

# “Window to the Outside World”: Bringing the outside in to housebound older adults in remote and rural areas

Gillian Dowds

Prof. Judith Masthoff  
Dot.rural Digital Economy Research  
Hub

Dr. Lorna Philip

Gillian.Dowds@abdn.ac.uk

University of Aberdeen, UK  
J.Masthoff@abdn.ac.uk

L.Philip@abdn.ac.uk

## ABSTRACT

Among older adults, the opportunities to remain engaged in out-of-home activities can become compounded by chronic illnesses. This can be particularly detrimental for older adults rendered semi or fully housebound due to chronic health problems, and further exacerbated amongst those living in remote and rural areas. Having little control over one’s engagement with activities in the outside world can increase a sense of isolation and reduce opportunities for independence and well-being. This paper outlines the background research which informed the design of a ‘Window to the Outside World’; an app designed to bring live and recorded, local activities into the homes of older adults who are semi or fully housebound and living in rural and remote areas.

## Categories and Subject Descriptors

H.5.2 [User Interfaces]: User-Centred Design

## General Terms

Design.

## Keywords

Older Adults, Housebound, Remote and Rural, User-Centred Design, Virtual Engagement, Surveillance zone.

## 1. INTRODUCTION

The global increase in the population of older adults brings projections of increases in age-related chronic illnesses [26]. Although an increasing number of older people will experience at least one chronic illness, the majority will remain living in their own homes through personal preference [21] and the current ‘extitution’ model of care [17]. For those with long-standing chronic illnesses and who remain living in their own homes, the ability to get out and about may significantly or even completely reduce, rendering them semi or fully housebound. The opportunities to partake in activities associated with Active Ageing such as getting out and about, involvement in social activities, travelling, experiencing nature and generally feeling connected to the larger world [12] can become further limited. Therefore, as well as having little engagement in out-of-home activities, the sudden or gradual disengagement with people and places can be detrimental to one’s sense of well-being and may potentially lead to isolation and loneliness.

The potential to become cut-off from out-of-home activities may be further exacerbated among older adults living in remote and rural areas. For example, transport policies for older adults in rural areas tend to prioritize ‘utility’ trips (necessary trips such as grocery shopping or health care appointments) over trips for enjoyment, which could improve quality of life for older adults [18]. Furthermore, chronic pain is an example of a chronic illness more commonly and intensely experienced in rural than urban environments. This may be due to having fewer distractions such

as traffic or social activities. Therefore increased social activity, new hobbies and engaging in more stimulating activities are recommended for rural residents with chronic pain [10]. Technology has the potential to offer virtual engagement and new forms of stimulation to older adults who are housebound due to chronic illnesses in rural areas, who may be otherwise increasingly isolated from the outside world.

## 2. RELATED WORK

Using technology to engage with the outside world may be of particular benefit to older adults who are housebound and living in remote and rural areas. User-centred studies have used technologies to address social isolation among older adults through encouraging links between them and their family [13], peers [9] and the wider community [7]. Technologies have been designed for older adults with chronic illnesses to promote communication with family members and friends [6] and to address loneliness [8]. Studies have also been conducted to encourage social interaction among those with chronic illnesses in rural areas [25].

The potential for older adults to virtually engage with places and out-of-home activities have been explored through using technology to promote place attachment [4] and by using remote presence to facilitate a visit to a museum [3]. Although bringing experiences from the outside world into one’s home has been tapped into with older participants, to our knowledge this has not been done in a rural context and among housebound older adults with chronic health problems. This project will address how technology can be used to promote engagement with people, places and out-of-home activities, in an effort to bring the outside in to those who are housebound due to a chronic illness and living in their own homes in remote and rural areas of North-East Scotland.

## 3. METHODS

To inform the design of technology aimed to promote engagement opportunities with the outside world (phase 3), two distinct research stages were firstly undertaken. Institutional ethical approval was granted for both phases and informed consent was provided by participants. Each phase involves older adults (aged over 55). Participants in phase 3 will possibly include some from phase 1 as well as new participants.

