Time travelling with technology

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discuss the use of technology-enriched reminiscence therapy for people with dementia

"Memories are the key not to the past, but to the future" (Corrie ten Boom, p17).

For people with dementia, reflecting on the past can raise their awareness of their personhood. This becomes more and more vital as short-term memory deteriorates.

Responsive behaviours and psychological symptoms of dementia (including anxiety, depression, hallucinations and delusions) affect up to 90% of people with dementia, with distressed behaviours challenging to manage due to communication and comprehension impairments often present in the trajectory (Feast *et al* 2016). This may result in decreased quality of life for people with dementia and their carer, increased self-isolation and higher rates of admittance to residential aged care homes (Cerejeira *et al* 2012; Spector *et al* 2016).

The Time Travelling with Technology (TTT) project is a unique approach to responsive behaviours that attempts to enable people with dementia by working with their existing strengths and abilities to promote wellbeing. This project combines Google Liquid Galaxy (LG) technology and reminiscence therapy (RT) to provide an enhanced carer-driven intervention for responsive behaviours that promotes communication and enhanced quality of life.

The TTT project is a joint collaboration between The MARCS Institute for Brain, Behaviour and Development at Western Sydney University, University of Technology Sydney, BaptistCare, and supported by the Dementia Centre for Research Collaboration (DCRC). Our team is investigating if there are additional benefits of reminiscence therapy when coupled with a high-tech immersive experience.

We conducted two research studies at the BaptistCare Yallambi and Waldock Centres in Carlingford and BaptistCare The Gracewood Centre, Kellyville, Sydney, where the Google Liquid Galaxy was temporarily installed. Wraparound screens displayed still and moving images in high definition to elicit a sense of travelling through space and time for the participants. The experience is non-invasive, enjoyable and engaging.

Week 1 of the Time Travelling with Technology (TTT) intervention familiarised residents with the immersive screens and technology. The technology enabled small groups to travel to 'landmarks' associated with experiences and activities from their early and/or adult life. Here we're viewing Palm Beach and Pittwater from Barrenjoey Head, north of Sydney, Australia

It was not unusual for residents, where mobile, to step up to the immersive display, recall an event elicited by the visual landmark and then gesture to other nearby locations and recall other adventures or activities associated with those locations

Imagine Elaine and Martin, two people living with dementia, given the opportunity to take care staff and family members to visit the neighbourhoods where they grew up. The group is seated in front of a large Liquid Galaxy screen displaying images sourced from Google Maps and Street View. While watching the moving images, Martin directs the group through the intricate maze of London's backstreets by pointing out the direction on the screen as he retraces his childhood journey from the family home to his local primary school, animatedly providing commentary and recalling locations and sites along the way. Martin's eyes widen. He leans forward, approaching the screen as the location of the sweet shop – a regular detour on his route to and from school – comes into view. The group members ask questions, make comments, chat and remember.

Next stop is La Perouse, Australia. Elaine shares her recollections of spending time there with her grandmother who would tell Dreamtime stories while making necklaces from the shells Elaine had collected on the beach. Elaine and Martin's feelings of uncertainty, evident moments before, have disappeared. Everyone is absorbed. Time travelling. Reminiscing.

How does it work?

Reminiscence therapy (RT) uses personal triggers such as music, objects and sound to engage a person's long-term memory, assisting them to recall life experiences (O'Rourke *et al* 2011), to facilitate the ability to talk, reflect and remember events from earlier times (Li *et al* 2017; Dempsey *et al* 2014; Woods *et al* 2018). RT has been used to support people with varying levels of cognitive ability to support communication, reduce social isolation and improve mood (Gonzalaz *et al* 2015; Woods 2009). TTT uses the new engaging technology of Liquid Galaxy and the web resources of Google Earth and Street View to enhance the effect of RT. Locations meaningful to the resident are displayed as life-size, hyper-real, software-rendered images that are navigable through space and time and elicit a sense of envelopment and continuity

(see images on the previous page).

Our research team conducted two TTT experiments, in October 2016 in Carlingford and May 2017 in Kellyville, that compared RT enriched with full immersion envelopment and continuity with a static image control to examine feasibility and evaluate effects on responsive behaviours for people with dementia.

