Final report: SMaRT messenger pilot project

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Final Report: SMaRT Messenger Pilot Project

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Date 3rd March 2016
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Summary

The SMaRT Messenger Pilot Project is an extension of a previous collaboration between Nottingham Community Housing Association (NCHA) and Loughborough University. Research at the university has contributed to the development of a device by which messages can be sent to the television screens of older and vulnerable people. For example, such messages might:

- Alert them to take medication
- Remind them of appointments
- Send them information of interest
- Communicate with friends and family

This research project has two objectives. NCHA would like to use the SMaRT Messenger system as a commercial product to enhance their service for their clients and to market to other agencies. Loughborough University, on the other hand, is interested in the digital inclusion of older and vulnerable people and the use of a television based messenger system to facilitate communication and Information to that portion of society. This one year study has investigated the utility of the device as perceived by participants in three different locations served by NCHA. A three-phase survey was conducted of people who are testing the system in their own homes. A subgroup of participants was questioned through SMaRT messenger and five people were interviewed face to face.

The system has been designed to enable communication between people who receive support from NCHA in their own home and NCHA staff, family and friends and other relevant services. The target audience is people who are not highly competent users of digital communication, such as emails or social media sites, and who have underlying or deteriorating health conditions, live independently with a strong functional support system. The findings indicate that a television based messenger system is an important way of communication for such a limited audience, giving them the feeling of reassurance and inclusion in society.
Background

Nottingham Community Housing Association (NCHA) is a Nottingham based charitable social landlord organisation which offers many services to their tenants and other vulnerable adults including care and support in their own homes.¹ This includes the SMaRT (Smart Management and Response Team) service which provides a range of assistive technology; an all hours telephone helpline; physical responses and out of hours support that enables vulnerable adults to live as independently as possible. NCHA is developing a messaging system (SMaRT Messenger) to add to the SMaRT service. The SMaRT team not only support residents of NCHA, but provide a fee based support service for people who are still living in their own home. Messages are delivered by means of a specially programmed “set-top” box that is connected to television screens and external devices such as DVD players, satellite and free view systems. The longer term intention of NCHA is to market the system to other similar organisations. The current pilot scheme is collaboration between NCHA and Loughborough University and is based on previous research which trialled a similar system (AAL-HOST) as part of a European initiative to develop smart technologies that help older people in social housing (HOST EU)².

The AAL-HOST project worked with residents in one specific housing association in Newark, Nottinghamshire in order to develop a television messaging system. During the initial project the wants and needs of the participants were taken into consideration and many technical issues were found³. SMaRT Messenger Pilot Project has taken the findings of AAL-HOST and is resolving technical and user issues in a practical way in order to construct a system that suits the target user group.

¹ http://www.personalisedsupport.co.uk  
² http://www.host-aal.eu  
³ Hepworth, M., Olphert, W. “2011, AAL HOST Project: User Requirements Definition
Introduction

The system for SMaRT messenger comprises a "set-top" box for SMaRT messenger containing software which allows registered users to receive and respond to messages via any television set with the appropriate connection system (for example Scart); an adapted remote control that can be used with their television and an online dashboard from which messages can be sent. The set top box is connected to the internet as well as the television screen and any other external system such as satellite receiver or DVD player. Currently messages can appear above any activity which is appearing on the screen, whether from a broadcast channel or a DVD, either as a small indicator in the right hand corner of the screen or as a banner across the screen. Messages are limited to a certain number of characters and can be sent by members of the user's family, friends, members of NCHA care staff or health care staff. The recipient responds by using their remote control to select and respond to pre-written questions devised by the sender. They are not able to respond with a message of their own. The system can also transmit photographs and is being developed to transmit videos. Messages can include reminders to take medication, health clinic appointments, matters of interest to users (for example, arm chair exercise classes) and daily checks on the health and wellbeing of recipients.

The Pilot study was located in three different housing areas covering people who are living either in sheltered accommodation or being supported in their own home. The participants were spread across the geographical locations covered by NCHA and included a variety of housing types and client group to which they provide support. The trials were evaluated by means of a survey which was conducted three times; first as a baseline assessment, (March/April 2015), then in the mid-term of the project, (August 2015) and finally near the end of the project (January/February 2016). The baseline survey was delivered verbally by Loughborough University researchers visiting people in their homes. The data for both the mid-term and end of project survey were collected by the well-known and trusted member of NCHA staff allocated to the pilot scheme in the participants own home. In order to validate the findings face to face interviews were conducted with five participants in their homes by a Loughborough University researcher who also sent questions over messenger in order to discover the functionality of the system and seek participant’s opinion of the type of message they wanted to receive. All data were analysed by a Loughborough University researcher.
Findings

Surveys

Details of participants

The baseline survey was conducted during March and April 2015. The sample group trialling the system was selected through purposive sampling from locations where NCHA has a variety of types of client. The individuals who participated in the pilot project were self-selected volunteers as representatives for their type of client relationship with NCHA. Out of the 23 participants 13 are female and 10 are male with an age range between 52 and 92; the median age group being 70-79 (Table 1). Out of the 23 participants who started the trial four did not complete the study, one dropping out after the baseline survey and the following three after the mid-term survey. Two males died and two females were admitted to hospital. Therefore 19 participants completed the study (12 female and 7 male).

Table 1: Age range of participants: Baseline survey

<table>
<thead>
<tr>
<th>Age span</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-59</td>
<td>1</td>
</tr>
<tr>
<td>60-69</td>
<td>5</td>
</tr>
<tr>
<td>70-79</td>
<td>8</td>
</tr>
<tr>
<td>80-89</td>
<td>5</td>
</tr>
<tr>
<td>90-99</td>
<td>2</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
</tr>
</tbody>
</table>

Three quarters of the participants live in managed accommodation and of these, two thirds subscribe to the SMaRT support service (Figure 1). One third of the participants does not subscribe to the full service but have been included in the pilot project to assess the market potential of SMaRT Messenger.

