Leveraging everyday technology for people living with dementia: a case study

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Abstract

Purpose
To present the self-described ‘journey’ of a person with dementia (Brian; author 3) in his re-learning of old technologies and learning of new ones and the impact this had on his life.

Design/methodology/approach
This is a single case study detailing the participant’s experiences collaborating with a researcher to co-create methods of facilitating this learning process, which he documented in the form of an online blog and diary entries. These were analysed using NVivo to reveal the key themes.

Findings
Brian was able to relearn previously used technologies and learn two new ones. This lead to an overarching theme of positive outlook on life supported by person-centredness, identity and technology, which challenged negative perceptions about dementia.

Research limitations/implications
The paper provides an example of how learning and technology improved the life of one person with dementia. By sharing our approach we hope to encourage others to embrace the challenge of designing and developing innovative solutions for people with a dementia diagnosis by leveraging both current mainstream technology and creating novel bespoke interventions for dementia.

Originality/value
The personal perspective of a person with dementia and his experiences of (re-) learning provide a unique insight into the impact of technology on his life.
Introduction

Dementia is an umbrella term for symptoms that arise from a number of different underlying causes including Alzheimer’s disease, vascular damage and Lewy bodies. The biggest risk factor for dementia is age although the numbers of younger people being diagnosed is increasing. Dementia is primarily a cognitive disorder (DSM-5, American Psychiatric Association, 2013) with the different causes resulting in different profiles of spared and impaired cognitive function, including memory, attention, planning and initiating activities. At this time none of the causes of dementia are reversible and people can expect to live with declining cognitive abilities over a number of years. While the profiles of cognitive impairment vary across the dementia subtypes, the effect is always to reduce a person’s independence leading to reliance on one or more other people to fulfil their needs (Astell, In Press).

Understandably dementia has a major impact on those who are diagnosed and their families World Health Organisation, 2012) and poses major challenges to maintaining quality of life (QOL; Topo, 2009). To date, the medical model of dementia has dominated, focusing on degeneration and loss of abilities (Gilliard, Means, Beattie & Daker-White, 2005; Innes, 2009; NICE, 2007). This view is both deterministic and pessimistic (Kitwood, 1990) and fostered widely held misconceptions that little or nothing can be done to help (Banerjee, 2010; Vernooij-Dassen et al, 2005). This has led to excessive disabling of people with dementia (Well & Dawson, 2000), where an individual with an acquired or congenital condition is disabled to a greater extent than is due to simply having the condition (Brody, 1971). This excessive disabling is due to environmental factors, which include the attitudes and behaviour of those around the person, who for a variety of reasons, take things away from or do not allow the individual to do a range of things for themselves.

However, it is possible to reframe dementia from a psychosocial perspective to provide a theoretical basis for a person-centred approach (Innes, 2009). Person-centredness involves valuing and treating each person living with dementia as an individual, appreciating their perspective and ensuring a positive social environment. This psychosocial approach focuses on retained cognitive and social
abilities, promoting their use to allow people with dementia to function to their full capacity (Kitwood, 1997; Robinson et al, 2010; Wells & Dawson, 2000) and live a relatively normal, enjoyable and active life (Devlin, MacAskill & Stead, 2007).

Finding ‘Non-drug interventions that make a real difference to people’s lives and improve quality of life’ and ‘enable people to maintain their dignity and independence for longer, reducing disability’ is a priority of the UK government (Department of Health, 2013b p.35). Technology is one such intervention that could help improve the lives of individuals with dementia (Cash, 2003). Most developments in this area have been in ‘Assistive Technology’ (AT), i.e. devices or systems that help individuals to perform tasks and increase safety (Royal Commission on Long Term Care, 1999 as cited in Cash, 2003), for example, automatic medication dispensers (Alzheimer’s Society, 2012). Limited technology has been developed specifically to support people living with dementia. Two such are CIRCA (Computer Interactive Reminiscence and Conversation Aid; Astell, Alm, Gowans, Ellis, Dye & Campbell, 2008) and LIM (Living in the Moment; Astell, Ellis, Alm. Dye, Gowans, & Vaughan, 2006), both of which highlight the applicability of ICT for people with dementia and particularly the accessibility of touch screens.

