University of Worcester

EVALUATION OF THE IMPACT OF TOUCH SCREEN TECHNOLOGY ON PEOPLE WITH DEMENTIA AND THEIR CARERS WITHIN CARE HOME SETTINGS

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Executive Summary

Background: Although the benefits of restorative memory interventions for people with dementia are well known, implementation of these interventions remains limited. Touchscreen technology such as the iPad has the potential to provide an easily accessible medium for such interventions and so increase uptake. This evaluation provides an independent assessment of pilot projects using iPad touchscreen devices with adults with dementia within the West Midland and South West regions.

Aims: The evaluation aimed to assess the effectiveness and impact of the use of touchscreen technology on the day-to-day lives of people with dementia and the staff engaged in their care.

Method: Staff and residents' experience of touchscreen technology was explored using a combination of topic guided interviews, focus groups, case studies and field observations

Results: People with dementia and the staff involved in their care reported mainly positive experiences of using touchscreen technology. The use of touchscreen devices such as the iPad in dementia care was found to have a number of advantages:

- **Supporting reminiscence:** the importance of helping people to record their life history was noted; in particular the positive emotions which were associated with these memories were stressed as having an important role to play in enhancing care
- **Aiding recall:** the value of the technology as an aid to support activities of daily living such as making food choices were highlighted
- **Increasing interpersonal interactions**: the way in which iPad interaction increased communication with other residents, staff members and family was evident. iPad use enhanced interactions both directly – through activities involving the iPad - and indirectly – by talking about the iPad.
- **Intergenerational communication**: shared experience of the technology provided a focus for conversation, acting as a link between younger and older generations.
- **Staff-resident relationships:** working with residents using the technology was seen as a means to get to know clients better. This could be around helping them to write a life story, or simply by learning more about likes and dislikes. This increased rapport has the potential to enable greater person-centred practice
- **Improving quality of life:** the increased interactions with others, along with the learning opportunities afforded by the technology were seen to have a positive impact on the quality of life of residents
- **Ease of use**: participants in the group sessions perceived the iPad as easier to use than traditional computers. The ease with which a life history could be recorded was also noted
- **Impact on the wider care environment**: the use of touchscreen technology encourages increased interpersonal interaction and a positive social environment

Some difficulties related to using the technology were also noted; however, these tended to be perceived as challenges to be overcome rather than limitations preventing its use. The main issues were:

- **Ergonomics**: the weight of the device, and problems seeing the screen because of its reflective surface were raised, although many participants found using a pillow to support the device at the right angle was helpful
- **Complexity of the interface:** users from one-to-one sessions recognised the complexity of full interactive use of the iPad. Using the technology to its maximum effect was most effective when scaffolded by staff
- **Staff confidence**: staff were concerned that their own limited skills could have a negative impact on the client's own experience
- **Connectivity:** corporate issues related to problems getting WiFi access were also noted.

Conclusion: The evidence gathered for this evaluation lends support to the idea that touchscreen technology can make a positive contribution to helping people to *live well with dementia*.

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Introduction

The mainstream advent of touchscreen tablet computers (Apple iPad, Samsung Galaxy Tab, Motorola Xoom and the Asus Eee Pad) has provided a unique opportunity for older adults to become engaged with computer technology whilst addressing the usability issues (e.g. difficulties in using a mouse or touchpad; Hertzum & Hornbaek, 2010 and confidence issues; Prensky, 2001) of 'traditional' computers. Such devices afford the user with a direct and interactive experience where interaction is controlled by contact with the device, and settings (e.g. font size, contrast and device volume) are user-defined. Whilst touchscreen devices have been available from a variety of manufacturers (Hewlett-Packard, Nokia and Samsung) and in a variety of formats, Apple's iPad enjoys market dominance (68% of all global tablet sales; ABI, 2011); furthermore it is supported by an online application store (where users can download purpose built applications to run on the device, in addition to built-in applications) which has 38% more applications than its nearest rival (Distimo, 2011). Furthermore, Pavel et al. (2010), report that the iPad's intuitive interface and forgiveness of mistakes is particularly appealing to older adults, and has aided Apple to reach beyond its originally targeted consumer base.

Despite the opportunities afforded by touchscreen computers, they are not without their own set of limitations and usability issues. The reflective and high-gloss screen easily attracts fingerprints and is difficult to view in direct sun light. Further, the form factor demands that one hand is used to hold the device whilst the other is used to navigate it, and despite a reduction in weight between the iPad 1 and iPad 2, both devices remain relatively heavy for prolonged use. Such issues are likely to be exacerbated for older adults, however, the limitations are greatly outweighed by the portability and non-traditional form factors of touchscreen devices.

The use of easy to use touch screen technologies such as the iPad are enabling new ways of incorporating 'restorative memory' and creative therapy interventions with people with dementia, due to their interactive applications. Previous research has suggested that learning remains possible for people with dementia (Fernández-Ballesteros et al., 2005; Fernández-Ballesteros et al., 2003), and the facilitation of procedural memory functioning is important in the performance of basic care activities of daily living, which is a contributory factor to quality of life in people with dementia (O'Connor et al., 2011). Neurorehabilitative evidence indicates that through enhancing procedural memory functioning, improvement in the performance of daily living activities, such as eating, is expected (Gitlin et al., 2010). Studies have found benefits in creating a life story-book such as connecting the older person or person with dementia to their relatives through sharing memories and reduction in anxiety

and depression (Clarke et al., 2003; Kellet et al., 2010). Through proper implementation the life story approach can lead to superior decision making, in a reciprocal way, based on greater awareness of the person's preference for care.

Despite the benefits of 'restorative memory' and creative therapy work limited uptake of such interventions, particularly, within care settings (NAO, 2007; NAO, 2010) remains. This limited uptake is plausibly due to the sheer number of resources needed for diverse and specific cases; also the understanding and/or skill and confidence necessary in using such resources. This is a pertinent point as it is through efficiency savings that these interventions are likely to be subsidised; and care settings are often restricted in terms of budget. Touchscreen devices may provide a resource that can unlock many interventions to harness the welfare of older residents, people with dementia and care staff through a person-centred care approach.

A number of pilot projects have been commissioned across the West Midlands and South West regions, where iPad touchscreen devices have been used with older adults with advanced dementia in residential and nursing care home settings. The devices have been used in one-to-one and group settings and have involved both life-story and reminiscence work (to help promote restorative memory). In order to provide an independent assessment of these projects, a systematic evaluation was carried out by the University of Worcester over a 6 month period (March 2011 to September 2011). The main objective of which assessed the effectiveness and impact of the projects on day-to-day lives and documented the contribution of this technology on helping people to *Live well with dementia*. This report sets out to identify the experience of people with dementia and their carer's use of touchscreen technology which aims to give insight into their thoughts, feelings and attributed behaviours towards the technologies application. Thus, because external memory aids have demonstrated reduction in resistance to care and the government seeks an accessible—in terms of cost to benefit—alternative to inappropriate prescribing of antipsychotics; this inquiry sets out to answer why touchscreen technology might be a viable alternative in the relief of the Behavioural and Psychological Symptoms of Dementias (see Banarejee, 2009 for a review). The main aims of this evaluation as outlined by the Department of Health West Midlands are:

- To provide insight into the experience of the person with dementia with regard to using the touch screen technology and the impact that it has on individual staff working with the person they care for.
- To develop a better understanding of the perceptions of people engaged in dementia care as to the potential for the use of touch screen technology.

