aged-care facility during the storymaking process. Her childhood memories significantly influence her current engagement in the garden:

During the war, Second World War, my father and uncles were away in the forces. My mother, aunts and offspring lived in the family home with my grandmother in Griffith Street. This was an age of mass austerity and the family created a garden of food, shrubs and flowers. By age six years, I knew every fruit, vegetable and flower by name and was very much involved in the growing process. (Kathy, digital story transcript)

In some cases, multisensory methods enable residents to discuss personal issues by diverting the focus on the issue, while providing opportunities for more personal interpretation of a place. Immersing herself in the garden with colours and scents, Brenda experienced therapeutic connections with her garden. In her digital story, she said:

I enjoyed many hours amongst my colourful perfumed roses and flowers of every kind. This helped me greatly in the times that I felt lonely or depressed. (Brenda, digital story transcript)

Mixed sensory experiences could bring back memories of loved ones. It is another way to engage with a landscaped garden. By conducting the interviews in the garden, Billy thinks of his late wife every time he sees a certain type of colourful flower:

There are certain things I missed about the garden. I missed Helen. And you know, when you see certain colours, sounds and smell ... You really never forget the sense of smell ... She used to love a plant called cherry pie. It's a purple plant. It's a plant with a beautiful smell. (Billy, interview)



Figure 5. Paula's garden memory in New Zealand.

Paula from Grevillea Grove has also had a similar influence from the shape, colour and scent of flowers. The irises in the garden connects her to special memories of her mother:

...even today when I walk past somewhere when I see half-a-dozen irises in a bunch or something, sometimes I have to keep tears down because it reminds me of my mother. (Paula, digital story transcript)

Senses recall significant memories in life. Olfactory and visual senses of the landscape captured through the multisensory approach also assist with stimulating vivid memories from the past. Paula continued to reflect on her past memories in her digital story (Figure 5):

I had weeping silver birch trees. We put three of those in and I put a bench underneath it, a garden bench, that's where we could sit, and I scattered daffodil bulbs around so when the daffodils came up, you could sit there on the seat. You could just dream, contemplate, it was lovely to just sit there. (Paula, digital story transcript)

Similarly, applying the multisensory approach to explore how residents interact with plants in the garden shows how the sense of touch can also assist in contributing to residents' engagement in the landscape and, moreover, to stimulate

precious memories. *Stachys byzantina*, commonly known as lamb's ear, provides a unique tactile sensory engagement experience. Billy, from Villa Eucalyptus, spent years trying to find a special plant which he used in his garden prior to moving into Villa Eucalyptus. It is a species of *Stachys* with a silver-white fur-like hair coating on the leaves used by the plant to prevent water loss in dry climates. One day he was given this plant as a gift so he planted it in his garden. The gentle feel of lamb's ear recalls a lovely memory for him:

They [lamb's ears] have soft leaves, like Maggie's ears [Billy's pet]. Helen [Billy's late wife] always liked to feel the lamb's ears because this boxer dog we had. Her ears were so soft. Like velvet you know, like a piece of velvet. When I first got these plants, I said to her 'Helen, come and feel these plants' so she felt the leaves and she said, 'oh it's just like Maggie's ears' ... When I feel my lamb's ears, I can feel my dog's ears, you know, because it is so soft. (Billy, interview)

Discussion

The research findings show that residents naturally give feedback about the physical setting when they are physically present in the environment. The combination of three methods in this multisensory methodological framework assists in further understanding of residents' landscape experience in a sensory way. The unstructured interview was a useful tool to create an initial understanding and also very importantly to build rapport. Following up with the go-along video-recording helped avoid potential stresses associated with camera or voice-recorded interviews. As Kusenbach (2003: 456) describes, "go-along" as an ethnographic research tool brings to the foreground some of the transcendent and reflexive aspects of lived experience as grounded in place'. As our findings show, the sensory experience of landscape is interwoven with a rich and diverse set of social meanings which might come to the fore when methods are used which separate the participant from the landscape. The support of using digital storytelling in this multisensory framework also deepened our understanding of residents' landscape experience when participants spoke about their previous experiences and memories related to a space.

A multisensory methodology also retrieves residents' emotional responses from the environment. Landscape is memory and every place has a story. Narratives of a specific place describe people's relationship with a space. Potteiger and Purinton (1998: ix) state, 'narrative is a very fundamental way people shape and make sense of experience and landscapes'. The power of adopting digital storytelling in a multisensory methodology is to enable the user in the environmental design to construct their narratives and turn abstract experience into meaningful relationships with the space. This is often difficult to document in traditional design practices.

Most importantly, the multisensory methodology enables the inclusion of older people who are often absent from the design process of an aged-care facility. Currently, older people who choose to live in an aged-care facility do not usually have a role in shaping their environment in any official design or planning process because the facilities exist before they move in. This methodology amplifies user

voices by providing opportunities to speak for their living environment. The visual images in this methodology reveal multisensory information about residents' disengagement in the environment. According to Powell (2010: 553), 'the visual as multisensory experience also has practical methodological considerations'. Through video-recording and storytelling in this research, residents who participated in this research have turned from passive audiences into active speakers.

