

## Background

- With the worldwide increase in dementia prevalence, acceptable and cost-effective home-based solutions are needed to support people with dementia to live well in the community for as long as possible and to delay institutionalisation.
- Ambient Assistive Technologies represent a way of enabling independence and facilitating “ageing in place” by supporting the health, lifestyle, and safety of people with dementia in an unobtrusive manner<sup>1</sup>.
- The Dementia Ambient Care (Dem@Care) toolbox uses a variety of ambient and wearable sensors to provide individualised, person-centred support in five domains (physical activity, sleep, activities of daily living, social interaction, and mood) in multiple care settings<sup>2</sup>.

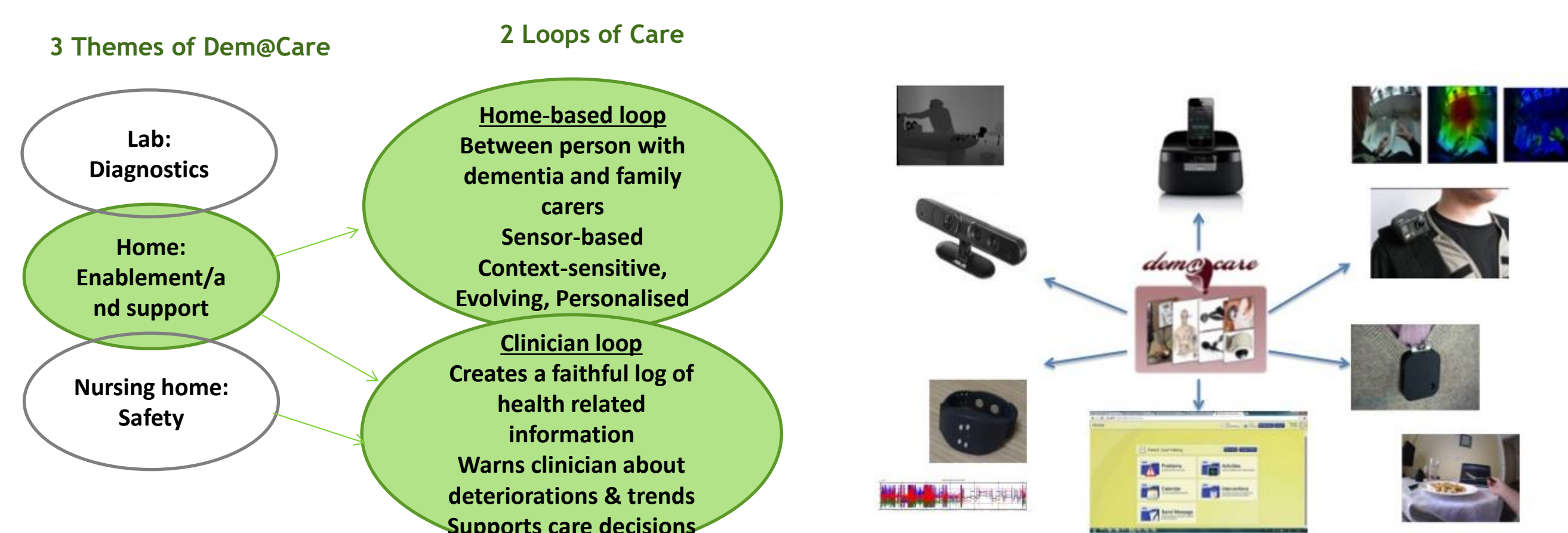


Figure 1. Dem@Care @Home system and sensors

## Objectives

- This study investigated the potential of using the Dem@Care toolbox to support a Cognitive Rehabilitation (CR) intervention.
- CR aims to prevent or reduce excess disability and maximise engagement in activity and social participation, thus improving quality of life (QoL) and well-being<sup>3</sup>. The development of our CR protocol was informed by the research of Linda Clare and colleagues<sup>3-5</sup>.
- The objective of this study was to determine if technology could support and enhance the delivery of a home-based psychosocial CR intervention with people with mild to moderate dementia.