### 3.1 Phase 1 Interviews:

Interviews have been used in design studies with older adults to gain a deeper understanding of their attitudes and values [e.g.5]. To obtain a rich understanding of the diversity of participants and to capture how being housebound affects one’s engagement with the outside world, semi-structured interviews were undertaken with 17 individuals (14 female, 3 male, average age 77) living with a chronic illness rendering them semi or fully housebound. The majority of participants lived in remote or rural areas in

North-East Scotland. To overcome recruitment challenges met in phase 1 and associated with housebound older adults [22], a variety of recruitment methods were used, including attending local groups held for older adults, informal chats with residents in remote and rural areas, displaying posters and a press release in a popular Scottish North-East newspaper. Interviews took place in the homes of participants. Interviewing older housebound adults in their own homes calls for particular ethical considerations [16], therefore particular attention was made to ensure that participants understood that the research was not health-care related or for therapeutic value.

Participants were asked about: their ability to get out and about; their attitudes towards out-of-home activities; and the types of activities they missed. Interviews were either digitally recorded then transcribed verbatim or extensive notes were taken throughout. Interview data was analysed using NVivo 10 software and adopting an iterative and comparative grounded theory approach [24].

### 3.1.1 Phase 1 results

Several participants were unable to leave the house unassisted. One participant who had suffered a recent stroke seemed resigned to the fact that his health had impeded his future involvement or engagement with out-of-home activities: *“We’ve no library now. Well we have, I shouldn’t say we haven’t because there’s a mobile comes every fortnight or something but since I had my stroke I’ve never been able to go... In my younger day, as I said, I’d go to the golf and the Highland Society and the church. So there was always something, you’d go out to meetings fairly often. But now it’s all finished for me”* (male).

Many activities which participants were now unable to attend incorporated a social element, such as meeting people when out and about, browsing the shops and going to church, e.g. *“I can’t go to church and that’s the thing I miss more than anything is going to church. It’s such an effort for me to get in a car, get out and then go into the church because I need a wheelchair”* (female).

Other activities reflected more solitary practices, such as fishing, gardening, visiting the beach or going for walks, e.g. *“there was something on the [place name] links one time, I’d love to go there again and paddle in the sea and things but now I can hardly put one foot in front of the other”* (female).

Despite being less able to get out and about, the views out of the windows in their homes were of particular significance to participants, who took regular interest in noticing people passing by, watching birds in the sky or nature in their gardens, e.g. *“I weren’t really into birds at one time... one day I saw this colourful bird, and...I thought it was somebody’s budgie. That had escaped. And I got hold of the bird book...and I looked, and I thought, that’s a great spotted woodpecker!...So then I took an interest and I started noticing - no they’re not all the same!...Yeah I get a lot of pleasure out of the birds”* (female).

## 3.2 Phase 2 Focus Groups:

To gain feedback on an early design of the technology, focus groups were conducted due to benefits including group interaction [14] and their use in previous user-centred design studies with older adults [9]. Continued iterative design with the same group of participants can increase a “sense of ownership” of a technological end-product [23 pg. 1556]. However, due to the dispersed locations and mobility restrictions of participants from phase 1 as well as recruitment difficulties faced in phase 1, focus groups in phase 2 were held with participants who met the age

demographic of end users, yet who were not necessarily housebound or living with a chronic illness. Two focus groups were carried out with older adult members of the SiDE (Social Inclusion through the Digital Economy) panel in Dundee, Scotland (14 older adults, 11 female, 3 male) to gain feedback on the initial concept of the technology.

The initial concept and design of the technology, called ‘Join In’, enabled older adult users to video-call local social events, such as committee meetings or group activities using Skype. The aim of phase 2 was to elicit reflections on the initial concept and design of the application. Focus groups with older adults in previous user-centred design studies have adopted methods such as inviting comments on working prototype devices [15]. As the project was at too early a stage for programming a working device, a power-point presentation of how the application would be used was given and paper prototypes of key screen shots were handed out. Participants were encouraged to note their initial thoughts and comments about the concept and appearance of the application on Post-It™ notes then share their thoughts. The discussions were recorded, transcribed and coded into themes using deductive methods.