- To evaluate the impact that the pilot programmes are having within the wider care environment in which they are used.
- To identify how touch screen technology can form an effective intervention as part of the care journey for someone with dementia over a period of 6 months and contribute to 'Living well with dementia'.
- Through evaluation of research findings and user feedback to make recommendations as to the future potential of the use of touch screen technology.
- To inform workforce development and increased awareness in the population as to the potential impact of using touch screen technology with people with dementia.
- To inform commissioner and providers as to the challenges and benefits of investing in the use of touch screen technology with people with dementia and their carers.
- Finally, to identify areas of good practice or specific case studies that can be shared as part of a learning event with all health and social care economies across the region as part of ongoing dementia care service development.

Method

In order to address the aims fully, the evaluation employed a multi-method approach including topic guided interviews, focus groups and observations (see Appendix i and ii, and iii respectively). Qualitative data were gathered to provide a rich and informative evaluation study. Interview numbers were guided by data saturation; thus it was determined that sufficient interviews had been conducted once no new themes were emerging from the respondents.

Study Context

The evaluation was carried out in 11 care homes involved in the pilot projects across the West Midland and South West regions. The use of touchscreen technology differed across the settings, with both group and one-to-one interactions being observed. The term 'scaffolded interaction' has been adopted throughout the report to refer to how participants use an iPad when working on a one-to-one with a carer, family member, fellow resident or visitor. Group use refers to how an iPad is embedded as part of a wider group activity where participants have the opportunity to choose songs, videos and history-based activities as part of a group reminiscence activity. Participants are unable to directly interact with an iPad as part of the group activity, however, they make choices through discussion with a group facilitator who in turn accesses relevant material on the iPad to help support the session.

Measures

Topic-guided interviews:

Topic-guided interviews were conducted with participants with dementia and care home staff. These Semi-structured interviews focussed on assessing:

a. Positives of using the iPad
b. Negatives of using the iPad
c. What the iPad has previously and is currently been used for. The difference between past and current use is important since issues such as confidence in using the device independently, device ergonomics (e.g. physical weight and size) and screen resolution may have altered the use of the device during the intervention.
d. What people with dementia would like the device to do differently in the future.
e. Other aspects of use not covered above.

The topic-guided interview was semi-structured to allow the evaluation to be driven by participants, around the five areas of interest indicated above.

Focus groups:

Focus groups were conducted with care home staff and managers, and centred on the positives and concerns of integrating touch-screen technology (with a particular focus on the iPad), into care settings. Key themes emerging from the topic-guided interviews formed the basis of a moderator guide (see Appendix iii) which helped structure the discussion.

Case studies of participants with dementia

Case studies of two participants with dementia ran in parallel with the interviews and focus groups. These case studies captured the longitudinal data over the duration of the evaluation, with a primary focus on investigating how the use of an iPad contributed to 'living well with dementia'. Participants were interviewed at three stages; initial interview (month 1), mid-review interview (month 3) and final interview (month 5). Interviews focused on:

a. Positives of using the iPad
b. Negatives of using the iPad
c. What the iPad is being used for and anticipated use of the iPad. Asking participants about their anticipated use allowed intended use to be compared to actual use throughout the evaluation.
d. Why actual usage was not the same as intended use (where appropriate) and any barriers (physical, technological or social) preventing intended use.
e. What individuals would like the iPad to do differently in the future. This was asked throughout the longitudinal evaluation since device firmware updates may provide iPad features previously not available.

Field Observations

Observations were used to record the moment by moment interactions within the activity sessions. Venn diagrams (see Appendix ii) were developed to simultaneously assess both 'direct' (i.e. communicative and physical) interactions between a resident and the touch screen device, and 'indirect' interactions. 'Indirect' interactions included conversations about the touch screen device with a staff member (S), a family member (F), another resident (R) and/ or other individuals (O) such as the researcher. Venn diagrams were used for two key reasons: firstly, they provide a means of clearly illustrating sets (in this case interactions) and for showing relations among them (Hays, 1963); and secondly, as method for selecting participants for the topic guided interviews as it provided a systematic way to ensure an even balance of participants displaying 'high' and 'low' direct or indirect interaction with the touchscreen device.

Analysis

All interviews and focus groups were analysed using thematic analysis. This method was chosen because it provides a robust means of identifying what is common to the way a topic, such as touch screen technology, is talked or written about (Braun and Clarke, 2006). This method assumes that truth can be accessed through language, but that accounts and experiences are socially mediated (Madill, Jordan and Shirley, 2000). Through the systematic identification and organisation of data into themes, insight can be given into why touchscreen technology is or is not relevant within care settings. Comparisons between themes raised in the interviews, focus groups and case studies were drawn to establish the most important themes emerging from the data.

Ethics

Ethical approval was gained from the Institute of Health and Society research ethics committee, University of Worcester. Informed consent was obtained from people with dementia, older adults; care staff; and carers/relatives: in accordance with the Mental Capacity Act 2005. All data generated by the evaluation was treated confidentially, reported anonymously and stored in accordance with the Data Protection Act (1998).

Results

Topic-guided interviews

Interviews were carried out with a total of 10 participants with dementia and one member of staff. All respondents were female. Three participants had experienced scaffolded interaction and seven had participated in group sessions. The staff member had been involved in scaffolded interactions with care home residents.

Two themes emerged from the interview data collected from participants experiencing group sessions and those experiencing scaffolded interactions: *Reminiscence and recall through touchscreen technology* and *Increasing Interpersonal Interactions*. The first of these themes concerns participants' experience of shared use of the technology, as described here by participant W2 when asked what she enjoyed about the group session:

> *I think they [iPads] appeal to a lot of people here as well, they bring back memories from our younger days. It was most enjoyable, I shall definitely be coming again*.
>
> (W2, Lines 7-9).

The potential of the iPad to bring back memories was raised by all the participants who had taken part in group sessions:

> *I think it's wonderful, things they can be brought up that you'd forgotten about.*
>
> (W, Lines 7-8).

Furthermore iPad use was consistently seen to generate positive emotional responses through reminders of participants' youth, and even childhood experiences:

> *I remembered him [Al Johnson] from my childhood days yes. I enjoyed that I thought it was going to be good but that's gone out the window I'm surprised to say it was quite superb!*
>
> (EPH, Lines 8-10)

Interviews in the care homes where scaffolded interactions were the norm also supported the idea that the iPad could be used to evoke early memories:

I liked to look at the crabs because I went crabbing as a young girl with my dad down at Lady Bay

(FB, Line 16).

Care home staff also commented on the value of iPad interactions for encouraging recall of early memories and producing positive emotions:

I think it can help with reminiscence as well, you know if she's laughing and happy; she's probably more happy to talk and get involved.

(S, Line 16)

Furthermore these interviews and that of the care home staff demonstrated a practical role for the iPad in aiding recall of information:

I chose my food on it the other day, but it does not make the food for you……. I can see the food on it. Sometimes I find it difficult to remember what I like to eat you see. So I get frustrated. But [name of carer] helps because she asks what I liked when I was younger. I could not remember the name of what it was so we had a look on the iPad.

(FB, Lines 14-22).

FB recognises she has difficulty remembering things sometimes. In this instance the carer was able to scaffold the participant in using the iPad as an external memory aid through which FB was able to complete the task of food selection and communicate this to the carer. Examples of the use of touchscreen technology in such scaffolded interactions were apparent across the data set; this excerpt identifies clearly one of the important benefits of iPad use for activities of daily living.

The second theme to emerge from across the data set was *Increasing Interpersonal Interactions*. It was evident that the group sessions encouraged residents to engage with others around them rather than spending time alone. When asked what they liked most about the iPad sessions, one participant replied:

Well it's the variety you know, and also you feel like you can all join in you know.

(SH, Line 7)

Likewise a participant who had experienced scaffolded interactions noted that:

> *I suppose I do like to talk to [name of resident] more when we are all looking at this device together.*
>
> (FB, Line 22)

This was given further support by the care home staff who described the way in which curiosity about other residents use of the iPad encouraged participation and increased interaction between residents:

> *I think it bring a group aspect as well to it so… everyone can get involved an' speak to each other as well*
>
> *(SH, Line 22)*

Two further themes which emerged from the data were specific to the type of session the participant had experienced.