## Acknowledgements

This research has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement 288199 – Dem@Care



## Methods

- Multiple case study design ( $n=6$ ; 3 male, 3 female; Mean age = 77); purposive sampling of people with mild to moderate dementia.
- Each participant took part in 12-14 sessions (90-120 minutes each) in their own homes. Participant consent was established at the outset and confirmed at each subsequent session.
- 4 therapists delivered the intervention; each participant had one therapist working with them for the duration of the intervention.
- Multidisciplinary team meetings were held regularly where the therapists and researchers discussed each case and received input from the team on how best to progress with their intervention.

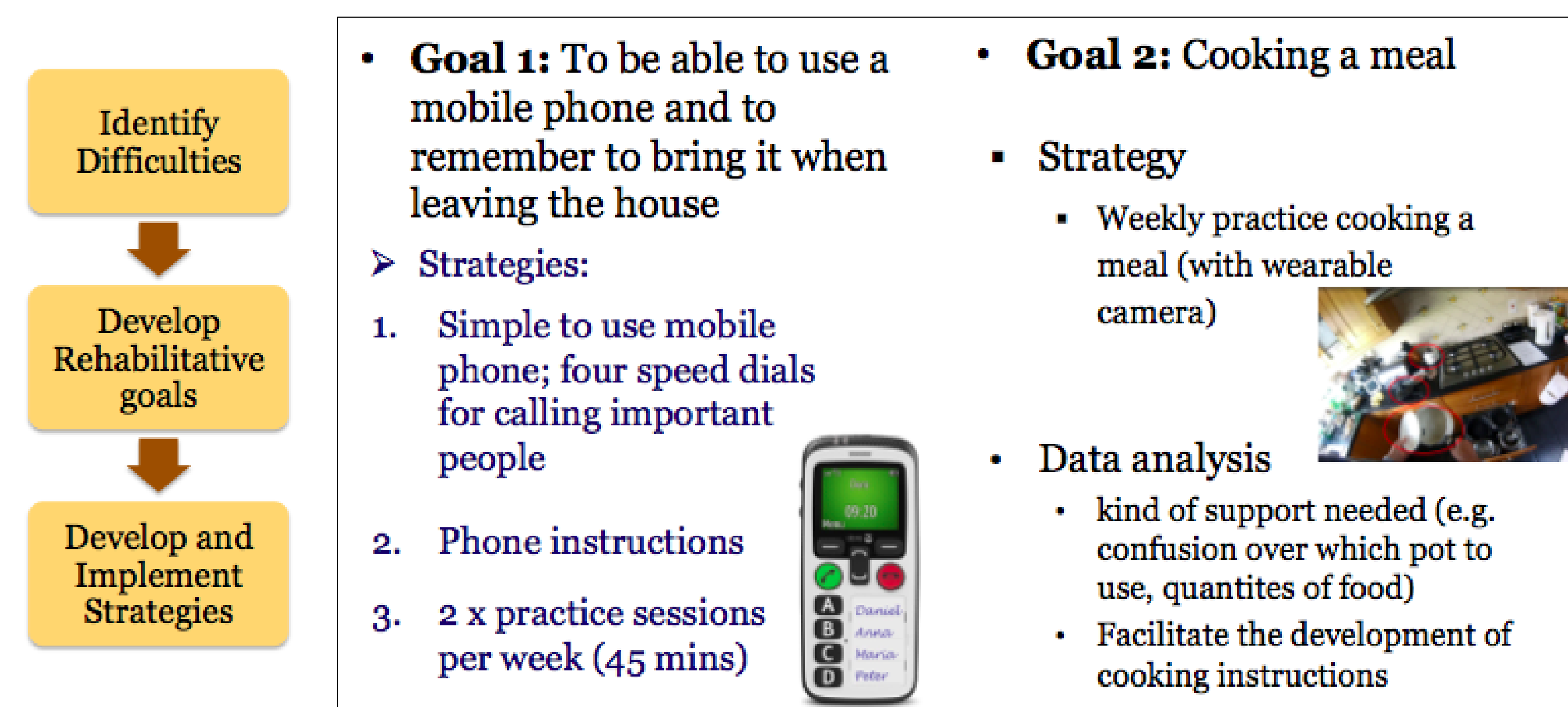
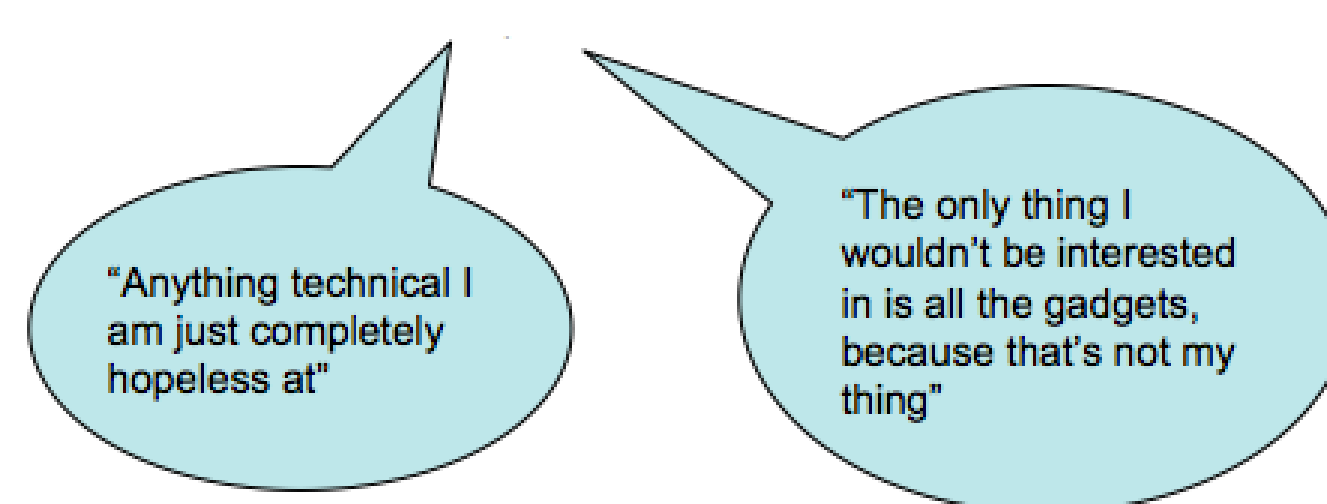