Figure 1: Participants’ housing circumstances: Baseline survey
Digital Technology

The participants were asked about their current use of and interest in digital technology in order to assess whether their interest and skill in using the technology increased during the project. It was found that in the initial baseline assessment 20 participants use mobile phones although the use of Smart Phones (for example, the Apple iPhone) was not specifically recorded. Certainly one participant used the navigation app on their smartphone. The other items most frequently used were CDs, DVDs and digital radios, closely followed by computers (PC, Laptop or tablet), the internet and digital cameras (Figure 2). One participant stated that they used the CD-player for music and documentaries and another used the camera on their mobile phone. One participant listened to digital radio on their television. One person reported that they used to have a SLR and a digital camera but have changed to using a disposable camera. Little interest was shown in gaming or satellite navigation (Sat Nav) devices with only one person saying that they had used Wii games. Opinion was divided about MP3 Players/iPods as 10 participants had no interest in those devices whereas 8 reported that they had never used them but would be interested to do so. Over half the participants showed no interest in E-book readers, however, four use them currently and five showed an interest in adopting their use; one mentioned that the price of an E-book reader was the prohibiting factor.

Figure 2: Baseline assessment of current use of and interest in digital technology

<table>
<thead>
<tr>
<th>Device</th>
<th>Use now</th>
<th>Previously used</th>
<th>Never used, interested</th>
<th>Never used interested in future</th>
<th>Never used, no interest</th>
<th>Not answered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile phone</td>
<td>20</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD</td>
<td>18</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DVD</td>
<td>17</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital radio</td>
<td>15</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet</td>
<td>11</td>
<td>2</td>
<td>1</td>
<td></td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Computer</td>
<td>11</td>
<td>4</td>
<td>1</td>
<td></td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Digital camera</td>
<td>11</td>
<td>1</td>
<td>3</td>
<td></td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Cam-corder</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td></td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Gaming</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td></td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>ebook</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td></td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Sat nav</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>MP3/ipod</td>
<td>1</td>
<td>8</td>
<td>1</td>
<td></td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>

Where participants had previously used a device, but no longer did so, reasons given were as follows:

- Lack of ease access to a device (computer)
- Cost of device (E-Reader)
- Enough on television
- Failing sight made using camera difficult
Findings from Surveys

- Lack of interest due to age (77)
- Stopped using Sat Nav but retains it for possible future use
- Found a computer difficult to use
- Only used a computer at work
- CD and DVD players replaced by set-top box (digital TV?)

However, the mid-term survey showed a developing interest in digital devices (Figure 3). It appeared that more of the participants are using digital cameras, from 11 in the baseline survey to 18 with 4 others expressing an interest in their use. Three more participants used MP3 Players or iPods with 14 people showing an interest in the device. Four more participants used computers, although internet usage has decreased from 11 to nine. The interest in E-book readers increased from two people to 14. Twelve people stated an interest in camcorders as opposed to only two for the baseline survey and 10 participants showed interest in Sat Navs and gaming. Six people were interested in the internet 1more than in the baseline survey. Two people have stopped using the digital radio.

**Figure 3: Mid-term assessment of current use of and interest in digital technology**

The reasons given for no longer using a device in the midterm survey included:

- Broken devices not replaced (digital radio)
- Preference of previous device that has been replaced (television)
- Limited use or access to a device (computer and internet)
- Loss of interest
Fewer people completed the final survey (Figure 4) and adjusting for that circumstance it can be noted that four more participants started using the internet since the mid-term survey although computer use was down. Use of E-book readers has risen by three and there is still little interest in gaming. On this occasion participants did not state that they had stopped using any device. Interest had risen slightly in digital cameras, DVDs and Camcorders, but interest in computers appeared to have waned. In comparison to the baseline survey it can be clearly seen that participants are starting to use more digital devices, four more are using E-book readers and four more are using digital cameras. The small number of participants for this study makes it hard to generalise that the use of SMaRT messenger helps people become more digitally competent. However, when the results of each survey are compared, we can see an increased interest in some devices by individual participants.

Figure 4: Final assessment of current use of and interest in digital technology

![Figure 4: Final assessment of current use of and interest in digital technology](chart)

Participants were asked whether they considered that the use of computers and other technological devices increases people’s happiness and contentment. Overall, most people thought that it did, although opinion of this varied throughout the time of the study. The Baseline survey showed that 19 out of 23 participants (82 %) agreed, 20 out of 22 (91%) in the mid-term survey and 15 out of 19 (79%) in the final survey (Figure 5). The reasons why they thought that computers and technological devices make people happy are as follows:

- For getting information and being informed
• For communication and being connected with friends and family
• For security
• Makes close family/children happy
• Makes life easy, for example shopping, booking flights and holidays
• To download music and films
• For jobs
• A means of support when they need it

The participants demonstrated awareness of the information uses of digital technology but also realised the potential for social use and communication, for example, “Keeping people safe”; “Keeping up with modern life”; helping with “life skills”; “Messaging service, emails, shopping”. As one participant put it, digital technology can “do more things than gather information”. Less positive opinions included “Does not mean anything to me”, “Don't know enough about technology” and “technology can [be] challenging”: as another participant stated, you have to have the skills and knowledge to use technology in the right way and understand content.

Figure 5: Do Computers Make People Happier?

Baseline

<table>
<thead>
<tr>
<th>CATEGORY NAME</th>
<th>VALUE</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>19</td>
<td>82%</td>
</tr>
<tr>
<td>Not sure</td>
<td>2</td>
<td>9%</td>
</tr>
</tbody>
</table>

Mid-term

<table>
<thead>
<tr>
<th>CATEGORY NAME</th>
<th>VALUE</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>20</td>
<td>91%</td>
</tr>
<tr>
<td>Not sure</td>
<td>1</td>
<td>5%</td>
</tr>
</tbody>
</table>

Final

<table>
<thead>
<tr>
<th>CATEGORY NAME</th>
<th>VALUE</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>15</td>
<td>79%</td>
</tr>
<tr>
<td>Not sure</td>
<td>3</td>
<td>16%</td>
</tr>
</tbody>
</table>
In order to be able to use the SMaRT messenger on their television, participants needed to get used to a simple, new remote control which has unfamiliar functions on the coloured buttons, so they were asked “How familiar are you with the different functions on your remote control?” It is pleasing to see that many participants learnt how to use their remote control over the course of the trial with 13 out of 23 (79%) replying that they were familiar with all or almost all of the functions at the baseline survey, rising to 18 out of 22 (82%) at mid-term, culminating in 16 out of 19 (84%) at the final survey (Figure 6).