### 3.2.1 Phase 2 results

The idea of remotely experiencing out-of-home activities was generally well-received, particularly by one participant who was wheel-chair bound: *“There are places that are **totally unaccessible** to me - if I can’t park at the door I can’t go to them. This would be quite useful for that, I could use it”* (female).

Being able to tune into local activities such as church services was also approved. Participants suggested how watching the activities remotely may lead to more social interaction, e.g. *“that’s a great thing if they can’t get out to them. that’s maybe something that all their life they’ve gone to. **They would maybe be able to get pastoral support or an Elders system or whatever”*** (female).

The main concerns with the technology related to privacy and security: *“Some people may not like the idea of being filmed or watched”* (male).

The results from phases 1 and 2 have informed the design of the technology which will be used in phase 3. Three main findings emerged: 1) the importance of the social element of out-of-home activities, 2) the benefits of viewing scenes/activities out of the windows in their homes, known as the “surveillance zone” [20 pg. 304] and 3) the potential benefits of remotely experiencing local out-of-home activities. Due to time restrictions associated with programming the application, concerns voiced in phase 2 about the end-user being filmed and the existence of previous research addressing social isolation among older adults (see section 2), the application currently focuses on bringing local scenes and activities into the homes of users, with scope to expand the socializing element in future work.

## 3.3 Phase 3 Technology design and implementation:

To enable older adults to engage in more out-of-home activities, the application aims to provide a virtual “Window to the Outside World”. The platform used will be a tablet, as touch-screen devices have been recommended for use with older adults due to its lack of peripheral devices such as a mouse or keyboard [11] and used in other user-centred studies with older adults [9]. We currently envisage four main ‘windows’, each representing a local

activity or scene, including a church service, nature scenes, a beach scene and street scenes (see Figure 1).



Figure 1: Main menu screenshot of “Window to the Outside World” App.

The images of the ‘windows’ will each contain a set of curtains. If, for example, the church service starts at 11am, the curtains will appear to be closed outwith this service time. An image of a ‘notice’ will state the date and time when the church service will start and thus when the web cam will be live again. For the ‘windows’ with live web cams, the curtains will remain open. It is hoped that the use of curtain images will heighten the sense of activities taking place in one’s “surveillance zone”, i.e. the zone which can be seen outside out of their window. To further maximize an *experience* of engaging with the outside world within one’s home, sound will be added to any live footage that is mute, e.g. the sound of waves will be added to the beach cam to promote more of a feeling of being outside at the beach. To support a socializing element of the technology, individuals hosting the church service will be encouraged to extend their usual welcome to involve everyone watching from home, and to invite phase 3 participants to join in with prayers and hymns etc. Ethical adherence will align with the BBC guidelines on filming in the public arena, whereby individuals may be captured, yet will not be purposefully focused on unless they provide consent [2].

When a ‘window’ is selected by the user, e.g. Nature, a selection of web cam options showing footage of local nature spots will appear. Some streams will be live, some will be filmed and made available as soon after as possible. The user can then select which web cam they would like to watch, which will deliver a real-time or recently recorded experience of the activity which the users may not normally be able to attend in-person. Some of the web cams will be set up by ourselves, and some footage will be taken from live feeds online, such as the beach scene [1].

#### 4. FUTURE WORK

This project highlights the importance of collaborative working when designing technology for older adults who are ageing in place [19]. Phases 1 and 2, with strong social science input, have informed the type of application which is aimed to enable participants to remain experiencing activities in the outside world, which they may not normally be able to travel to. Interdisciplinary research in phase 3, with strong computing science input, will ensure that the findings from phases 1 and 2 will not only inform

a new design of technology, but that the design will also be delivered and tested among end-users. Follow-up interviews will inform literature in both the fields of designing technologies with older adults and social science.