Figure 2. Examples of CR goals and associated strategies

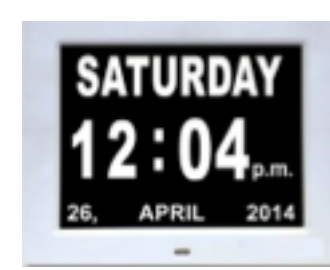
## Results

### Case Study - “Bridget”

- Experiencing time disorientation first thing in the morning/during the night
- Self-confessed “technophobe”



- Strategy:** Dementia-Friendly Clock (or tablet screensaver)
- Clearly-defined goal
  - Low-tech provided the most effective solution
  - Acceptable option for the person
  - Met the needs of the person

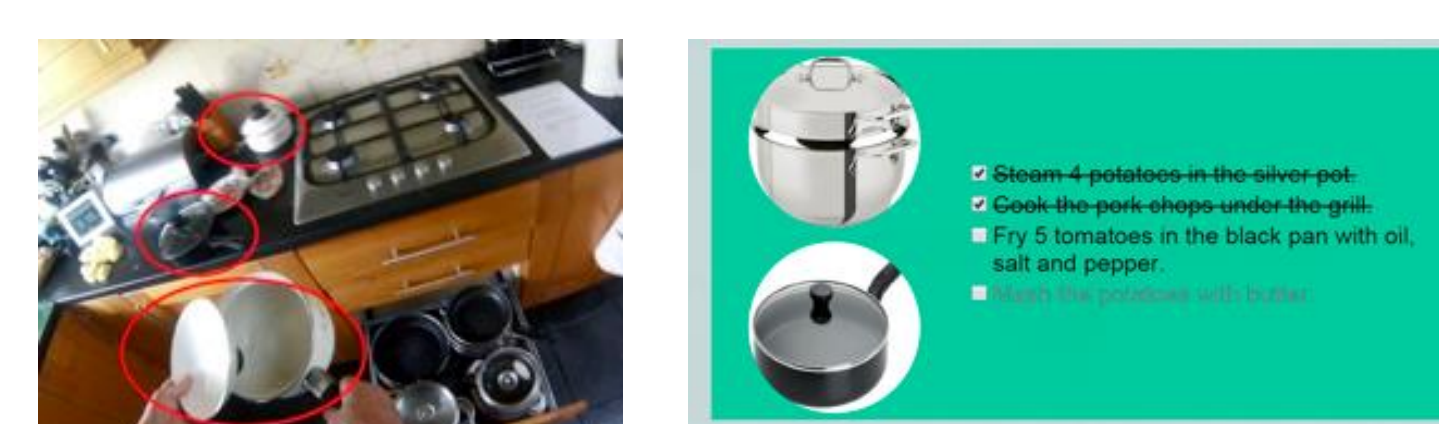


“The clock is really a great thing, it's great because I look at it for the dates and all. I feel kind of in control, do you know what I mean? Like in control of my day, I wake up and I know exactly”.

### Case Study - “John”

- Goal 1: Learn to use a mobile phone
- Goal 2: Maintain ability to cook a meal

- Strategy:** Simple phone, checklists, prompts
- Clearly-defined goals
  - Tasks were recorded in the person's own kitchen and analysed for sequencing errors
  - Audiovisual prompts were created



- But:**
- Very high levels of support were needed from the therapist and from the caregiver (e.g. practice sessions, morning reminders to put the phone in his pocket)

## Case Study - “George”

- Experiencing low mood and anxiety
- Retired IT consultant – analytical by nature
- Wearable activity sensor measured stress levels
- Design issues with strap and confusion with buttons
- Disengagement with technology – missed opportunity

“It was just the frustration of putting on, and getting it to stay on, and by the time you did that, then to remember which button to press or not to press, you were forgetting it... well, I was forgetting it, and reaching for the notes again”.

## Therapist Reflections

“The main challenges at times was the conflict I felt between thinking about the use of technology and just thinking about [PwD] and what he needed. I wanted to stay as true as I could to the aims of the project and yet, wanted to follow [PwD]'s lead in goal setting and his aims. This sometimes created conflict for me and an uncertainty that I was allowing my OT/mental health skills take priority over some more [technology based] work.”

“I feel there may be some occasions when technology can prove useful. However, in general, this experience suggests that human interaction is the primary factor in supporting the person. Thus, any technology is simply another tool to be used in the context of human interaction rather than an alternative to this type of support.”