**Figure 6: Participants familiarity with remote control functions**

Health

The general health of the participating service users appeared to vary over time from most people either being in good or fair health during the time period of March/ April (39% each), to 52% being in good health during August and finally most people stating that they were in fair health during January or February (Figure 7). Six participants (29%) were in poor health in August but only three (16%) at the final survey in the winter months. This could be due to the participants who were in the poorest health not participating in the final survey.
Out of the 23 participants who completed the baseline survey, 11 reported that they were registered disabled, two did not reply and 10 said they were not registered disabled. In August, out of 22 participants, 10 said that they were registered disabled and 12 that they were not. No more participants were registered as disabled by the time of the final survey, although three had acquired health problems.

The participants suffer from a range of health conditions which could affect their mobility such as “back problems”, Osteoporosis, lung and breathing difficulties and heart conditions; or from mental health conditions which may impair their memory, for example Alzheimer’s; or from conditions which need constant, regular medication, for example diabetes. One participant did not reveal the nature of their health condition.
Initially, the majority of the participants stated that they had no worrying memory problems. This decreased from 17 participants to 11 in the midterm survey dropping to nine in the final survey. Four more participants appeared to have slow starting memory problems during the course of the study whereas 1 participant has suffered memory loss after the loss of a loved one and other, after a fall (Figure 8).

Figure 8: Participants’ memory problems

Independence and Well Being

Instrumental Activities of Daily Living (IADL) Scale

The Instrumental Activities of Daily Living Scale gives an indication of how well an individual can function independently while living on their own and whether there is any loss of their abilities when the scale is applied over time\(^4\). The score ranges from 0, which indicates low function, meaning that the individual is highly dependent, to 8 which shows high function and therefore independence. Table 2: 2 shows the results of the scale applied during the baseline survey beside the results of the same individuals in the mid-term and final surveys. The spaces indicate that a particular individual did not complete that phase of the survey (Table 2). 16 participants completed all three surveys.

It can be seen that out of the 5 individuals with the lowest scores on the baseline survey who also completed the mid-term and final surveys, only 1 increased their score therefore becoming more independent. Overall 6 participants completing all surveys scored less over time, becoming less independent while 9 maintained a high level of independence. Taken altogether the scores demonstrate a high level of ability to live independently in the sample taken for this project. Some individuals added comments to their IADL scale interpreting the way that they may overcome some practical problems and to show that they are being helped, or help others. For example not only does one participant do his own shopping, he also shops for other people. Sons or daughters or personal assistants help some participants to go shopping, or do it for them. Family members also do some washing for participants. Two have weekly cleaners to help with the housework and one has a friend who does her cleaning fortnightly.

\(^4\) http://consultgerim.org/uploads/File/trythis/try_this_23.pdf
Cooking can be difficult for some participants and one qualified her statement of “can warm and prepare food” with “if it is simple”. One person stated that they still drive whereas another participant commented that she is helped by her family or uses a taxi. Although one participant has difficulty with his finances, he is helped by his son.

**WHO-Five Well Being Index (WHO-Five)**

The WHO-Five Well Being Index\(^5\) is a questionnaire designed to gauge an individual’s mental well-being in a snapshot of time, over a two week period. When repeated at intervals over a longer period of time it indicates changes in the well-being of the individual. It is scored in percentages with 0% indicating the worst possible quality of life and 100% being the best. Of the 16 participants who completed all three surveys, 5 scored above 50% on every occasion meaning that they have a reasonable quality of life. Four participants scored lower that 50% on every occasion, however.

*Table 3* shows a comparison of the results of each survey. Spaces indicate that an individual did not complete that phase of the survey. The overall picture shows that the well-being of 13 participants increased, the well-being of 6 participants decreased while two people stayed in the same state of well-being. Of the 16 participants who completed all three surveys, 5 scored above 50% on every occasion meaning that they have a reasonable quality of life. Four participants scored lower that 50% on every occasion, however.

\(^{5}\) https://www.psykiatri-regionh.dk/
Table 3: Participants’ scores on the (WHO-Five) index

<table>
<thead>
<tr>
<th>Baseline percentage mark</th>
<th>Mid-term</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>16%</td>
<td>48%</td>
<td>48%</td>
</tr>
<tr>
<td>20%</td>
<td>12%</td>
<td>72%</td>
</tr>
<tr>
<td>20%</td>
<td>20%</td>
<td>24%</td>
</tr>
<tr>
<td>28%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>32%</td>
<td>40%</td>
<td>32%</td>
</tr>
<tr>
<td>36%</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td>76%</td>
<td>56%</td>
</tr>
<tr>
<td>40%</td>
<td>48%</td>
<td>44%</td>
</tr>
<tr>
<td>44%</td>
<td>48%</td>
<td></td>
</tr>
<tr>
<td>44%</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>52%</td>
<td>68%</td>
<td>64%</td>
</tr>
<tr>
<td>56%</td>
<td>56%</td>
<td>44%</td>
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<tr>
<td>56%</td>
<td>80%</td>
<td>92%</td>
</tr>
<tr>
<td>56%</td>
<td>56%</td>
<td>44%</td>
</tr>
<tr>
<td>64%</td>
<td>32%</td>
<td>84%</td>
</tr>
<tr>
<td>68%</td>
<td>20%</td>
<td>28%</td>
</tr>
<tr>
<td>68%</td>
<td>64%</td>
<td>80%</td>
</tr>
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<td>68%</td>
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<tr>
<td>72%</td>
<td></td>
<td>80%</td>
</tr>
<tr>
<td>80%</td>
<td>60%</td>
<td>68%</td>
</tr>
<tr>
<td>84%</td>
<td>96%</td>
<td>100%</td>
</tr>
<tr>
<td>100%</td>
<td>72%</td>
<td>76%</td>
</tr>
</tbody>
</table>

Support and social contact

The participants were asked about the people who supported them in their daily life and to rank the importance of the type of support that they receive. It can be seen from Figure 9, Figure 10 and Figure 11 that the most important people who give support to the participants are their family. Housing association staff, including NCHA staff, also play an substantial role in supporting the participants. Friends are quite important but not ranked so highly as family and housing association staff.
Figure 9: Ranked importance of support, baseline

Figure 10: Ranked importance of support, mid-term

Figure 11: Ranked importance of support, final
The participants commented about the support that they either receive or give to their friends, such as "Sharing the load with friend, re washing up and cooking"; "son does heavy shopping" and that NCHA staff will give support "if phoned". Health professionals were viewed as providing support, either over the phone or through visits to their surgery. One participant stated that they are supported by social services and another emphasised the care received from carers for attendance and personal support. One person stated that she has no support whereas another lists their daughter, son, and sister as their family support.