Ethical approval for phase 3 is in the process of being obtained. Usability tests will be carried out prior to the technology being deployed in summer 2015. Approximately 8-12 older adults (some of whom may have been phase 1 participants), who deem themselves to be housebound due to living with one or more chronic illnesses and living in rural and remote areas of North-East Scotland will be given the technology to use for 1-3 months. Participants will be briefed and interviewed prior to trialing the technology. They will be visited or phoned intermittently to ensure the equipment is working correctly. After the trial, an exit interview will be conducted. Interview questions will relate to the usability of the application and how often participants used it. Participants will also be asked whether: remote engagement in activities provided a greater sense of connection with the outside world; if the technology acted as a new form of stimulation; and whether they felt any benefit to their sense of well-being. Comments will be gathered relating to the potential for an increased social element to be added.

#### 5. LIMITATIONS

A primarily female participant base may bias the technology towards activities or scenes which females may prefer. A greater effort to recruit males will be made in phase 3, (possibly through the attendance of male-only groups), to ensure the evaluation provides a more balanced contribution from both men and women.

#### 6. ACKNOWLEDGMENTS

We are very grateful to all of the participants in phases 1 and 2 who gave their valuable time and input to this project. The research described here is supported by the award made by RCUK Digital Economy Theme to the dot.rural Digital Economy Hub: EP/G066051/1 and the RCUK Digital Economy Research Hub EP/G066019/1 “SIDE: Social Inclusion through the Digital Economy”.

#### 7. REFERENCES

- [1] Aberdeen City Council. Aberdeen Beach. Webcam. [Online] [http://www.aberdeencity.gov.uk/xwc\\_webcam.asp](http://www.aberdeencity.gov.uk/xwc_webcam.asp) Accessed 05/02/15.
- [2] BBC. 2015. Editorial Guidelines: Section 7 Privacy. [Online] <http://www.bbc.co.uk/editorialguidelines/page/guidelines-privacy-privacy-consent/> Accessed on 11/03/15.
- [3] Beer, J. M. & Takayama, L. 2011. Mobile Remote Presence Systems for Older Adults: Acceptance, Benefits, and Concerns. *Proceedings of Human-Robot Interaction Conference: HRI*, pg 19-26.
- [4] Brunette, K., Eisenstadt, M., Pukinskis, E. & Ryan, W. 2005. Meeteetse: Social Well-Being through Place Attachment. In *CHI '05: extended abstracts on Human factors in computing systems*, pg 2065–2069, New York, NY, USA. ACM.
- [5] Coleman, G.W., Gibson, L., Hanson, V.L., Bobrowicz, A., & Mckay, A. 2010. Engaging The Disengaged : How Do We Design Technology for Digitally Excluded Older Adults ? In *Proc. DIS 2010*, ACM Press, pg 175-178.
- [6] David, J., Gromla, D., Benjamin, A., Birnholtz, J. & Baecker, R. 2011. Living with Pain, Staying in Touch: Exploring the Communication Needs of Older Adults with