## Discussion

- Variety of different needs/goals identified by people with dementia.
- Technology is not a “quick fix” to psychosocial problems. There are certain needs for which technology is not a suitable solution.
- Goals well-suited to a technology-based solution were:
  - ✓ Managing confusion/disorientation in the morning (dementia friendly clock, morning/evening checklists)
  - ✓ Feeling more secure when out of the house (mobile phone)
- Goals for which technology was not as suitable a solution:
  - Living as well as possible with a dementia diagnosis (acceptance)
  - Reducing stress and anxiety
  - Increasing social interaction

## Conclusions

- Person-to-person social interaction is important to people with dementia; technology should support but not replace this.
- When considering technology, collaboratively determine:
  - Is technology able to provide a possible solution?
  - Is this the best solution for the person themselves. (i.e. does it play to the person's strengths)?
  - Is the technology acceptable to and easily used by the person?

## References

1. Kelly, P., Marshall, S. J., Badland, H., Kerr, J., Oliver, M., Doherty, A. R., & Foster, C. (2013). An ethical framework for automated, wearable cameras in health behavior research. *American journal of preventive medicine, 44*(3), 314-31
2. McHugh, J. E., Smeaton, A., Irving, K., & Newman, E. (2013). SIGCHI Workshop on Designing For-and-With Vulnerable People: The Dem@Care “Toolbox” Approach.
3. Clare, L. (2007). *Neuropsychological rehabilitation and people with dementia*. Psychology Press
4. Clare, L., Bayer, A., Burns, A., Corbett, A., Jones, R., Knapp, M., ... & Pool, J. (2013). Goal-oriented cognitive rehabilitation in early-stage dementia: study protocol for a multi-centre single-blind randomised controlled trial (GREAT). *Trials, 14*(1), 1.
5. Clare, L., Linden, D. E., Woods, R. T., Whitaker, R., Evans, S. J., Parkinson, C. H., ... & Rugg, M. D. (2010). Goal-oriented cognitive rehabilitation for people with early-stage Alzheimer disease: a single-blind randomized controlled trial of clinical efficacy. *The American journal of geriatric psychiatry, 18*(10), 928-939.