Immersion and dynamism vs static images

Large immersive, wraparound displays were used to present images to resident groups with a facilitator to guide the session (these displays are shown in a short film on the project, available to view at www.youtube.com/watch?v=YK8NF4-vgaI). Each group consisted of three to four residents 'travelling through' pre-loaded Google Earth and Street View landmarks over the six-week intervention. The residents in the intervention condition experienced three immersive and dynamic, personally meaningful locations (such as their first school, family home, favourite holiday destination) displayed on five screens at each weekly session (see image below). The control condition displayed personally meaningful locations as static, large 'postcard-like' images across three instead of five screens (see image above right). This latter comparison condition controlled for immersion and dynamism of the display.

In the 'intervention', personally meaningful locations from Google Earth or Street View were pre-loaded and displayed across five interconnected, immersive screens

Feedback

Feedback from family and staff suggest some reduction in responsive behaviours. For example:

"Thank you so much for doing this; he loves it; he thinks it's amazing how you have all the big screens and take him to places he knows."

"It's lovely, [it's] wonderful for the residents. You know, the other day I was [taking] a resident back from a session [who] is usually quite withdrawn and she said, 'Oh no take me down to the dining room, I feel like chatting after that'."

"Abby loves it. Just to get a smile out of her you're doing well… because she has very… [points to her face demonstrating flat affect]. Coming back in the bus yesterday, as we were pulling back up to the unit she said, 'That was really good'."'

Next steps

Our team is currently working on a technical solution to improve the practicality of TTT by using existing aged care resources (large-screen TV/tablet), to provide an accessible, low-cost intervention to reduce responsive behaviours that has the potential to promote wellbeing. An implementation guide will also be made available later this year to help guide staff in conducting future sessions. The guide will be available to users of TTT free-of-charge from the researchers.

By enabling carer-driven TTT, new technology such as Liquid Galaxy can be enjoyed by the person with dementia and their carers to improve communication, potentially decrease responsive behaviours and provide alternate platforms for conversation to strengthen relationships and reduce carer burden.

Results from the TTT studies are expected to be published in early 2019. For more information on the project and forthcoming implementation guide, contact Professor Kate Stevens at kj.stevens@westernsydney.edu.au ■

A 'control' condition was used to bring into relief differences between the more immersive and dynamic intervention condition with a condition where the visual display and experience was less immersive (three instead of five screens) and static rather than dynamic. All other features of the small group sessions were common to the intervention and control conditions

References

ten Boom C, Sherrill J, Sherrill E (1971) *The hiding place*. Westwood NJ: Barbour.

Cerejeira J, Lagarto L, Mudaetova-Ladinska E (2012) Behavioural and psychological symptoms of dementia. *Frontiers in Neurology* 73. Available at: https://bit.ly/2zsut50

Dempsey L, Murphy K, Cooney A, Casey D, O'Shea E, Devane D, Jordan F, Hunter A (2014) Reminiscence in dementia: a concept analysis. *Dementia* 13(2) 176-192.

Feast A, Orell M, Charlesworth G, Melunsky N, Poland F, Moniz-Cook E (2016) Behavioural and psychological symptoms in dementia and the challenges for family carers: Systematic review. *British Journal of Psychiatry* 208(5) 429-434.

Gonzalez J, Myardormo T, Torres M, Sales A, Melendez J (2015) Reminiscence and dementia: a therapeutic intervention. *International Psychogeriatric* 27(10) 1731-1737.

Li M, Lyu J, Zhang Y, Gao M, Li W, Ma X (2017) The clinical efficacy of reminiscence therapy in patients with mild-to-moderate Alzheimer's disease: study protocol for a randomised parallel-design controlled trial. *Medicine* 96(51). Available at: www.ncbi.nlm.nih.gov/pmc/articles/PMC5758240/.

O'Rourke J, Tobin F, O'Callaghan S, Sowman R, Collins D (2011) 'YouTube': a useful tool for reminiscence therapy in dementia? *Age and Ageing* 40(6) 742-744.

Spector A, Orrel M, Charlesworth G, Marston L (2016) Factors influencing the person-carer relationship in people with anxiety and dementia. *Ageing Mental Health* 20(10) 1055-1062.

Woods R (2009) Reminiscence groups for people with dementia and their family carers: pragmatic eight-centred randomised trial of joint reminiscence and maintenance versus usual treatment: a protocol. *Trials* 10(64).

Woods B, O'Philbin L, Farrell E, Spector A, Orrell M (2018) Reminiscence therapy for dementia. *Cochrane Database of Systematic Reviews* 3. Available at: https://bit.ly/2KKZpCN.

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