Similarly, the participants were questioned about the amount of face to face contact that they have with other individuals on a daily or weekly basis. Figure 12 shows that most participants have face to face contact with other people at least once a day. In the baseline survey eight participants had face to face contact with other people less than twice a week and that dropped to three participants in the final survey. No-one had face to face contact less than once a week after the baseline survey.

**Figure 12: Participants’ face to face contact**

![Bar chart showing face to face contact](chart)

It is interesting that when asked which people that they saw the most frequently more participants replied that they saw their neighbours more frequently than their families, despite families being ranked highly for the support that they are perceived to give to the participants (Figure 13).

Participants were asked how frequently they communicated with people either by phone or computer. Figure 14 below shows that that over the course of the study most participants communicated digitally at least once a day, although some only had contact twice a week or less. By the time of the final survey, only two participants replied that they had digital contact less than monthly. They were then asked who they spoke to over the phone or through their computer and as can be seen in (Figure 15) members of participants’ families again dominate the scene.
Figure 13: People seen the most frequently

Baseline

Mid-term

Final

Figure 14: Frequency of digital contact
Friends are also important contacts in both occasions and health professionals were contacted the most frequently by two participants in the first and second surveys but that dropped to one participant only in the final survey.

Figure 15: Who do you speak to most often on the phone or computer?

DUKE-UVC Functional Social Support Questionnaire (FSSQ)

The DUKE-UVC Functional Social Support Questionnaire is used to measure the strength of an individual's social support network. In this instance the answers given to each of seven questions are rated on a scale of one to five with one being “Much less than I would like” and five being “As much as I would like”. The scores obtained are averaged to produce the result. A higher score shows the greater amount of support perceived by the participant. As in the two previous indexes, Table 4: DUKE-UVC FSSQ shows the results of the questionnaire completed for the baseline survey alongside the results of the same individuals in the mid-term survey. The spaces indicate that a participant did not complete the questionnaire for that survey.
Over the course of the study, the perception of support decreased in some cases quite dramatically with originally 11 participants scoring five, the highest score, to five participants in the Final survey. On closer examination it can be seen that of the 18 participants both three increased their scores between the baseline and the final survey. Overall, 10 scored lower, with five participants remaining with or reverting to their original score.

Table 4: DUKE-UVC FSSQ

<table>
<thead>
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<tbody>
<tr>
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</table>
Additional Comments to the survey

Baseline assessment

Nine of the participants choose to make additional comments about their experience of using the Care Messenger system with the SMaRT team. The potential for the system was recognised by three people and useful suggestions were made about the system's improvement. Only one person showed enthusiasm for the system with six making negative comments.

Comments on the potential of the system and positive opinions included:
- Happy with reminders
- The system enables the support worker to provide a better service
- The family are keen to use the service once it is working properly
- Gets a better picture on TV

Negative opinions included:
- Four participants would prefer a two way messaging system
- Four preferred to use a mobile phone
- Three considered that they did not have a use for the system
- Three had viewing problems
- Two participants commented that they had no control over the system
- Poor functionality, for instance messages were not always received, television signal and channels were lost, voice to text does not work and subtitles and Skype functions did not work
- It could not replace face to face contact
- The current system is limited; only being able to answer yes or no and there is no way to know that a message has appeared if the television is switched off
- The system has become too complicated

The suggestions for improvements to the system were as follows:
- Sending out messages from the client/customer to say that they are out or on holiday, or ill but do not require assistance
- Broadcast general news of local events or updates about other tenants, for example if they have gone into hospital
- Having a diary function
- The television should bleep if there is a message

NCHA are taking these comments and suggestions into consideration as they adapt and develop the system together with the software engineers with whom they are working. Therefore the system is constantly being upgraded and assessed during the pilot project.

Mid-term survey

Some general feedback about the Care Messenger system was gathered by the NCHA staff member as he delivered the mid-term survey. The feedback can be summarised as follows:

- Most participants are satisfied with the system development, with the NCHA SMaRT customer service and product support and with the quality of the product so far and has met their expectations
• Most participant said that they prefer the Care Messenger service to the Tunstall® alert system and that they are satisfied with the Well-being messages
• Four participants would like to have other features included, such as news of local events and weather updates
• Three participants had viewing issues with the system
• One participant was not satisfied with the system development
• Currently most messages are being sent by NCHA SMaRT service

Interviews

The interviews with randomly selected participants (aged from 60 to 78), over three locations were of approximately 20 minutes in duration and were based on a framework of five lead questions which were as follows:

- What is your opinion of the SMaRT Messenger system?
- The messenger system is through your television? Do you consider that there are benefits or disadvantages to this?
- Have you noticed anything different to your way of life since using SMaRT Messenger?
- Now you have been involved with the trial, would you keep SMaRT Messenger or be happy without it?

These questions were designed to find out: participants' general opinion of SMaRT messenger, any technical challenges that they faced, the degree of benefit of a television based messenger system and its potential for an independent living aid. Discovering their perspective on the value of the system and its impact on their lives was also a factor and whether the participants' inclusion in the digital world and general well-being had increased through the introduction of the messenger.

It was thought that SMaRT messenger was a good concept. Two participants were very positive with one stating “yeah, I like it” and another, “Alright, a good idea”. However two participants considered it “Slow and irritating” or frustrating and annoying. Another participant preferred aspects of the system that was used for the previous trial which included Skype and useful phone numbers. One participant said that it “was not for him”, although he appreciated that some people would find it useful. Most of the participants found the system easy to use, although one was apprehensive about pressing the buttons on the remote control. The participants were satisfied that any technical problems that they encountered were dealt with promptly by NCHA staff.

The advantages of using a messenger system delivered via a television appeared to outweigh the disadvantages. Messages appearing over the top a favourite programme was not a popular feature, however all the participants thought that it was a “good idea” for messages to be sent “through the TV”, it was good to have “everything on the screen” especially for those who did not own a computer. No one considered that SMaRT messenger had changed their lives either for the good or bad, “Things go on the same” or messenger had “not needed to” change

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6 Tunstall is a company that specialised in products to aid assisted living. NCHA SMaRT team use Tunstall alert systems with their clients.
http://www.tunstall.co.uk/Uploads/Documents/Portfolio-issue27.pdf
anything. However, two participants felt safer by having SMaRT messenger because it “is there when you need it”.