- Chronic Pain. *CHI 2011, ACM Work-In-Progress*, pg 1219-1224.
- [7] Ellis, J. B. & Bruckman, A. S. 2001. Designing Palaver Tree Online: Supporting Social Roles in a Community of Oral History. *Proceedings of CHI 2001*. Seattle, WA, April.
- [8] Fokkema, T. & Knipscheer, K. 2007. Escape loneliness by going digital: A quantitative and qualitative evaluation of a Dutch experiment in using ECT to overcome loneliness among older adults. *Aging & Mental Health*, 11: 496–504.
- [9] Garattini, C., Wherton, J. & Prendergast, D. 2011. Linking the lonely: an exploration of a communication technology designed to support social interaction among older adults. *Universal Access in the Information Society*, 11: 211-222.
- [10] Hoffman, P. K., Meier, B. P. & Council, J. R. 2002. A comparison of Chronic Pain between an Urban and Rural Population. *Journal of Community Health Nursing*, 19(4): 213-224.
- [11] Holzinger, A. 2003. Finger instead of mouse: touch screens as a means of enhancing universal access in Carbonell, N. & Stephanidis, C. (Eds.) *Universal Access: Theoretical Perspectives, Practice and Experience*. Berlin: Springer-Verlag, pg 387-397.
- [12] International Council on Active Ageing. 2001-2015 'Overview: The ICAA Model'. [Online] <http://www.icaa.cc/activeagingandwellness.htm> Accessed on 04/02/15.
- [13] Judge, T. K., Neustaedter, C. & Kurtz, A. F. 2010. The family window: the design and evaluation of a domestic media space. *Proceedings of the 28th International Conference on Human Factors in Computing Systems, CHI 2010*, Atlanta, Georgia, USA, April 10-15.
- [14] Krueger, R. A. 1994. *Focus Groups a Practical Guide to Applied Research*. Sage Publications, Thousand Oaks.
- [15] Lindley, S. E., Harper, R. and Sellen, A. 2009. Desiring to be in Touch in a Changing Communications Landscape: Attitudes of Older Adults. In *Proceedings of the 2009 SIGCHI conference on Human Factors in computing systems*, 1693-1702. New York: ACM Press.
- [16] Locher, J. L., Bronstein, J., Robinson, C. O., Williams, C. & Ritchie, C. S. 2006. Ethical Issues Involving Research Conducted With Housebound Older Adults. *Gerontologist*, 46 (2): 160-164.
- [17] Mort, A. and Philip, L. 2014. Social isolation and the perceived importance of in-person care amongst rural older adults with chronic pain: a review and emerging research agenda. *Journal of Pain Management*, 7 (1): 13-21.
- [18] Parkhurst, G., Galvin, K., Musselwhite, C., Philips, J., Shergold, I. and Todres, L. 2013. A continuum for Understanding the Mobility of Older People. In: *45th Universities' Transport Study Group conference*, St Anne's College, Oxford, UK, 2nd - 4th January, 2013.
- [19] Rantz, M. J., Marek, K. D., Aud, M., Tyrer, H. W., Skubic, M., Demiris, G. & Hussam, A. 2005. A nursing and technology collaboration to help older adults age in place. *Nursing Outlook*, 53: 40-5.
- [20] Rowles, G. D. 1981. The surveillance zone as meaningful space for the aged. *The Gerontologist*, 21 (3): 304-311.
- [21] Scottish Executive. 2007. All Our Futures: Planning for a Scotland with an Ageing Population 1: Summary and Action Plan. [Online] <http://www.scotland.gov.uk/Topics/People/Equality/18501/Experience> Accessed on 04/02/15.
- [22] Shearer, N. B., Fleury, J. D. and Belyea, M. 2010. An innovative approach to recruiting homebound older adults. *Research in Gerontological Nursing*, 3(1): 11-10. doi:10.3928/19404921-20091029-01.
- [23] Taylor, N., Cheverst, K., Wright, P. and Olivier, P. 2013. Leaving the Wild: Lessons from Community Technology Handovers. *CHI 2013: Changing Perspectives*. Paris, France.
- [24] Teddlie, C. & Tashakkori, A. 2011. Chapter 16 – Mixed Methods Research: Contemporary Issues in an Emerging Field in Denzin, N. K. and Lincoln, Y. S. (Eds.) *The Sage Handbook of Qualitative Research 4*. USA: Sage Publications, pg 285-299.
- [25] Weinert, C. 2000. Social Support in Cyberspace for Women with Chronic Illness. *Rehabilitation Nursing*, 25 (4): 129-135.
- [26] World Health Organization. 2014. "Ageing Well" must be a global priority. [Online] <http://www.who.int/mediacentre/news/releases/2014/lancet-ageing-series/en/> Accessed on 04/02/15.

**Columns on Last Page Should Be Made As Close As Possible to Equal Length**