The first of these was *Ease of using touchscreen technology*. This theme was specific to those experiencing the group sessions. These participants, who had experienced only limited hands on interaction with the iPads, commented the ease with which the technology would allow them to record information such as life story/history work:

> *A lot of people go to have their life story written but it's a hassle so if there were something easier [like the iPad] that'd be fine.*
>
> (SM2, Lines 13-16).

iPads were interpreted as "something easier" for recording important events in an individual's life. Furthermore participants noted that a touchscreen device was much easier to use than other technology such as computers:

> *Well it's easier [than a normal computer] isn't it.*
>
> (SM, Lines 33-34).

In contrast, participants experiencing one-to-one interactions were less convinced that the iPad was easy to use. Data from these interviews suggested another theme: C*hallenges to using touchscreen technology*. The complexity of full interactive use of the iPad was evident from comments such as:

> *It's a job to remember everything.*
>
> (FB1, Line 15)

And

> *Do I like using it? I'm not used to it yet, I might get used to it*
>
> (FB2, Line 15)

This theme was reiterated by the staff member who noted that:

> *I used the iPad for music: to listen to Frank Sinatra with [resident's name]. We use it a lot together one-to-one. I was surprised at how quickly she was able to access YouTube simply by me prompting her with what to do next…..she can touch the screen on her own but she cannot access YouTube without me*
>
> (S, Lines 27-33).

.

Summary of interview findings

Four main themes emerged from the interview data:

- *Reminiscence and recall through touchscreen technology*: iPad use was found to have a positive impact on recollection of personal history and information recall. This was usually associated with positive emotions
- *Increasing Interpersonal Interactions:* iPad use in both group and one-to-one sessions encouraged interaction between residents
- *Ease of using touchscreen technology*: users in group sessions perceived the iPad to be an easy device to use
- C*hallenges to using touchscreen technology*: users in one-to-one sessions perceived the iPad to be challenging to use to its maximum effect

Focus Groups

Two focus groups were conducted with a total of 10 care home staff and care home managers. All participants were female. Five participants were drawn from a care setting within the West Midlands area and five from a care setting within the South West region.

Three themes emerged from the focus group analysis: *Inter-generational parity, Enhancing quality of life through touchscreen technology* and *Touchscreen technology as a challenge*.

The first theme *Inter-generational parity* refers to participants increased experience of intergenerational communication and collaboration through the use of touchscreen technology, as exemplified in the following extract:

> *I mean we put ah a toy box made and collective learning things to try and encourage families and children because when I first came here it was rare…really rare that you ever saw a child, but it is really difficult for them. So the technology, this iPad, is a way that the young children understand and they use it with their elderly relatives and it is amazing seeing relatives play with their grandchildren on this equipment, it keeps both parties interested and relaxed.*
>
> (Focus Group 1: P5, lines 199-208).

This intergenerational communication was not exclusive to family interactions:

> *I don't know if any of you were here when a school group came in; they were playing with the iPad with some of the residents and um it was amazing because one of the residents was sat with the school kids and they were talking about Twitter and they were showing them how to use Twitter on this technology. They were absolutely amazed, but for me that interaction was brilliant.*
>
> (Focus Group 2: P2, lines 156-162).

These responses highlight the way in which this technology can encourage family, friends, and other individuals to engage with the residential community within a care setting. Through this technology the home care environment can become a place of opportunity, where the younger and older generations are connected through their experiences of the device. The iPad is able to act as a link in communication, discrediting the idea that the older generation are at a disadvantage compared to those born in the digital era when using new technology (Prensky, 2001). The above extracts illustrate unity, or parity in generational interactions

rather than the disparity implied by the portrayal of the younger generation as digital natives and the older generation as digital immigrants. This communication link may have important potential for dementia care; there is a strong association between improvements in the challenging behavioural and psychological symptoms of dementia and enhanced communication (Clare and Shakespeare, 2004).

The second theme, *Enhancing quality of life through touchscreen technology,* dominated many of the focus group discussions:

> *I think it [the device] can be a positive to their life really. As it means you can access things you were unable to do before mm… and learn new things and say, it could open up a conversation with someone, or with a group…so I think it adds a positive thing.*
>
> (Focus Group 1:P1, Lines, 92-95).

The following dialogue indicates some of the positive aspects of touchscreen technology that were deemed important for quality of life:

> *I think that's its greatest strength for me - it is here, um, it's purpose umm is to improve 'quality of life' and there are many ways in which I think it does that. All the ways that everybody has just said by uhh enabling internet access, so they can learn, they can find out, and they can Skype people and keep in touch if their relatives are away or abroad.*
>
> (Focus Group 1: P5, Lines 96-100).

This extract clearly illustrates the range of benefits provided to residents through the use of touchscreen technology. A positive impact on staff-resident relationships, also important for quality of life, was noted:

> *I think it influence as well the relationship between staff and the residents, a closer relationship as well cause you got to think that you know we're all different staff and we've got different interests so we use different apps. So you work with residents and …you talk about things you get to know them better.*
>
> (Focus Group 1: P2, Lines 124-131).

These closer relationships are indicative of the rapport that is an essential element of person-centred care practice (Brooker, 2007). Through getting to know residents better, it is possible for care staff to identify individual eccentricities, and recognise triggers for disruptive behaviours, so relieving carer burden and resident distress, which will inevitably improve quality of life.

The final focus group theme focused on '*Touchscreen technology as a challenge*'. This theme represents the challenges presented by using touchscreen technology within the care setting. Comments on the ergonomic nature of the device, including weight and screen resolution, were marked across participant responses:

> *When I've worked with people and people have said oh it's quite heavy…so I tend to think oh I can put it [the device] on a cushion or a pillow and it can be…you know adjusted to suit the light or time of day.*
>
> (Focus Group 2: P5, Lines, 24-26).

It is important to note that the issues raised were discussed in terms of challenges to which solutions were sought, rather than as negatives which would prevent the use of touchscreen technology.

Some concern was also directed toward integration of the touchscreen technology within the care setting, in terms of Wifi connectivity and issues of security:

> *Well it's funny here because we have been reliably informed (Laughter) that we can have Wifi connected to the private rooms of each resident, but there was a policy issue with the local council about Wifi connectivity in a communal area. Also there are issues surrounding theft!*
>
> (Focus Group 2:P4, Lines 395-396).

Concern was also expressed by staff about their own confidence in using the touchscreen technology and how this might impact on the resident(s) experience:

> *For me it's my own confidence in actually understanding how to use a being proficient at using the iPad, I would worry that I was spending, that I was having to umm spend too much time working out how to use it and putting off the person I am with.*
>
> (Focus Group 1: P5, Lines 460-461).

However once again this was seen as a challenge to overcome rather than a barrier to use.

Summary of focus group findings

Three themes emerged from the focus group analysis:

- *Inter-generational parity:* participants with dementia experienced increased communication and collaboration with the younger generation through the use of touchscreen technology
- *Enhancing quality of life through touchscreen technology:* a range of benefits to residents were described including opportunities for learning, communication, and improved staff-resident relationships
- *Touchscreen technology as a challenge:* ergonomics such as weight and screen resolution, problems with connectivity and limited staff confidence with iPads were described as challenges rather than barriers to use

Case studies

Case Study 1

Participant X is 77 years and comes from a White British background, who at the time of the initial interview had been at the care setting for 2 years. Interviews were carried out with Participant X at three time points over a six month period: April, July and September 2011.

Two themes were identified from the interviews with participant X: *Advantages of touchscreen technology* and *Using touchscreen technology for exercising memory*.