Two participants had no other digital devices and were not at all interested in using computers. On the other hand, three had a combination of mobile phone, tablet, PC or laptop which they used regularly. Both the participants without digital devices answered that they would be interested in keeping SMaRT messenger after the trial, but those who were more adept at using other digital systems were not. All but one participant had used Skype, which they liked and one commented that SMaRT messenger is “not as good” as Skype because with Skype you can “Talk to a human”. Another participant stated “it is not a bad system, I only use it when I get a message. I don’t like bothering people”. The participants suggested improvements such as receiving the messages in audio, for those with visual impairments, and being able to send messages and set alerts oneself.

Four case studies were produced from the interviews, outlining the type of client which would benefit the most from using SMaRT messenger. These can be seen in the appendix at the end of this report.

Questions sent over SMaRT messenger

A series of 27 questions were sent in small batches on SMaRT messenger over a three month period to 16 of the pilot study participants. This was so that the researcher could experience the system first hand, to explore the types of messages that participants considered useful and how they felt when using the system. The questions covered the topics of well-being, alarms and alerts, general information and friends and family. The following tables show the topic, the question asked and the numbers of each multiple choice reply that was selected for that question.

SMaRT messenger is set to send each participant a message each morning about their general well-being, to which participants must reply. Table 5 details the participant’s opinions of the well-being message. Although such a message could be considered an intrusion into their daily lives most participants gave positive responses to this group of questions. Receiving the message provides security, for example, six participants felt cared for, four understood that they would receive help when something was wrong, and eight felt reassured that someone cared. Knowing that their well-being is monitored made five participants feel less alone and four more connected to society. The wording of the message was not important to four participants, five considered the simple phrase “Are you feeling well today?” was adequate but only one person wanted to receive the message on a daily basis. Five participants would like the ability to only receive the message when they are unwell and five would prefer to receive it as a weekly rather than daily check.
### Table 5 Well-being messages

1. **Do you feel that someone cares about you when you receive the well-being message?**
   - Yes, I feel cared for
   - Yes, I know that I will get help if something is wrong
   - No, people are just asking me because it’s their job
   - No, I find it annoying

2. **Do you feel less alone when you get the message asking if you are well?**
   - I don’t feel alone
   - I feel less alone
   - It makes me feel connected to society
   - It makes no difference

3. **How would you prefer to be asked about your wellbeing?**
   - Are you feeling well today?
   - A question just for you like How is your back today?
   - By a statement that you do not have to answer such as Tell us if you feel unwell
   - You would prefer not to be asked

4. **How frequently would you like to be asked if you are OK?**
   - Daily
   - Every few days
   - Weekly
   - Only when I am not well
Other findings

SMaRT messenger can send tailored alerts to remind the participants to do something, such as take medication at a certain time, or about an event, such as a doctor’s appointment. The batch of questions seen in Table 6 examined whether participant felt they needed these alerts, whether they were useful and to which events they wanted to be alerted. It appears that only a small proportion of participants consider that they need to have alerts. For example three participants considered that receiving a reminder about taking medication helped them a lot and three more thought that it usually helped whereas it did not help eight participants. Similarly, only three said that a reminder about household safety (locking doors, switching off light and cookers) was of help whereas 14 considered that it was not. Birthday and religious service reminders were not popular but just under half the participants wanted reminders about social or local events.

Table 6 Alarms and alerts

6. Does it help you when you get a reminder message to take medication?

- Yes, it helps a lot: 1
- Yes, it usually helps: 3
- No it does not help: 8
- I do not need regular medication: 3

7. Does it help you when you get a reminder about Bills and Payments?

- Yes very much: 4
- Yes usually: 6
- No: 5

5. Does using SMaRT messenger make you feel “visible”?
8. Is it helpful to get a message reminding you to go to appointments?

- Yes, I would forget otherwise: 4
- Yes, it helps me be organised: 4
- No, I am well organised: 4

9. Would you like to be alerted about friends or family birthdays?

- Yes, it would help me: 3
- No, I don’t need reminding: 13

10. Would you like to be told when there is a local event?

- Yes, I like to be informed: 6
- No, I am not interested: 7

11. Would you like reminders about religious services?

- Yes, I like to attend my place of worship: 2
- No: 3
It is possible to send messages of general interest to participants, and the following batch of questions (Table 7) explored the interest in such a service, and the type of event about which people would like information. There was not a great deal of interest shown in the suggestions that were made, although there was a small number of people who appeared to appreciate such information. For example, one participant showed interest in local sporting events, one was positive about receiving recipes, four were interested in the cinema and theatre, one wanted to know about pubs and restaurants, and two library users were interested in library opening times. There was more interest in knowing whether it was a special day, such as bank holiday or Valentine’s Day; six participants wanted this information whereas eight were not interested.

**Table 7 General information**

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Would you like alerts about your social events?</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>13. Would you like alerts about daily tasks such as locking the door, turning off the lights making sure the cooker is off?</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>14. Do you like being told when it is a special day?</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>
15. Would you like to know about local cinema or theatre performances?

- Yes I like going to the cinema and theatre: 4
- No I do not have anyone to go with: 2
- No I am not interested: 9

16. Do you like getting recipe suggestions?

- Yes, I like reading them: 8
- No, I do not need them: 6
- No, I do not cook: 2

17. Would you like to know about library times?

- Yes, I use the library: 11
- Yes, I would use the library if I knew when it was open: 2

18. Would you like to have recommendations for books or films?

- Yes, I like books: 8
- Yes, I like films: 3
Currently there is a low proportion of the participants whose family or friends are registered to use SMaRT messenger. The final batch of questions was asked in order to discover the participants’ views on what comprises a family group, and the value of communicating with family members (Table 8). Interestingly, only three participants considered that a family only consisted of direct relatives, whereas 10 participants included a wider circle of relationships, for example people married to family members and other close friends. Eight participants communicated with their family through a computer or digital devices, but five did not. To the
participants, the foremost value of communicating with family members appears to be the feeling of inclusion.

### Table 8 Family and Friends

23. Who do you consider to be part of your family?

- Direct relatives only (parents, brothers, sisters, children, grandchildren)
- Above and People married into your family (parents in law, brother or sister in law, son or daughter in-law, etc)
- Other very close friends

24. How many of your friends send you messages over care messenger?

- Many of my friends
- Some of my friends
- None of my friends

25. Do you use the computer/ social media/ emails to communicate with your friends and family?

- Yes, I use emails
- No, I don’t use the computer
- Yes, I use a combination of the above

26. What do you like best about messages from friends and family?

- Finding out the latest family news
- Keeping up to date with friends
- Seeing photos
- Feeling included
Summary of Findings

Most participants of this pilot study were independent and active. Even those with impaired mobility had busy social contact with friends and family. The participants ranged in age from their late 50s to early 90’s, which means that there was an age difference of at least 35 years from the youngest to the oldest. This age difference, however, had no bearing on the results. The skills, ability and health condition of each individual had much more influence on whether they found that SMaRT messenger was a useful tool.