Everyday non-specialised technology, for example, television sets and telephones, also have utility and significance in the lives of people with dementia (Nygård, 2008). Further exploration of this mainstream functionality could go a long way to addressing the pressing needs of growing numbers of people with dementia. However, technology in dementia care raises ethical issues relating to privacy and control (Kinney, Kart, Murdoch & Conley, 2004) and the need to balance the rights and responsibilities of people with dementia and care providers (e.g. use of electronic tagging – see Astell, 2006 for a discussion of this debate).

Currently, the potential of technology to help people with dementia is acknowledged, but not fully realised (Cash, 2003; Robinson, Brittain, Lindsay, Jackson & Olivier, 2009). Specifically, there is a need for more research with people living at home with the early stages of dementia, as most research
has been conducted in residential care when people’s cognitive needs are typically more advanced (Topo, 2009). Furthermore, many technology interventions have been designed to meet the needs of caregivers (Astell, 2006; Schulz et al, 2003; Topo, 2009) rather than focusing on the individuals with dementia (Orpwood et al, 2007).

The subjective experience of individuals with dementia is critical for improving the relevance and quality of dementia care (Department of Health, 2013b; Phinney, 2008). While there are some high profile examples of first person accounts of living with dementia (for example Christine Brydon, 2007, 2012; Thaddeus Raushi, 2001; and Richard Taylor, 2007) there has been limited investigation of the subjective experiences of people with dementia using technology. This case study presents the experiences of a person with dementia and a researcher, working together with currently available mainstream technology. This study investigated the impact of technology use on Brian’s life and how this might translate to other people living with dementia.

Method

Participants

Research participant: Brian (living with dementia)

“I am 63 years of age and I was given a diagnosis of Mixed Lewy Body and Vascular Dementia when I was 60. My background in brief: 1965-1974: Royal Navy; 1974-1982: Hospital porter; 1982-1988: Care Assistant; 1988-1993: Social Care Officer; 1993-1997: Senior Care Officer; 1997-2003: Training Officer. I had a stroke in 2001 and subsequent investigations and assessment in 2008 lead to my dementia diagnosis in 2009. Before my diagnosis my experiences with technology were no different to anyone else - Mobile phone, PC, TV and hoists in my work. Post-diagnosis I had problems with anything with a plug: PC, TV remote control, talking books, microwave, cooker, landline phone and any new technology. My dementia training at work had taught me that new learning was not possible in
dementia, which made me quite depressed. I was referred to the Dundee Alzheimer Scotland Resource Centre where I met Dr Maggie Ellis.”

Researcher: Maggie

“I was working as the Senior Research Fellow on the COBALT (Challenging Obstacles and Barriers to Assistive Living Technologies; www.cobaltproject.org) project, developing tools for increasing awareness, adoption and availability of technology to benefit older adults generally, not just those living with dementia. Part of this work involved taking a novel application – NANA (Novel Assessment of Nutrition and Ageing; Astell et al, 2012) - to an Alzheimer Scotland resource centre to gather feedback from people with dementia. Brian was one of the attendees who agreed to try the NANA system and during the subsequent interview he expressed his wider interest in technology. I invited Brian to become involved in the COBALT project by co-developing strategies with me to help him to re-learn old and learn new technologies. Brian agreed to write a blog for the project based on these experiences as part of this process.”