Advantages of touchscreen technology highlighted how the iPad differed from more 'traditional' computers and that this was an advantage:

> *The iPad doesn't have keys or a mouse like those big things we used before. It helps me with my hand-eye co-ordination and can be easier.*
>
> (April: Lines, 8-9).

Even the difficulties with the iPad were described as easily overcome:

> *I find it difficult to see [the iPad] sometimes because it's shinny. But [name of carer] usually puts a cushion underneath and that helps*.
>
> (April: Lines, 14-15).

It is clear that the carer in this instance, was able to adapt the technology to suit the environment in which it was used. This is important as the 'portability' of this equipment is a distinct asset in comparison to more 'traditional computers' (Astell et al., 2010).

The second theme, *Using touchscreen technology for exercising memory* emerged from the mid-review and final interview. Participant X described how the iPad had been used to exercise aspects of memory, as seen in the following extract:

> *We looked at flowers and coloured them in. I remembered my favourite the Blue Bell*.
>
> (June: line 4).

Life story work with the iPad was also seen as beneficial for exercising memory:

> *I have a record on the iPad, [name of carer] and I we get pictures of places I have visited. I drag them across, name them when I can and we record it. Helps me exercise (…..) my memory*

(August: Lines, 5-8).

The progression in use of touchscreen technology is clearly demonstrated here. The initial application that was used by Participant X was a simple Artwork app; by the final interview a form of 'cognitive exercise' was employed through the identification of places Participant X has visited. The evidence suggests that people with dementia are better able to learn information that requires an accompanying action (Smith et al., 2011). Thus the action of dragging pictures across and then naming the places, although seemingly simple, could provide an indispensable method for enhancing everyday memory skills.

Case study 2

Participant Y is a 87 year old female from a White British background, who at the time of the initial interview) had been at the care setting for 20 months. Interviews were carried out with Participant Y at three time points over a six month period: March, June and September 2011.

A key theme drawn from the interviews with Participant Y was *Touchscreen technology as a tool for communication*. Initially Participant Y described the iPad as a focus for communication:

> *We discuss the device me and [name of carer]. But haven't talked to others about it yet. I do want to talk to my daughter, she live abroad you see.*

(March, Lines 6-10).

Discussing the device might be a necessary first step of engagement with the iPad, prior to Participant Y becoming more comfortable in how to use the device: the iPad at this early stage is a prompt for conversation. However, the interim and final interview data highlight how the device was ultimately used as a tool for communication which allowed Participant Y to fulfil her dream of seeing and talking to her daughter:

We got speaking me and my daughter. On Skype. I get to see her much more now and we talk. We laugh too.

(June: Lines, 2-3).

It was clear from Participant Y's responses that over the six months of the study she had increased in confidence and understanding the functions of the iPad. Through Skype geographical space is reduced, lifting the restriction on the frequency with which Participant Y can see her daughter. Empirical evidence supports the positive impact that enhanced communication with family can have for people with dementia, particularly with reference to effective compensatory strategies and performance of activities of daily living (Smith et al., 2011; O'Connor et al., 2011).

Summary of case study findings:

The case studies demonstrated a clear progression in participant use of the iPad over time. key themes emerging from the data included:

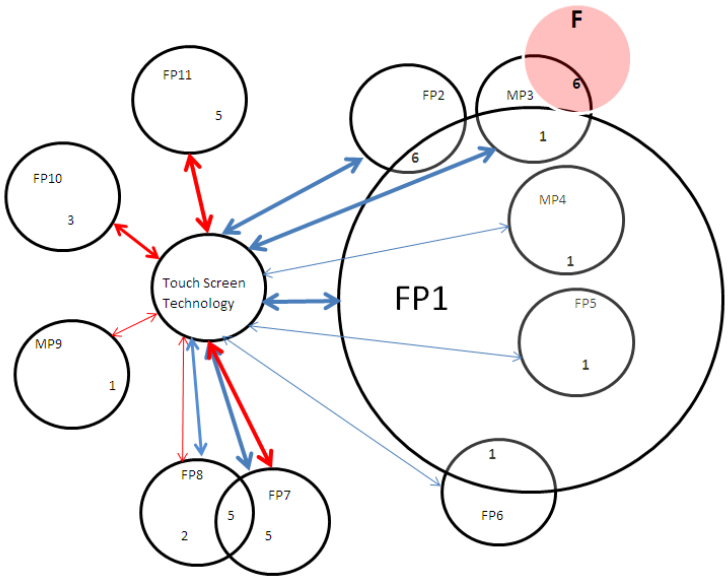
- *Advantages of touchscreen technology* highlighted how the iPad was an improvement on more 'traditional' computers
- *Using touchscreen technology for exercising memory* demonstrated how the iPad supported cognitive exercises
- *Touchscreen technology as a tool for communication* showed the importance of applications such as Skype for enabling communication

Field Observations

Observational data were gathered from a total 149 participants: 116 women and 33 men. The observations concerned both scaffolded and group interactions and demonstrated the way in which touchscreen technology supports both direct interaction (i.e. involving the iPad) and indirect communications (i.e. talking about the iPad).

For example, during a 1hr 'activity session' conducted by the Alive! Charity, observations were used to systematically identify where the majority of the interaction was focused within the group (see Figure 3). The figure demonstrates the multiple interactions engaged in by female participant 1 (FP1) who interacted with FP2, six times; MP3, once; MP4 once; FP5 once and FP6 once. More indirect communication than direct interaction is demonstrated.

Figure 3. Venn diagram representation of group interaction over a 10—minute period.



Note. Blue arrows represent indirect interaction (e.g. talk) to do with the touchscreen device. Red arrows represent direct interaction, i.e. touching/ using the device. Thickness of the arrows indicate frequency of interaction, e.g. the more interaction the thicker the arrow. F, in the red set stands for Family member.

The social interaction provided a form of verification for FP1's cognitive rehearsal which took on an 'interactive process' with the group (see Figure 4).