Opinion about the usefulness of SMaRT messenger was split. The more physically active and digitally aware participants found it limiting. They preferred using Skype or emails on their tablets or PCs because it was more immediate and direct. However, the participants who were less mobile and had no interest in computing or other digital technology were very pleased with SMaRT messenger. They appeared to see it as an extra tool that made them feel safer in their home. All participants, despite their personal preferences, considered that the concept of sending messages over a television screen was sound and right for the right individual. No-one felt that it had transformed their lives or increased their digital skill.

In fact, evidence from the survey shows only a small increase in the use of digital devices. E-book readers and digital cameras have become more popular and computer and internet use rose slightly in August but dipped again by February. The perception of the value of digital technology to a person’s well-being was generally quite high with many participants agreeing that the use of computers and other technology can make people more content or happy. A caveat was given that one had to have the right skills and abilities to enjoy digital technology. The one improvement in digital skills was using the SMaRT messenger remote control; the baseline survey indicated that some participants found it difficult to use but nine or 10 months later most of the clients have learnt to use all or almost all of the functions.

The premise of SMaRT messenger is that it can be an aid to memory and help people to live independently. It is suited to individuals who find it hard to remember times, dates appointments and events. As such, the participants were asked about their memory and how useful they found the alerts. At the start of the pilot study, most participants considered that their memory was good. This declined slightly over the course of the year, but most participants still considered that they had no need for alerts and reminders about when to take medication, lock doors or to go to an appointment. However, an important minority thought that such alerts were very useful, meaning that the SMaRT messenger alerts and reminders can be a useful opt-in service.

Improvements to the system were suggested, and some ideas from individuals were tested through the questions sent by SMaRT messenger, such as information about local events. It was found that most participants were not interested in general information, but a minority considered that information about books, films, restaurant, the theatre, sport and libraries would be useful. This too could be an opt-in service. The participants who were the most digitally aware wanted the ability to send messages and set alarms themselves. The most essential improvement suggested is to enable audio so that people with visual impairment could use the system.

A wide circle of family members are overwhelmingly the people to whom the participants turn for support and social contact, although housing association staff appear to have a significant role.
Health professionals and carers are also acknowledged by the participants who need them. Most of the participants appear to have a busy social life either with seeing friends, or phoning, skyping or emailing their family and close friends. It is therefore unfortunate that few close friends and family are registered to use SMaRT messenger. The participants considered that maintaining communication with their family made them feel included.

When asked, participants were reluctant to pay a subscription for the messenger service. This was also identified in an independent market research report by Ampersand Research7. In their rigorous research of possible users it was friends and family who identified the utility of the SMaRT messaging system as a means of communicating with their relative. Communication between family members is therefore important to everyone and SMaRT messenger offers another tool for that communication. One aspect of SMaRT messenger that was discovered is that participants felt reassured and connected to society by having it installed. Although some people thought that receiving the well-being message daily was too frequent, it made them feel cared for. Therefore, although some individuals do not like communication with computers and other digital devices, they still have an opportunity to be part of the digital world using SMaRT messenger.

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7 SMaRT Messenger Market Testing, Presentation of results, January 2016, Ampersand Research
Conclusion

Receiving messages through a television screen is perceived generally as a good idea but the SMaRT messenger system would benefit from further development. It is most suited to individuals who are less physically active, who have no interest or capability of using other forms of digital devices and who have significant memory or organisational problems. The simplified remote control appears to be easy enough for anyone to use.

Although participants considered that SMaRT messenger had no effect on their daily lives, the study demonstrated the importance to the participants of feeling safe, feeling included and being part of society. It was apparent that SMaRT messenger did have that effect on the participants. Generally, it can be concluded that SMaRT messenger is an additional, useful means of communication for a minority market.
Appendix 1: Case Studies

Case Study 1

User profile 1: Daniel

Daniel is in his early 60’s living in a small housing association flat near the centre of a town in the East Midlands. It is close to all amenities, opposite a supermarket, which is fortunate as Daniel has impaired mobility, due to heart and other health problems. Because of these problems he has more than one sort of alert system in his flat: a red pull cord as well as a wrist alert device.

Being safe and secure seemed to be important to Daniel. He told that the flats are “secure”, which he considered was a good thing. However, the idea of having something there to help in time of need appeared to give him reassurance. Daniel was positive about the benefits of SMaRT messenger. He commented that he liked it and that he felt reassured that it was there when he wanted it and he knew that he could get in touch with someone to help when needed. He said that receiving messages through the television is beneficial and that he takes care to answer all the messages that arrive. This shows that he attached an importance to the messages that he was receiving.

He was not fluent at using technology and showed concern about doing something wrong. For example, he had not tried pressing the new green alert button on his remote control, although he realised that it was a way of summoning help. He also stated that sometimes it is hard to remember which button he should press. However, he had Skype in the earlier trial of a television based messaging system, which he used in order to speak to friends living overseas and he stated that he missed being able to do that. He confirmed that he had no interest in technology and did not have a computer. Therefore he was not able to keep in contact with his friends.

He was positive about future developments of the SMaRT messenger system said that he would like to continue receiving the system after the trial has ended. He was reluctant to pay for the service, however.

As Daniel has multiple health problems he is mainly bound to his flat. He is also not interested in digital technology and does not own a computer. He was watching television while being interviewed and I got the impression that it was a constant background and therefore a good way of sending him messages knowing that he would read them. He seemed to like the system, and I thought that he felt reassured that it was there. He repeated the thought several times throughout the interview, although he said it had not changed his life style. I believe it gave him reassurance that it was a support, a tool to use when necessary. He is a therefore an appropriate candidate for the system.

Case Study 2

User profile 2: Gloria

Gloria is in her mid-70s and lives in a sheltered housing flat near the central shopping area of a small East Midlands town. She leads a very active and independent life.
Gloria does not see any personal benefit to the SMaRT system and will not be carrying on at the end of the pilot scheme. She feels that the system is too slow and she prefers Skype because you can “talk to a human”. Speed of communication appears to be important to her and she communicates with her family through Skype and email over her tablet, receiving family photographs in that way. She is in daily contact with friends and family.