Co-developed learning sessions

Maggie visited Brian at home 26 times over approximately twelve months with the broad aim of developing a methodology that would allow Brian to re-learn previously used technologies and learn how to operate new technologies that interested him and to maintain the learning. Eighteen of the 26 sessions had a specific objective, of which four were general in focus, e.g. “To teach Brian the basics of using an iPhone” and 14 were more specific, e.g. “To show Brian how to download an App and teach him how to use it”. The remaining eight sessions were designed to ‘re-cap’ information/techniques/tasks that had been previously covered. All 26 sessions involved the development of sets of either written or typed instructions corresponding to each task. Brian and Maggie jointly agreed the order and number of steps required for each task together (see Table 1 for example).
Materials

Brian wrote a blog for the COBALT project outlining his experiences and feelings about re-learning to use old technology and learning new ones and how these experiences impacted on his life. He posted 32 blogs between September 2012 and May 2013, which provided a personal representation of the impact of technology use on a daily basis. Table 1 contains an example of the diary entries provided by both Brian and Maggie outlining the content and purpose of each visit.

Insert Table 1 about here

Data analysis

Brian’s blogs were analysed using NVivo 9 (NVivo), a Computer Assisted Qualitative Data Analysis Software (CAQDAS) by QSR International, to facilitate analysis and reinforce methodological rigour (Sinkovics & Alfoldi, 2012). NVivo formalises the way data are analysed and creates an ‘auditable footprint’, thereby increasing reliability, transparency and credibility (Sinkovics & Alfoldi, 2012 p.827; Sinkovics & Ghauri, 2008). It helps balance the nonlinearity and fluidity of qualitative research, with detailed documentation of the process and ensures that researchers are self-reflective in the analytical process, thinking critically and justifying their decisions (Sinkovics & Alfoldi, 2012).

After carefully reviewing different approaches, a method of analysis based on O’Neill’s (2013) four stages of analysis, which was adapted from Edhlund (2011) and Sinkovics and Alfoldi’s (2012) method, was selected (see Table 2).

Insert Table 2 about here
Procedure

Brian’s blog entries were transcribed manually and imported into NVivo. The sources were analysed and an initial model created. The results were reviewed again and condensed into higher order themes.

Results

Brian was able to relearn to use his desktop computer, for the first time in years, and learn to use a smartphone and a laptop. He re-acquired a number of lost skills, including emailing and also learnt a number of new ones, including downloading and using a variety of apps on his smart phone. Over the sessions he learnt to plan and carry out independent travel, to use PowerPoint and had the opportunity to give a number of talks about his experience in the COBALT project.

The qualitative analysis revealed an overarching theme of ‘Positive Outlook on Life, which was supported by three main themes; ‘Person-centredness’, ‘Identity’ and ‘Technology’. A number of sub-themes contributed to Brian’s overall positive outlook on life.

1. Positive outlook on life

As a result of using technology Brian realised that he could live well with dementia.

“I was just thinking to myself this evening. I have every reason to be positive about my Dementia and how every time I find a square peg, I can nearly always find a square hole to fit it into.” (14/10/2012)

He began to have a more positive outlook on his dementia diagnosis and life generally.

“I realised that recently, some very positive things had happened to me. I was successfully relearning my pre-diagnosis ability to use the computer. “ (14/11/2013)

After his diagnosis Brian had been depressed and negative about his future. He gave up many activities and was particularly disappointed to have stopped using his computer. His mood improved as he re-engaged with technology.
I very strongly feel that any fear or despondency I had previously has been put aside and replaced by a new me. There are so many good things happening in my life, I can face each day with a completely different outlook. (24/02/2013)

Through his blogs Brian documented all of his experiences, including the setbacks and periods when he was unwell. In spite of these, he felt that his life was much improved.

“So at this time I am well and looking forward to future challenges and have to say, the positives are easily outnumbering the negatives through this part of my Journey through Dementia.” (19/11/2012)

2. Person-Centredness

Brian’s family and Maggie created a social environment that supported Brian’s psychological needs. Maggie used Brian’s interests to individualise the intervention for him, recognising his uniqueness, experiences and perspective. Maggie continually assessed the level of support Brian needed and facilitated, enabled, encouraged and empowered him.

“Originally when I first met Dr Maggie she had to go back to the very beginning with me and start with very easy to understand tasks on my computer.” (11/05/2013)

Brian’s wife, ‘S’ and daughter ‘J’ supported him strongly throughout the project and he described how his wife’s approach benefitted him.