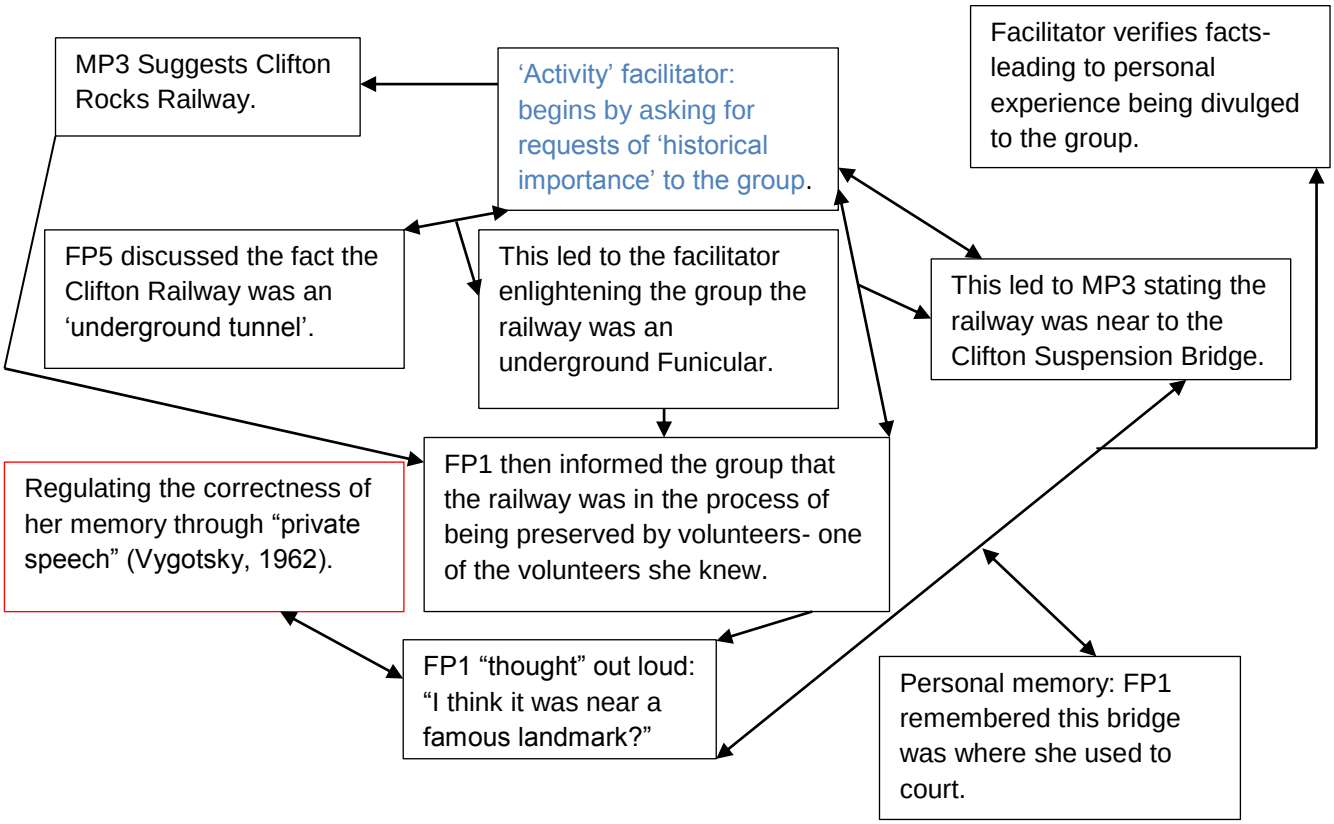
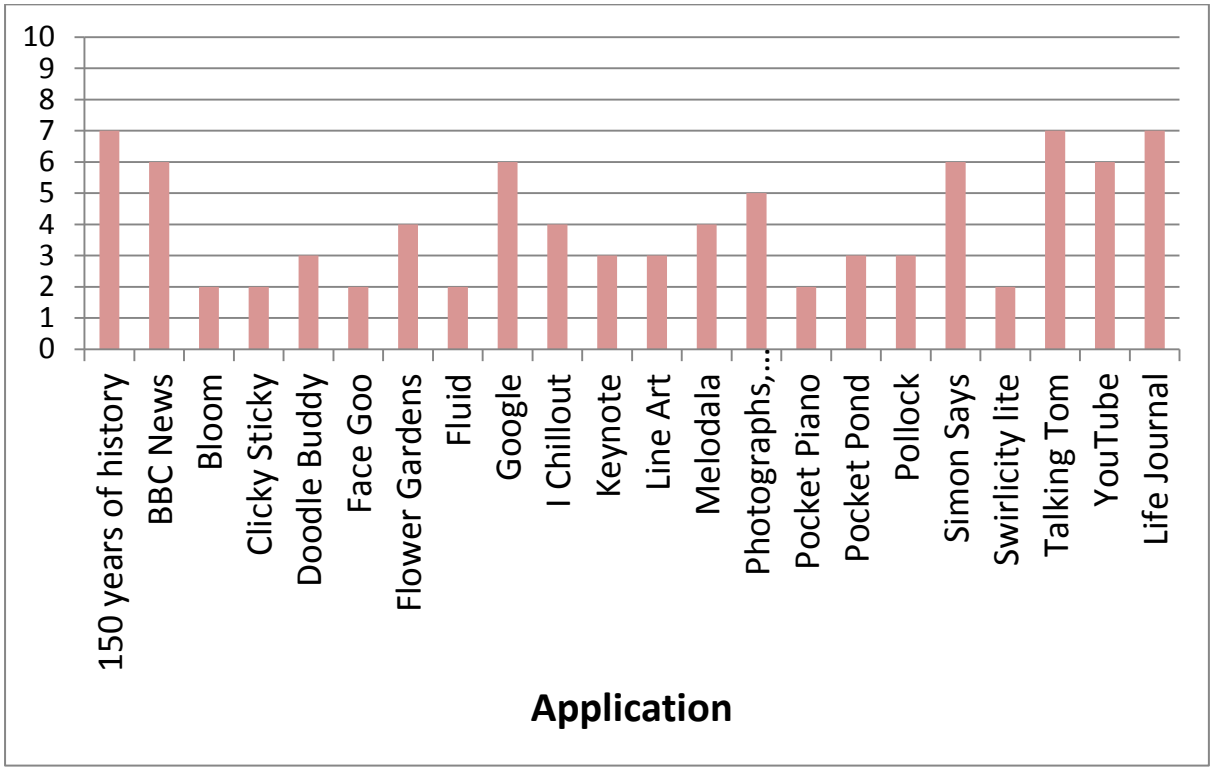


Figure 4. Field Note 21/7/2011: group interaction and memory rehearsal for FP1

Figure 4 demonstrates the way in which the iPad can be used to verify the elements of an individual's personal knowledge, whilst at the same time providing a learning experience for the group as a whole.

During field observations information was also collected concerning resident's opinions of the different applications they had used on the iPads (see figure 5). A total of seventy seven residents rated all the *apps* on a scale of 1(poor) to 10 (good). As shown in figure 5 the top three *apps* were 150 years of history, Talking Tom and Life Journal.

Figure 5: Residents Rating of iPad *Apps*



Summary of findings and Conclusions

Experiences of people with dementia when using touchscreen technology

The people with dementia who had experienced touchscreen technology identified a number of advantages related to using iPads. Although people's experiences differed, with some enjoying group activities and others one-to-one sessions, many of the benefits described were similar:

- **Supporting reminiscence:** the potential to evoke early memories, which were associated with positive emotions

- **Aiding recall**: the iPad provided an external memory aid to assist procedural memory, for instance, in choosing what to eat.

- **Exercising memory**: the iPad supported increasingly complex cognitive exercises

- **Increasing interpersonal interactions**: both group and one-to-one sessions encouraged residents to engage with others around them.

- **Enhancing communication**: the iPad was also used as a tool for communication; for example Skype provided a means for keeping in touch with family who were living too far away to visit regularly

- **Ease of use**: participants in the group sessions perceived the iPad as easier to use than traditional computers. The ease with which a life history could be recorded was also noted

Thus overall, people with dementia felt very positive about their use of touchscreen devices. This was irrespective of whether they had engaged in one-to-one interactions or group sessions. Interview participants reported enjoying the music and artwork applications, although ratings of a range of available *apps* suggested those recording history – both public and personal – were well regarded. Some difficulties related to using the technology

were also noted; however, these tended to be perceived as challenges to be overcome rather than limitations preventing its use. The two main issues were:

- **Ergonomics**: the weight of the device, and problems seeing the screen because of its reflective surface were raised, although many participants found using a pillow to support the device at the right angle was helpful
- **Complexity of the interface:** users from one-to-one sessions recognised the complexity of full interactive use of the iPad. Using the technology to its maximum effect was most effective when scaffolded by staff

The staff engaged in using touchscreen technology with residents had a very positive view of its impact on them and their clients; the main concern related to their own confidence in using the technology, as they felt this could have a negative impact on the client's own experience. Corporate issues related to problems getting WiFi access were also noted. The potential impact of the technology on people with dementia was discussed extensively in the focus groups with staff, as outlined in the next section.

Perceptions of people engaged in dementia care regarding the potential of touch screen technology in this care

In general, staff focussed on the benefits of the technology for enhancing the lives of people with dementia. Staff agreed with many of the benefits of using touchscreen technology described by their clients, particularly:

- **Supporting reminiscence:** the importance of helping people to record their life history was noted; in particular the positive emotions which were associated with these memories were stressed as having an important role to play in enhancing care

- **Aiding recall:** the value of the technology as an aid to support activities of daily living such as making food choices were highlighted

- **Increasing interpersonal interactions**: the way in which iPad interaction increased communication with other residents, staff members and family was praised by the care staff. Staff noted that the iPad could enhance interactions both directly – through activities involving the iPad - and indirectly – by talking about the iPad.