Gloria is proficient with many digital devices and goes to classes in the library to learn computing skills. She therefore feels that SMaRT messenger cannot add to her current methods of communication. She has also identified a current major flaw, she is in the early stages of a visual disability, and she finds it difficult to read the printed word on the television screen, without getting very close to the television. Gloria considers that SMaRT messenger as it stands is not a very aid for people who have both visual and physical disability. However she is of the opinion that SMaRT messenger is useful for people with fewer skills than she has.

Therefore Gloria is not a suitable candidate for SMaRT messenger. Her independent lifestyle and competence with technology means that she can communicate in many other ways. Similarly, her oncoming visual impairment means that as it currently stands, messenger is not suitable for Gloria’s needs.

Case Study 3

User profile 3: Ted

Ted is in his late 70s living in a small housing association flat near the centre of a small town in the East Midlands. It is very close to the central shopping area and 2 supermarkets. There are a number of cafes in the high street and at the corner of the road where he lives.

Although Ted moved around independently, he appeared to have some mobility problems. He wore an alert alarm around his neck and a “Tunstall” alert button near his door, which indicates that he could have a rapid decline in his health. He is diabetic and has breathing difficulties and is registered as disabled. Despite this he is active and capable of living independently, visiting the cafes twice a week with his partner and cooking for both of them on the other days. He has daily contact with many people and his large family are supportive.

Ted is very positive about the SMaRT messenger technology; he has no concerns and finds that it “works really well” for him although he is aware that other users do not find it so easy. He is very forgiving of teething troubles, for example the screen turned pink on one occasion, but after receiving advice over the phone from the project technician, he was able to sort out the problem himself.

He considers that receiving messages over the television is beneficial; it is “Alright, a good idea, ideal”. He finds it a useful way of receiving information, stating that it is “Worthwhile to know things” and he “gets to know all about things”. He showed a natural curiosity and described himself as “nosey” because he chose to be part of the trial and he is actively interested in its development and growth. He is not digitally aware; he has no computer and rarely uses a mobile phone. The only digital device that he has started using over the course of the trial, other than SMaRT messenger, is a digital camera. He mainly uses a cordless phone, which has speed dial buttons set up for him by his sons. His family contact him by phone regularly and do not use SMaRT messenger.
He feels that having Messenger has not changed anything in his life, especially as he spends most of his day watching television. His social support has decreased over the course of the project, but this is balanced by the general quality of his life improving. He would like to keep SMaRT messenger at the end of the pilot scheme as it gives him an added level of reassurance, for example he said that “You never know when you may need it” and it is “better when you live on your own”. Having SMaRT messenger makes him feel included in society and provides reliable contact with the outside world. He would be prepared to pay a small fee to use the system.

Ted seems to be a good candidate for the messenger system. He is not very digitally interested, but he is competent and confident in the use of his television and satellite technology. I got the impression that although he has friends in the complex and has children, grandchildren and great grandchildren that he can contact, he feels reassured that he has a system which he could use to be in touch with the rest of the world and to use in a crisis.

**Case Study 4**

**User profile 5: Ben**

Ben lives in a bungalow with a garden at a sheltered housing court on the outskirts of an East Midlands town. Retired and in his mid-70s he is physically and mentally active and lives independently, owning a small dog for companionship. He has a positive self-perception of health despite having breathing difficulties.

Ben considers that SMaRT messenger is not suitable for him, although he appreciates that it can be useful for other people; it is “Hard to develop a system that is right for everyone”. He is irritated by the well-being messages which have to be answered, because he feels that he is in good health. He is concerned that there would be too long a delay in response to physical emergency calls to SMaRT, and feels that the SMaRT team are not trained to deal with mental health emergencies. He comments that Messenger does not have audio, which is a disadvantage for people with visual impairment. He sees no benefit to having messages on the television because it is not always switched on.

He is digitally aware and corresponds regularly with family members by email or Skype. He sees his friends and neighbours on a daily basis, although it appears that his family do not live near. He deals with email correspondence daily and is an infrequent user of social media. He shops over the internet, using “about 5 different firms” and has an electronic calendar that reminds him of appointments. He is keen to learn more about computing, for example he has bought a tablet and would like someone to show him how to use it.

Because of his digital skills he finds SMaRT messenger frustration, because he is not able to answer the messages directly himself and he has no direct control over what alert messages are sent. He stated that he would only be interested in retaining SMaRT messenger should these improvements be made, and that it cost less than “pounds”.

Ben is not the ideal candidate for a TV based messenger system. He seems to have made up his mind about SMaRT at the beginning of the trial and not changed the opinion by using it. It appears that he is actually quite astute and digitally aware, using his computer to do many functions. This is what he is used to and finds it rather frustrating not to have control over
something, i.e. not be able to use the system to send as well as receive. He appears to be an active minded individual, and does not consider that he is ill despite having COPD. He is making the best of his time, having a dog, and being physically active, not contained in his room, but going out and not having the TV on all the time.
Appendix 2: Questionnaire

SMaRT Messenger Pilot Project

BASELINE SURVEY

Participant name: ........................................................................................................
Address: ...................................................................................................................
Date of interview: .........................
Interviewer: ......................

The following background information will help us to evaluate how useful the SMaRT messenger system is for you and your experience and views of using it. If you do not wish to respond to any of the questions you may do so without giving a reason.

Respondent Characteristics and Demographics

1. Male/Female  M □  F □

2. What was your age at last birthday?

   | Age | ........... years old
   | Not sure | □
   | No answer | □

3. Housing circumstances:

   | Live alone in NCHA sheltered accommodation with manager? | □
   | Live alone in NCHA accommodation with SMaRT support? | □
   | Other (please specify) | ..........................................................
### 4. Attitudes to and Use of Technology Checklist

<table>
<thead>
<tr>
<th>Do you use, or have you ever used, any of the following/would you be interested in using:</th>
<th>Yes</th>
<th>Yes but not now</th>
<th>Never used, &amp; no interest</th>
<th>Never used but interested</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 CD player</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2 DVD player</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3 MP3 or ipod</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4 mobile phone</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5 digital camera</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>6 camcorder</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>7 electronic book reader (e.g. Kindle)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>8 digital radio</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>9 sat-nav</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>10 gaming packages (such as Wii, playstation, Xbox)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>11 Computer (pc, laptop or tablet ............... )</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>12 Internet</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