“Since the day of my diagnosis, this is how she coped with it. Never questioning, never angry and never lying down to my Dementia. She deals with it face on. She has led by example and this is why I can be so positive about my Dementia.” (13/12/2012)

Encouraged by his successes with Maggie, Brian and S started to work on household technology that he had previously stopped using.
“This week I am being re-trained in our kitchen. S has been concentrating on my use of our Microwave Cooker...With a lot of patience, S is doing a great job and I am slowly getting the idea of safety in the kitchen.” (02/04/2013)

Brian acknowledged the importance of having the support and encouragement of other people in helping him to move forward.

‘With Maggie’s help and my wife and daughter supporting me, I can be so much more positive in the coming weeks and months.’ (10/10/2012)

3. Identity

Brian’s view of himself as a person with dementia changed over the time period as his technology use increased and his confidence grew.

“I only have to think back six months and recall that I could barely use a Television Remote Control. The changes in me are incredible.” (04/02/2013)

Important in changing his view of what people with dementia are expected to achieve was his experience of (re)learning.

3.1 (Re)Learning

Based on his previous training and experience working in health and social care. Brian thought that people with dementia could not (re)learn

“Before I was asked to take part in COBALT I had very little interest in re-learning or in fact learning something new. I thought those days had passed me by.” (11/10/2013)

The use of technology allowed Brian to (re)learn and use skills he had not used since his diagnosis.

“When I reflect on the last ten weeks I am amazed at how much I have learned and re-learned.” (26/11/2012)
This was incredibly important to Brian as it enabled him to carry out tasks again and prove to himself that he could move forward and there was hope despite a dementia diagnosis.

“I sometimes find it unbelievable that I have been able to understand, sometimes complex Instructions, and retain at least some of them.” (14/10/2012)

3.2 Self-image

Brian’s self-worth, -belief and -esteem increased dramatically. He was previously self-conscious about not being able to do things, but technology showed that he could (re)learn and do things independently.

“I am now using modern technology in my everyday living. I can safely operate the Microwave, the digital TV remote control and the door exit alarm system. Things, which I found so simple in the past, are now a great mystery to me. That is until I met Dr. Maggie and I started the re-learning process.” (13/12/2012)

Furthermore, technology allowed Brian to participate and contribute to society through the blog.

“As long as I am doing the blog and know that others are interested, it gives me that extra strength and confidence. Thank you all.” (14/11/2012)

3.3 Confidence

Technology brought back and increased Brian’s confidence both in technology and in life more generally.

“The more I use my new phone seems to further increase my confidence.” (13/10/2012)

As part of being involved in the COBALT project, Brian had several opportunities to give presentations to a number of audiences, which also boosted his self-confidence.

“Other things have happened recently as a result of meeting Maggie such as delivering presentations and public speaking with a new found confidence.” (14/11/2012)
3.4 Independence

Technology use allowed Brian to be more independent, for example, travelling independently, carrying out tasks, and being less reliant on others.

‘My work with the Scottish Dementia Working Group requires me to travel out of Dundee fairly often. My phone carries all my files and information so I can travel lightly. It is also a great comfort to me as I can keep in touch with everyone I need to.’ (13/12/2012)

3.5 Control

Technology use gave Brian back a sense of control and empowered him.

“Today I was on my own at home and decided to watch a D.V.D. “Problem” I had not actually carried out this task for more than 2 years. I have come to rely on other people doing it for me. What used to be a comparatively simple task for me has gone. Before I was involved with the COBALT Project I would have decided to wait until someone would do this for me. Not now!!” (14/02/2013)

It also gave him the tools, for example, the Internet, to find out and understand information.

“I soon got to grips with entering information and realised I was managing to work a bit faster. I put in at least fifty names and numbers and felt really pleased with myself.” (12/10.2012)

4. Technology

Technology itself positively impacted Brian’s life. For instance Brian’s iPhone became an essential part of daily living and he downloaded a number of apps, for example, a daily journal to help keep a record and record daily happenings.