In addition staff observed the following advantages for touchscreen technology:

- **Intergenerational communication**: staff praised the way in which shared experience of the technology provided a focus for conversation, acting as a link between younger and older generations.

- **Staff-resident relationships:** working with residents using the technology was seen as a means to get to know clients better. This could be around helping them to write a life story, or simply by learning more about likes and dislikes. This increased rapport has the potential to enable greater person-centred practice.

- **Improving quality of life:** the increased interactions with others, along with the learning opportunities afforded by the technology were seen to have a positive impact on individual's quality of life

Impact of pilot programmes on the wider care environment in which they are used

In general, the benefits of using touchscreen technology outlined by staff and residents related to the impact on the individual and the immediate environment. However it could be argued that by increasing the opportunities for individuals to live well with dementia, the wider environment will also be affected positively. In particular it could be suggested that the use of touchscreen technology encourages increased interpersonal interaction and a positive social environment because:

- Touchscreen technology provides many resources that can be accessed relatively quickly encouraging new experiences or events to talk about.

- The device itself is also a talking point, and both staff and residents described how others wanted to join in and experience iPad use for themselves.

- Touchscreen technology was seen as a community activity both in care homes where group sessions were the norm and those where one-to-one sessions were typical.

- Resident and staff feedback demonstrated clearly that use of the iPad was associated with experiencing positive emotions.

It could also be suggested that other factors already described, such as the positive impact of the iPad use on intergenerational interaction, both with family members and others from the wider community has a benefit for the wider care environment. Finally, by supporting practical applications such as Skype, touchscreen technology allows greater contact with friends and relatives who would like to visit residents, but are unable to because of geographical location and/or work commitments. Ultimately, this increased contact with loved ones is likely to have a positive impact on individual wellbeing.

Touchscreen technology as an effective intervention that contributes to living well with dementia

Two case studies of residents involved in the pilot projects were carried out over the 6 months of the evaluation. These demonstrated a clear progression in the ability of the participants to engage with the iPad over time. Practicing skills enabled greater proficiency in use of applications, leading ultimate to greater sophistication in the activities in which participants engaged.

Thus by the end of the six month period Participant X was able to carry out cognitive exercises using the iPad, which may well improve everyday memory skills. A possible advantage of touchscreen technology is that it requires action (e.g. dragging an item across the screen); there is evidence that learning is enhanced for people with dementia when information is associated with action. Touchscreen technology may therefore provide a superior means of learning and remembering for people with dementia.

Touchscreen technology was also able to contribute to living well with dementia for Participant Y, but in a very different way. At the beginning of the evaluation study this participant had just begun to use the iPad and one of her keenest desires was to share this information with her daughter who lived abroad. At the end of the evaluation Participant Y was very pleased to be able to report that not only had she told her daughter about the iPad, but that she was in regular contact through the iPad Skype facility. Her new found ability to not only talk to, but also see her daughter on a regular basis clearly had a profound impact on Y. Her happiness at being able to talk to and laugh with her family was very evident. Furthermore her increased confidence at using the iPad may well have had a positive impact on her self-esteem.

Whilst it is important that the findings of these case studies are not overstated, there is a clear indication that the use of touchscreen technology may have a rehabilitative effect on dementia. Both participants, in particular Participant X, demonstrated progression in

cognitive skills over the six months of the evaluation. Furthermore the positive social and emotional impact of the device should not be underestimated.

Recommendations for the potential future use of touchscreen technology, including the challenges and benefits of investing in its use with people with dementia

Our findings suggest an important role for touchscreen technology in the care of people with dementia. In particular we would recommend the following uses:

- **Supporting reminiscence**: this can either be on a one-to-one basis using applications such as Life Journal or through group activities using *apps* such as *You Tube* to search for and play music or films that older adults will recognise from their youth.

- **Enhanced communication:** applications such as Skype can provide a means to keep in touch with family and friends who are geographically distant

- **One-to-one sessions:** staff-resident relationships are enhanced by working on a one-to-one basis. This has the potential to enable more person-centred practice. However it is important that staff scaffold residents in their use of the technology in order to ensure the applications are used to their full potential.

- **Group sessions:** residents perceive touchscreen technology as a communal activity, therefore group sessions will encourage greater interaction between residents and so create a positive social environment

It is also recommended that training be provided for staff who lack confidence in their knowledge of touchscreen technology; staff expressed concern that their own limited skills might have a negative impact on the residents experience of touchscreen technology. There are also a number of challenges to be considered concerning increased use of this technology:

- **Cost**: the initial purchase of iPads can be expensive. A cost may also be associated with the purchase of applications as not all of these are free to download.

- **Security**: devices will need to be stored securely in order to protect any personal data. Furthermore touchscreen devices are expensive and attractive pieces of equipment that are easily portable.

- **Internet use**: there may be practical issues to address concerning the use of WiFi for security, and financial reasons

Thus if the use of touchscreen technology is to be implemented more widely in the care of older adults with dementia, residential and nursing care homes will need to provide an appropriate infrastructure. This may include practical facilities such as WiFi networks, as well as organisational features such as the appointment of a 'champion' in each home who would be responsible for staff training and development. Furthermore, it is essential that care home managers are made aware of the wider benefit of touchscreen technology to enhance day-to-day care; in addition to the direct advantage of using *apps* that enhance reminiscence and recall, the use of touchscreens can have a range of indirect effects including improving staff-resident rapport and increasing interpersonal interactions. Thus the 'value-added' benefits of touchscreen technology such as encouraging person-centred practice and a positive social environment should be emphasised. However, the costs associated with the use of such technology also need to be addressed. This has particular significance at a time when budgets are either being frozen or cut; schemes could be explored which will support care homes to fund devices, for example through fundraising activities or sponsorship deals which can help meet costs.

Conclusions

The main objective of this evaluation was to assess the effectiveness and impact of using touchscreen technology with older adults with dementia in residential and nursing care home settings. Overall people reported very positive experiences of using this technology. The perception of both staff and residents was that touchscreen technology has a constructive role to play in the care of people with dementia. The evidence gathered from interviews, focus groups and observations lends support to the idea that touchscreen technology can make a substantial contribution to helping people to *live well with dementia* through their engagement in an active process of memory recall, restorative therapy and social engagement. Moreover, the data indicates a potential rehabilitative role for touchscreen technology in dementia. This possible effect deserves further exploration and it is therefore recommended that further prospective evaluation is undertaken in order to establish the evidence base, and provide support to future implementation of touchscreen technology in the care of older adults with dementia in residential and nursing care home settings.