Older people's experience in the landscape are multisensory (Orr *et al.*, 2016). In order to gain a holistic understanding of residents' landscape experiences, there is a need to apply innovative methodology to engage research participants. According to Harris and Guillemin (2012: 690), 'attending to the senses offers us potential insight into dimensions that would otherwise remain unexplored'. In this research, a multisensory methodology was developed as a framework to explore older people's garden experiences in their aged-care facilities. It draws on the sensory nature of people's landscape experiences, which means exploring a space by using all possible senses. Our research findings suggest that a multisensory methodology is a more user-focused way to understand residents' landscape experiences in aged-care gardens. Apart from the visual perception of a space, this methodology takes into consideration a user's sensory and bodily engagement in the environment. It generates candid feedback about the physical environment and obtains sensory insights. Sensory data collected from this framework such as olfactory, auditory, tactile and multisensory interactions provide sensory knowledge about the people and place relationship.

Furthermore, our findings also show that there is room in garden design for a more sensory experience creation. It is evident from the findings that there is a need to create more colours in the garden to enhance the visual experience, introducing positive soundscapes in the environment, intensifying fragrances from flowers, expanding the variety of textures, as well as encouraging more edible plants that enable the sense of taste. People's spatial preferences rely on the multisensory elements such as visual and aural senses (Gan *et al.*, 2014). Understanding people's sensory experiences from outdoor objects (such as plants, hard landscaping, garden decoration and benches) and physical spaces (such as gardens or balconies) are beneficial for future design recommendations. Residents' sensory experience could be enriched by a more sensory-oriented landscape design in aged-care facilities.

Research limitations

There are some limitations to this research. Firstly, this research related to two horizontal facilities. The two sites we chose are all individual apartment-style (horizontal) facilities with a maximum of two levels instead of high rise-style (vertical) facilities. As a result of limited urban land, there are increasing numbers of vertical facilities. Therefore, people's landscape experience in vertical facilities will be important to advance our understanding of other design contexts.

In addition, our research did not have a systematic research approach to investigate the sensory engagement of older people with visual impairments in aged-care facilities. According to Wahl *et al.* (1999), visually impaired older people are keen to take part in issues that relate to their living environment. In this research, we had two visually impaired residents from Grevillea Grove and Villa Eucalyptus who

discussed their landscape experiences in their facilities. The strong desire to engage outdoor space and richness of their sensory experience led us to think there is a need for further understanding of the sensory landscape experience of this special group of older people in order to engage their participation in the landscape. We have sought to avoid any conflation of ageing and disability in this research, but we also do not wish to invisibilise disability in our participant group, and acknowledge the need for more disability-focused multisensory research concerning landscape.

Conclusion

People's landscape experience is a mixture of sensory exploration, feelings, ideas and memories which result in multisensory interactions in the environment. As people age, their sensory abilities influence their response to the environment (Webb and Weber, 2003). Therefore, a multisensory methodology would be able to also capture the information that might not be observed in a visual-only or text-based methodology. According to Pink (2006), a sensory methodology goes beyond talk-based approaches. Mason and Davies (2009) suggest that applying a sensory methodology is a creative way to explore the complexity and entanglement of people's perceptions and interpretations of an experience. Applying this multisensory framework opens a door to understand users, social groups and other individuals on everyday sensory experience in the outdoor environment.

Today, we are living in an ageing society. There are increasing demands and services to cater for various types of users, in particular older users. According to Clarkson (2003), designers realise the failure of mainstream design to address design issues related to ageing people and those with disabilities. The increasing awareness of aged-care environmental design in Australia has also highlighted the importance of understanding older users on an experiential level. A multisensory framework provides a way to include older user's voices, experience, thoughts and ideas. It welcomes authentic feedback and responses because it is *in situ*. Being inclusive to older users is a way for environmental design to enhance the liveability and usefulness of the environment (Steinfeld and Maisel, 2012). This framework acknowledges the diverse characteristics of research participants by investigating their sensory and bodily engagement within the environment. It is a more user-sensitive approach in the inclusive design process (Newell *et al.*, 2011). In environmental design, older user's sensory landscape experiences hold the key to the success of an aged-care landscape design. A multisensory methodology emphasised the current residents' sensory disengagement and engagement in their living environment. This framework promotes sensory exploration and understanding of residents' living environment in a new way.

Ethical standards. This research followed the National Statement on Ethical Conduct in Human Research in Australia and received ethical approval from Queensland University of Technology (approval number 1400000675).

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Cite this article: Tsai M, Brough M, Cushing DF (2023). Developing a multisensory methodology to explore older people's landscape experience in Australian aged-care facilities. *Ageing & Society* **43**, 1707–1729. <https://doi.org/10.1017/S0144686X21001471>