“I am also able to refresh my memory about what has happened recently at the touch of a button…”I make use of the alert mode to help me with my medication times and to remind me of meetings and appointments.” (13/12/2012)
Brian’s computer allowed him to make PowerPoint presentations and enabled him to book transport and hotel accommodation and make online purchases.

“…here I am all ready to use the Internet on the comfort of the couch.” (13/10/2012)

4.1 Engaged

As a result of using technology Brian became more engaged and experienced a renewed interest in life. This started with the iPhone, which ‘captivated’ him and extended to other technologies and life in general, from television programs to his Grandson’s schooling and sports.

“Out today to a family gathering. I could not wait to let them see the latest challenge, which I had started to overcome. They were very impressed (especially my nieces and nephews and my grand-son). I was tired by the end of the day trying to explain “COBALT” to them. So much has happened to me in the past few weeks.” (14/10/2012)

4.2 Social

Socially, technology allowed Brian to re-engage and become an active part of the family again, which also improved his relationships. Social media enabled Brian to keep in touch with relatives and friends all over the world. Such activity was important for tackling the stigma of Brian’s dementia as people could see he was living well and were less wary to get in touch. Brian realised he was not alone and that other people with dementia felt the same.

“I decided to go on to the computer just to see how much work I would be able to carry out. I started by sending out 3 E-Mails to friends and asked them to send me a reply when they received them. Within 1 hour I had 3 replies. I marked that up as another success. I then spent 2 hours on the Internet and did some Family research. I had some good results and was able to link up with people from Ireland, Australia, U.S.A. and England.” (05/10/2012)
Through his blog Brian was included and connected to society and able to help people understand dementia.

“I feel encouraged with so many good people around me to help in my hour of need. I include in this the people who actually read the blog.” (14/11/2012)

4.3 Purpose

Technology use brought meaning back into Brian’s life giving him a purpose, something to look forward to and keep him busy.

“It is my intention to keep posting my blogs. They have become part of my life.” (19/11/2012)

Brian also felt that he was contributing to society, being a voice for people who have dementia and helping other people, particularly through describing his life with dementia.

“My Vascular Dementia appears to be on hold at the moment but my Dementia with Lewy Bodies has been erratic to say the least… I am currently ticking all the boxes for my Dementia with Lewy Bodies. It has been explained to me the unpredictable nature of this Dementia and this is the bit I have problems fully understanding” (04/02/2013)

4.4 Pleasure

Technology also brought Brian pleasure, from using his iPhone to look at photos to reading via the Kindle, which his wife gave him for Christmas. Brian was excited to learn anything new on his iPhone.

He was enjoying life, was a lot happier and brighter.

“…I spent hours basically enjoying using the phone.” (25/10/2012)

4.5 Opportunities

In addition, to these benefits Brian had other opportunities, which he believed not have had if he had not joined COBALT and started using technology.
“I thought those days had passed me by. It also took me into a completely new place. I was transferring my new technology skills into writing presentations and going on to actually deliver them to some well attended Conferences. This was down to Dr Maggie and the confidence she had in me.” (11/05/2013)

Two main opportunities were public speaking and being on the National Committee of the Scottish Dementia Working Group (SDWG).

“I have been elected on to the National Committee of The Scottish Dementia Working Group. This organisation is run by people who have Dementia. The committee represents others who have Dementia and their carers. The S.D.W.G. are funded by Alzheimer Scotland. The committee has a keen interest in the political departments who have any interest in Dementia Strategies. Being a newly elected member I will have to give a presentation to the rest of the existing Committee.” (19/11/2012)

Brian was able to participate because of his positive outlook gained from technology use. These opportunities further increased his positive outlook by increasing his confidence, sense of achievement, pride, value and self-worth.

“These days I am been made to feel so included that my self-worth has increased greatly.” (4/02/2013)

5. Setbacks

Like most people Brian sometimes found technology difficult and frustrating and he experienced a number of setbacks, which detracted from his positive outlook. His dementia also affected him at times, which he wrote about with great clarity.