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Appendices

Appendix i	Topic Guided Interview
Appendix ii	Interaction Diagrams
Appendix iii	Focus Group Moderator Guide

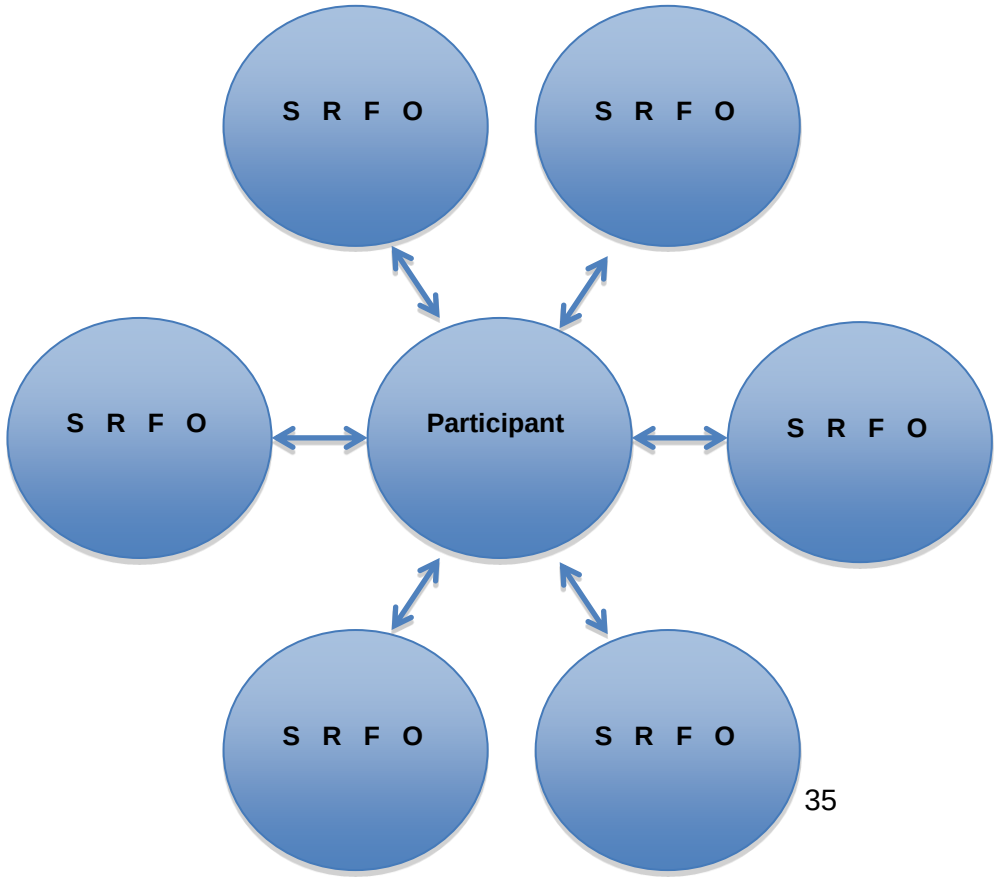
Participant Name:		**Applications Used Today:**	
Participant Number:		**Applications Previously Used:**	
Participant Gender & Age:	**M / F**	**Time Spent with Device Today:**	
Date & Time:	**/ /2011**	**Level of Engagement:**	**High Medium Low**

Interview Questions

1. What do you like about the device?
2. What have you been using the device for today?
3. What would you like to use the device for in the future?
4. What don't you like about the device?
5. Do you enjoy using the device?
6. Do you spend more time with other people when using the device?
7. What is your favourite thing you use the device for?
8. What one thing would you like the device to do?

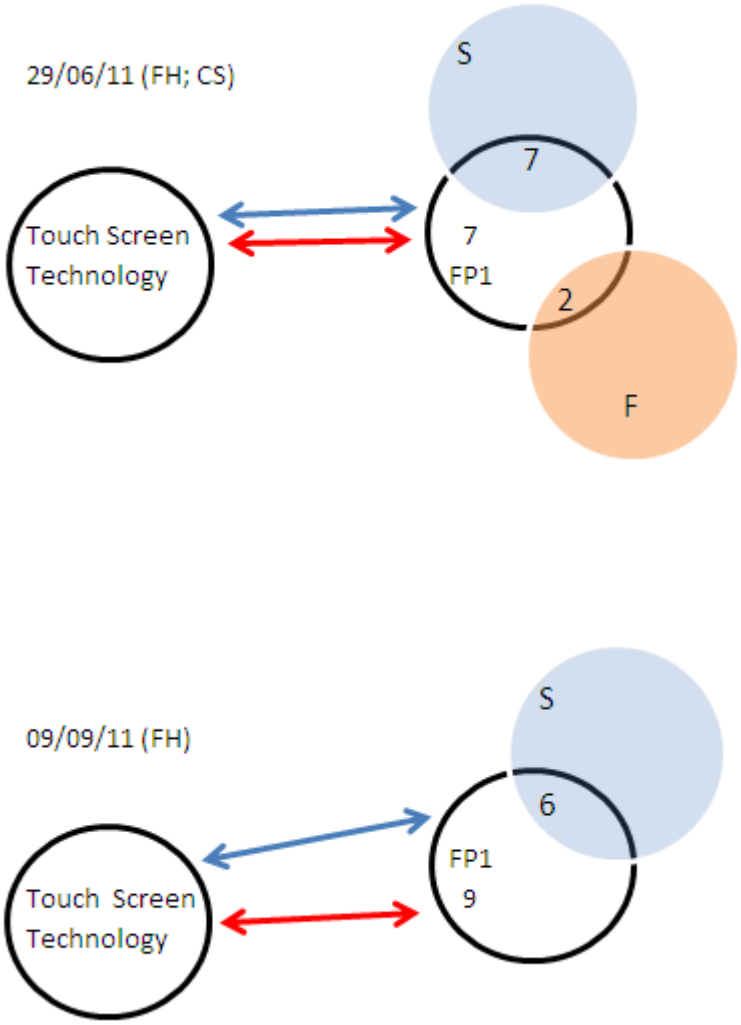
Carers/Staff Only

9. Does the device detract from other activities?
10. How do other residents respond when you spend time with one person to use the device?