“I do still have very dark days when I do not retain much information and I can become very confused sometimes.” (12/10/2012)
After one period of three or four days when it was difficult to remember things, Brian found that when he next worked with Maggie he was able to pick it back up.

“I am thankful that I am able to use the computer and the phone, so obviously most of my newly learned skills have been retained. This is very important to me, as it is the opposite of what has been happening to me in the past. I see this as a positive experience.” (02/10/2012)

Brian was able to overcome the setbacks and persevere through the support he received, the realisation that he could (re)learn and his attitude.

“…occasionally I will have these “temporary blips” but when they happen now I know help is at hand.” (02/02/2013)

In addition to the themes relating to Brian’s experience, the analysis identified one further theme of importance for making technology more widely available to other people living with dementia, that of the low expectations and negative beliefs held by other people.

6. Challenging negative perceptions

Brian reported several examples of other people being surprised or amazed at this regained abilities and the way he was able to learn new technologies.

“I spoke with my Consultant last week and he was delighted to hear how successful Dr Maggie has been in such a short time. To be honest, he looked astonished when I demonstrated the use of my IPhone.” (11/05/2013)

His experiences confirm that the people around individuals with dementia often have very low expectations about what they can do.

“Friends, relatives and even some carers have said that they were sure that a diagnosis of dementia would leave me without these skills forever. Some of them have been shocked to see me use me use an iPhone. Especially, when I know when they cannot use one.” (13/12/12)
Discussion

This study aimed to investigate the impact of an individual with dementia working collaboratively to re-engage with technology and examine the impact of this on his life. The first finding was that Brian was able to relearn to use technology he had previously used, particularly his desktop computer. In addition, he became a confident user of a smart phone and a laptop. Qualitative analysis of his blog posts during the project revealed that technology use produced an overall ‘Positive Outlook on Life’ for Brian, comprising three main themes: ‘Person-Centredness’, ‘Identity’ and ‘Technology’. This study contributes to the currently limited research on the subjective experiences of people with dementia using technology. It highlights the potential of technology to improve subjective quality of life and make a real difference to the people living with dementia.

Person-Centredness was very important in contributing to the positive impacts of technology use in Brian’s life. This illustrates the importance of a psychosocial approach (Brooker, 2007; Kitwood, 1997) and highlights that interventions may be most effective when implemented in the context of Person-Centredness. Furthermore, Person-Centredness provides a way of managing ethical issues by focusing technology use on the needs of the individual and not on motives such as filling gaps or priorities of care providers, which may conflict with those of the individual (Astell, 2006).

Person-Centredness has been criticised as an overused and ‘woolly’ term, which ‘is often so difficult to achieve in practise’ (Brooker, 2004 p.221). There are only a few empirically rigorous studies looking at Person-Centred interventions and the subsequent impacts on people with dementia (Edvardsson, Winblad & Sandman, 2008). The current study provides a working example of Person-Centredness by working collaboratively with a person with dementia at every step of the process. Individualising the support offered to Brian was central in this study. Therefore, when applying technology use to other people with dementia and deciding what, if any, technology is most appropriate, it is important to consider the individuality of each person (Nygård, 2008), recognise their
retained abilities (Gillard et al, 2005; Wells & Dawson, 2000) and ensure that they are central in making decisions (Alzheimer’s Society, 2012). In Brian’s case, this was evident in the co-development of the learning sessions and the structure of steps agreed by both parties. Other people with dementia may be less interested and committed than Brian and will have different needs and views and as with the population at large, technology might not be suitable for everyone (Alzheimer’s Society, 2012).

Future research into the subjective experiences of people with dementia using technology, including other dementia subtypes, should inform how technology could be most effectively used. The findings also demonstrate that people with dementia can (re)learn if appropriate techniques are used, supporting previous findings (Bier et al, 2008; de Werd, et al, 2013). Additionally, the process of (re)learning was an important part of technology use that contributed to the positive impacts. Previous studies have highlighted the desire to learn and the meaning and positive impact of (re)learning in people with dementia (Beard, Knauss & Moyer, 2009; de Werd et al, 2013). However, as shown in this study, a high level of support was needed, which must be balanced against the benefits. Other research also highlights that training and on-going technical support is vital (Kinney et al, 2004). Therefore, a key recommendation is that, if possible, other people with dementia should try and be encouraged to (re)learn, using appropriate teaching methods and support, such as the approach developed here. As Brian’s experience highlights, the benefits of (re)learning are not restricted to technology use. Future research into the most effective learning techniques in people with dementia should identify how these can be applied most successfully to a whole range of interventions to enable people to live well with dementia.

The present study confirmed that technology can have an impact in dementia care beyond safety and security and improve subjective QOL, helping people with dementia to enjoy life, remain active and involved (Marshall, 2001; Orpwood et al, 2007; Topo et al, 2004). Furthermore, the potential for everyday non-specialised technology to have positive impacts was highlighted, supporting the results of Nygård (2008).
Brian’s example will hopefully provide hope and encouragement for people currently living with dementia and their families that it is possible to influence life after a diagnosis of dementia. Brian is just one individual and as such, his experiences with technology, both before and after his diagnosis are unique. However, we hope that by sharing his experiences with technology both here and on the COBALT blog, other people will start to challenge the low expectations and negative perceptions of what is possible once someone has a dementia diagnosis.

Excess disability was first described in the 1970’s but its relevance and appropriateness in describing the experience of people diagnosed with dementia is just as important today, as indicated by the negative reactions Brian encountered during the project. With the current political drive to reduce costs and demands on health and social care services by people living with dementia, tackling excess disability is now essential. Intervening to maintain people with dementia to function as well as possible will delay demands on families to provide care and also reduce demands on formal care services.

Harnessing the functionality and capacity of technology is a key part of achieving this and the first prong of our call for more researchers to turn their talents and scientific skills to developing solutions for people living with dementia.

In making this argument we are not proposing that technology is a panacea for all of the challenges faced by people living with dementia. Rather, we suggest that technology should be an increasingly important part of equipping people to live as well as possible after receiving a dementia diagnosis. At its most basic technology can provide prompts and reminders to assist people with their daily activities. As Brian’s example demonstrates, technology can also support the maintenance of independence, i.e. doing things for himself rather than having to rely on someone else, for example booking travel and travelling independently.

Additionally, digital technologies can support people living with dementia to meet their higher-level needs for autonomy, pleasure and fun (Astell, 2013), for example through engaging and meaningful activities (Astell, Alm, Dye, Gowans, Vaughan & Ellis, 2014). The technological functions that support
social interaction for the wider population, including email, FaceBook™, and Skype™, can also be of major benefit to people living with dementia, as is starting to be recognised elsewhere (Hori, Furuya Kubota, Koike, & Kinoshita, 2011).

In future we can expect technology to be much more involved in delivery of care and supporting self-management, due to generational effects and the increasing numbers of people, like Brian, being diagnosed at a younger age (Levine, 2013). Cognitive prostheses were originally proposed to enhance the cognitive abilities of everyone, although their potential application to people with cognitive impairment is possibly even more appropriate (Astell, et al., 2008). Unfortunately there are very few digital activities designed specifically to meet the needs of people with dementia and this is the second area where we would encourage other researchers to bring their creativity and innovation to bear.

Combining current and future digital functionality and hardware with understanding of the cognitive profiles of the different dementia subtypes opens up a whole new world of opportunity to enable people to live a good life with dementia.

Limitations

Generalisation of findings from a case study is difficult in terms of other people with dementia, who may have different types and stages of dementia and of course each person and their experience is unique. However, key findings and principles from this study can be a starting point for working with other people with dementia. In future studies, a combination of qualitative and quantitative measures could be used, for example, QOL measures at the start and end of the study.

Conclusion

To conclude, this study has demonstrated that technology use is not only possible but can be meaningful and beneficial to a person with dementia. The experience of re-engaging with technology had a positive impact on the life of an individual with dementia and contributed to an overall ‘positive
outlook on life’. Other people with dementia might also benefit from a similar approach that is individualised, in a person-centred context with appropriate teaching methods and support.