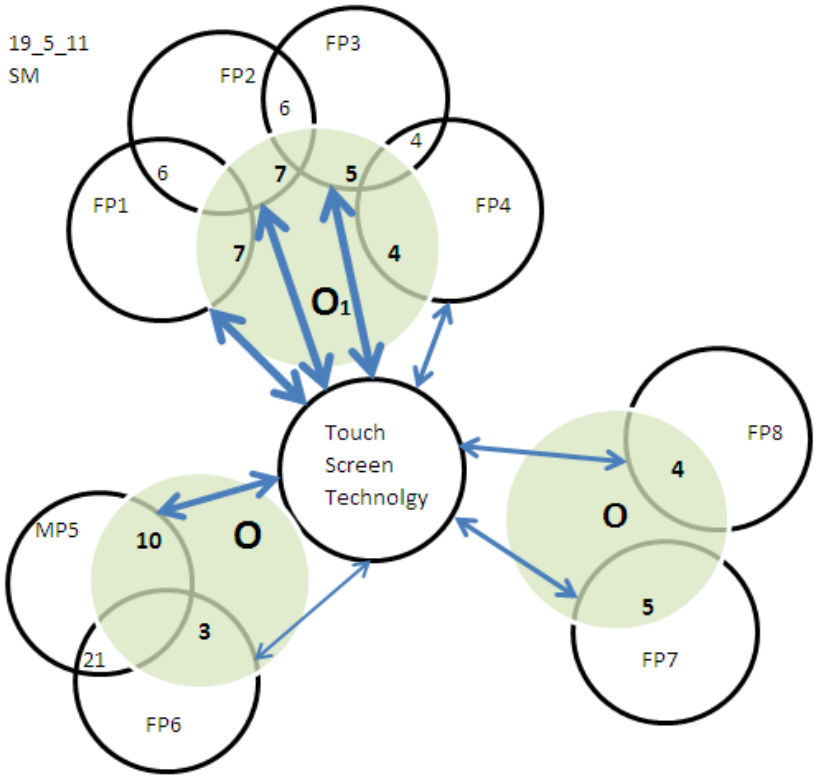
Appendix ii

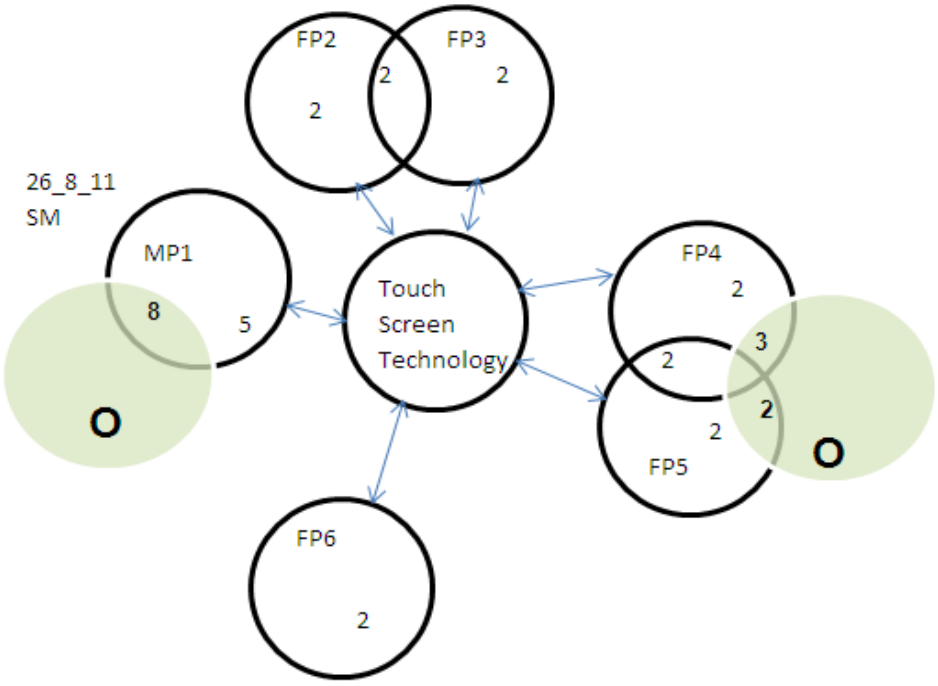
Interaction Diagrams: Examples



Note. Blue arrows indicate indirect interaction (i.e. conversation about the technology or application currently in use). Red arrows indicate direct interaction with the technology (i.e. touching the screen, and the use of a particular application).
FP1 stands for female participant 1. The number above FP1 in the first example (7) is the number of direct interaction with the iPad. The blue set **S**= staff member, who interacted with FP1 7times with regard to the device. The red set **F**=relative, who interacted with FP1 twice with regard to the device.

Interaction Diagrams





Note. Thickness of the arrows indicates the number of indirect (i.e. conversational) interactions with regard to the device. FP1, 2, 3 etc. Stands for Female Participant 1, 2, 3 etc. MP1, 2, 3 etc. Stands for Male Participant 1, 2, 3 etc. Green sets **O**= Other, indicating people who are not Care Staff or Family. $\mathbf{O_1}$= Activity Facilitator.

Appendix iii

Touchscreen Technology & Persons with Dementia – Focus Group Moderator Guide

- Thank participants for attending – ask participants to turn off mobiles and handout consent forms and name badges.

Introductions

- I will be asking questions and making comments/managing the discussion.

- Sarah/Dan will be listening/taking notes/checking equipment etc.

Operational

- How the focus group will operate:

- The focus group will be recorded and transcribed for the research team to analyse.
- All transcriptions will be anonymised.
- Please can you complete the consent forms now.
- The session will last for approximately 80 minutes including a comfort break.
- You are under no obligation to continue your participation in the focus group and you may withdraw from taking part at any time, including choosing to withdraw your data.
- The focus group will be separated into the following principle sections:

1. Introductions	(5 Minutes)
2. Use of Touchscreen Technology	(15 Minutes)
3. Integration of iPad Technology	(15 Minutes)
4. Break	(10 Minutes)
5. Positives of iPad Technology	(15 Minutes)

6. Challenges of iPad Technology (15 Minutes)

7. Final Comments (5 Minutes)

- Explain to participants that a) there are no right or wrong answers and b) the research team are interested in their experiences of using touchscreen technology with persons with dementia particularly in a care setting. Remind participants that all data is anonymised and that the general themes for the discussion will be reported.

➢ Rules:

- The moderator will lead and direct discussion although we want YOUR views, please don't wait to be asked for your contribution.

- Please be polite if you don't agree.

- Try and let others speak and respect peoples opinions, the moderator will intervene if necessary.

- If there is a point where everyone wants to say something, the moderator will intervene and let people speak in turn.

- It is important that you feel you have had the opportunity to contribute, and if you wish you had something earlier in the conservation you will have the opportunity to contribute your point at the end of the focus group.

Focus Group

Introductions (5 Minutes)

- Dan and Sarah to introduce first and briefly state their backgrounds, interest in project and what the project is seeking to achieve.

- Please introduce yourself telling the group your name, your occupation/role and whether you have had any personal or professional experience of using touchscreen technology (this can include all touchscreen devices e.g. iPod Touch, iPhone, iPad, Android, Blackberry, Nokia handsets etc.).

Focus Group

Use of Touch Screen Technology (15 Minutes)

- What contribution(s) can touchscreen technology make to persons with dementia?

    - **Prompts:**
    - Quality of Life
    - Opportunities for Interaction (Carers, Staff, Family Members)
    - Cognitive Rehearsal (e.g. LifeBooks)
    - Move beyond barriers of traditional technology (e.g. computer keyboards)

- How often is touchscreen technology used in your care home/day care setting?

- What types of activities take place with touchscreens?

- What type(s) of devices are predominately used?

- How confident are you in using touchscreen devices?

Focus Group

Integration of iPad Technology (15 minutes)

- Have you used an iPad in your care home/day care centre with residents, and if so how often do you use it?

- If you haven't used an iPad with residents, what are the reasons for this?

- What applications do you predominately use with persons with dementia and why?

- How do persons with dementia respond when you show them the iPad for a) the first time and b) repeated occurrences?

- What barriers exist to integrating iPad's into care homes?

    - **Prompts:**
    - Technological – Lack of fast 3G connectivity, lack of WiFi
    - Personal – Confidence in using device, time management
    - Economical – Cost associated with device/training/technological infrastructure

- What would you like the iPad to do for persons with dementia that it currently doesn't do?

COMFORT BREAK – 10 MINUTES

Focus Group

Positives of iPad Technology (15 Minutes)

- What are the benefits of using an iPad that other devices don't provide?

    - **Prompts:**
    - Cost
    - Form Factor (e.g. size, weight, screen resolution, battery life, connectivity options)
    - Collaborative nature

- What do you like about the iPad when thinking about its use with persons with dementia?

- Do persons with dementia respond to particularly applications better than others, and if so what applications?

- Do other persons with dementia appear interested when an iPad is being used in the home or day-care centre?

- How do family members respond when you are using an iPad with their relative?

- Do persons with dementia collaborate with each other when using the device?

- What scope do you think the iPad offers to helping persons with dementia retrieve memories?

- How does the iPad help persons with dementia in this way?

Focus Group

Challenges of iPad Technology (15 Minutes)

- What challenges do you face when using iPad's in residential homes and/or day-care centres?

    - **Prompts:**
    - Cost
    - Form Factor (e.g. size, weight, screen resolution, battery life, connectivity options)
    - Lack of engagement by other staff
    - Lack of engagement by management
    - Lack of engagement by persons with dementia
    - Technological (e.g. lack of connectivity for web-based applications i.e. Safari, Maps and YouTube)

- What is the most significant barrier you face in using iPad's with persons with dementia?

    - **Prompts:**
    - Time
    - Training
    - Lack of engagement by other staff
    - Lack of engagement by management
    - Lack of engagement by persons with dementia
    - Technological (e.g. lack of connectivity for web-based applications i.e. Safari, Maps and YouTube)

- How easy is it to integrate iPad's into your residential home/day care activity program?

- How could the iPad be better used in your residential home/day care?

Focus Group

Final Comments (5 Minutes)

- Is there anything else you would like to add that we have not discussed as part of this focus group?

FOCUS GROUP – END

Thank Everyone For Attending