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### Table 1. Example of a co-developed learning session from the perspective of both Brian and Maggie

<table>
<thead>
<tr>
<th>Visit number</th>
<th>Date</th>
<th>Brian’s perspective</th>
<th>Maggie’s perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>26/09/12</td>
<td>We worked on my Desktop Top computer after you had shown me how to switch it on then assisted me to log on. At this early stage I had forgotten the very basics. You worked very slowly when explaining the skills I would need to operate the computer. You also suggested to me that perhaps it would help if everything you taught me should be also written down so that I could refer to it when I was alone. You taught me that day how to send E-mails and also how to send work attached to E-mails. It took me some time to understand this but I did send you an E-mail while</td>
<td>Objective: To introduce Brian to the idea of writing a blog. The COBALT team had decided that we might ask Brian to write a blog for us detailing his experiences of using technology. Brian agreed in principle and we decided that the first thing we would do would be to reintroduce Brian to using his PC. Brian had mentioned that he had lost confidence in using his desktop PC. For example, he used to make personalised greetings cards and has recently given this up as he doesn’t feel able to do it anymore. I started slowly with Brian, showing him how to get started with switching the PC on and signing in, etc. He mentioned that he had forgotten how to send emails so I started by</td>
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you were standing beside me and I did manage this successfully. I then sent you an attachment. You demonstrated to me how I might send photographs and blogs. BLOGS?????? So you then explained what a blog was. As I said previously you wrote everything down so that I may refer to it when you were not there with me. I was very eager to get started and decided that night to write and send my very first Blog for Cobalt.

reminding him how to do this. It became clear that Brian would benefit from having a set of instructions available to him each time he went to use his PC. He could refer to these when I had gone and this would allow him to work independently and to rehearse the procedures involved.

Method:

I wrote a set of set-by-step instructions down on his notepad as we worked through them, e.g. Switch PC on Logon using your password Double click on the ‘mail’ icon, etc. Brian and I decided that it would be good practice for him if I sent him an email from my iPhone, there and then. As he had agreed to write a blog for COBALT I asked if I could take a photo of him on my iPhone so that we could use it on the
website. Brian agreed and I took a photo of him sitting at his PC and then emailed it to him. I then showed him how he could save the photo to his PC and send it as an attachment to an email. Brian and I did this together and he sent me a further email later that evening by himself with another photograph attached.
Table 2. Data Analysis Stages based on O’Neill’s (2013) Method

<table>
<thead>
<tr>
<th>Stage</th>
<th>Steps</th>
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| 1: Descriptive | Project details were entered into NVivo.  
Data sources were imported into NVivo and attributes, values and classifications were assigned to the data (O’Neill, 2013). |
| 2: Topic  | The research question guided the analysis. Coding involved grouping related concepts and organising them into nodes, with initial nodes seen as ideas or topics (O’Neill, 2013).  
Models and graphs of the nodes were created outside NVivo. These allowed reflection on developing aspects and helped identify emerging higher order themes (O’Neill, 2013).  
Whilst technology may have had an impact, other variables, known as rivals, could also have contributed. Therefore, topics and nodes were created for potential rivals. Yin (2009) describes a number of different types of rivals, for example, craft rivals that include the null hypothesis, threats to validity and investigator bias and real-life rivals including direct, commingled and implementation rivals. |
| 3: Analytic | Nodes were merged into hierarchies, sets, models and relationships to create higher order themes (O’Neill, 2013). This was firstly done in NVivo. The results were then transferred into MW, reviewed again and condensed into higher order themes.  
The tool ‘memos’ was used in NVivo, which allows interpretations to be documented separately but linked to the material being analysed (O’Neill, 2013). |
| 4: Conclusions | Theories and models were developed from the analysis.  
Diagrams were useful to illustrate the findings. |
Figure legends

Figure 1a, CIRCA interface

Figure 1b, LIM interface – musical chimes