5. If have stopped using, reasons? .................................................................

6. Do you think using computers or other technology can make people more content or happy?

| Yes | ☐ |
| No | ☐ |

7. Reasons?..........................................................................................................

8. Thinking about your television, how familiar are you with the different functions on your remote control?

| I know almost all or all of the functions | ☐ |
| I know many of them | ☐ |
| I know some of them | ☐ |
| I know a few of them | ☐ |
Health and Memory Questions

9. In general, how would you say your health is?

<table>
<thead>
<tr>
<th></th>
<th>□</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>□</td>
</tr>
<tr>
<td>Good</td>
<td>□</td>
</tr>
<tr>
<td>Fair</td>
<td>□</td>
</tr>
<tr>
<td>Poor</td>
<td>□</td>
</tr>
</tbody>
</table>

10. Do you have a registered disability?

<table>
<thead>
<tr>
<th>□</th>
<th>N □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

11. Do you have any health conditions?

<table>
<thead>
<tr>
<th>□</th>
<th>N □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

12. If yes, which?

...........................................................................................................

13. Do you have problems with your memory and if yes, when did these problems start?

<table>
<thead>
<tr>
<th>No problems with my memory that worry me</th>
<th>□</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have memory problems and these started slowly</td>
<td>□</td>
</tr>
<tr>
<td>I have problems with my memory and these started suddenly:</td>
<td>□</td>
</tr>
<tr>
<td>after a stroke</td>
<td>□</td>
</tr>
<tr>
<td>after a fall</td>
<td>□</td>
</tr>
<tr>
<td>after the death of a loved one</td>
<td>□</td>
</tr>
<tr>
<td>none of the above</td>
<td>□</td>
</tr>
</tbody>
</table>
### 14. Instrumental Activities of Daily Living (IADL)

<table>
<thead>
<tr>
<th>Activities</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extending message/using the telephone</td>
<td>I am unable to use the phone</td>
</tr>
<tr>
<td></td>
<td>I am capable of answering phone but unable to operate it</td>
</tr>
<tr>
<td></td>
<td>I am able to operate the telephone</td>
</tr>
<tr>
<td>Shopping</td>
<td>I am unable to do any shopping</td>
</tr>
<tr>
<td></td>
<td>I am capable of purchasing up to 3 items, otherwise I need help</td>
</tr>
<tr>
<td></td>
<td>I do my shopping independently</td>
</tr>
<tr>
<td>Preparing meal</td>
<td>I am unable to cook</td>
</tr>
<tr>
<td></td>
<td>I am able to cook if the ingredients are ready or to warm cooked food</td>
</tr>
<tr>
<td></td>
<td>I cook independently</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>I am unable to do the housekeeping</td>
</tr>
<tr>
<td></td>
<td>I am able to do light tasks (sweeping, make the bed) only, but otherwise need help</td>
</tr>
<tr>
<td></td>
<td>I do the housekeeping independently (capable to do all household tasks including mopping and washing clothes)</td>
</tr>
<tr>
<td>Washing clothes</td>
<td>I am unable to wash my clothes</td>
</tr>
<tr>
<td></td>
<td>I am able to wash light clothes or ironing, but otherwise need help</td>
</tr>
<tr>
<td></td>
<td>I do my washing independently (using washing machine included)</td>
</tr>
<tr>
<td>Utilization of transportation means</td>
<td>I am unable to travel by any transportation means</td>
</tr>
<tr>
<td></td>
<td>I travel on public transportation/taxi or private car if I am helped/accompanied by other</td>
</tr>
<tr>
<td></td>
<td>I travel independently</td>
</tr>
<tr>
<td>Responsibility of own medication/preparing own medication</td>
<td>I need help from others to prepare and consume my medication</td>
</tr>
<tr>
<td></td>
<td>I am able to take it if medication is previously prepared</td>
</tr>
<tr>
<td></td>
<td>I take my medication independently (I am able to prepare my own medication according to prescribed dose and time)</td>
</tr>
<tr>
<td>Ability to handle finances</td>
<td>I am incapable of handling my own finances</td>
</tr>
<tr>
<td></td>
<td>I am able to arrange my daily purchases, but need help with banking/major purchasing</td>
</tr>
<tr>
<td></td>
<td>I am able to manage financial problems (household budget, pays the rent, receipt, bank matters) or to monitor my income</td>
</tr>
<tr>
<td>Total score</td>
<td></td>
</tr>
</tbody>
</table>
15. **WHO-Five Well-being Index (WHO-Five)**

Please indicate for each of the five statements which is closest to how you have been feeling over the last two weeks. (Higher numbers mean better well-being).

Example: If you have felt cheerful and in good spirits more than half of the time during the last two weeks, put a tick in the box with the number 3 beside it.

<table>
<thead>
<tr>
<th>Over the last two weeks</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>More than half of the time</th>
<th>Less than half of the time</th>
<th>Some of the time</th>
<th>At no time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 I have felt cheerful and in good spirits</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2 I have felt calm and relaxed</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3 I have felt active and vigorous</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4 I woke up feeling fresh and rested</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5 My daily life has been filled with things that interest me</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Circle of support and social contact**

16. Do you have support from any of the following (tick any that apply):

<table>
<thead>
<tr>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing association staff</td>
</tr>
<tr>
<td>NCHA staff</td>
</tr>
<tr>
<td>Carers</td>
</tr>
<tr>
<td>Health professionals</td>
</tr>
<tr>
<td>Family</td>
</tr>
<tr>
<td>Friends</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

17. Please rank them in order of importance to you (above)
18. How often do you usually have face to face contact with other people?

<table>
<thead>
<tr>
<th>Options</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than once a day</td>
<td></td>
</tr>
<tr>
<td>Once a day</td>
<td></td>
</tr>
<tr>
<td>Twice a week</td>
<td></td>
</tr>
<tr>
<td>Once a week</td>
<td></td>
</tr>
<tr>
<td>Every two weeks</td>
<td></td>
</tr>
<tr>
<td>Once a month</td>
<td></td>
</tr>
<tr>
<td>Less often</td>
<td></td>
</tr>
</tbody>
</table>

19. Who do you see most often face to face? ..................................................

20. How often do you usually have telephone (or computer) contact with other people?

<table>
<thead>
<tr>
<th>Options</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than once a day</td>
<td></td>
</tr>
<tr>
<td>Once a day</td>
<td></td>
</tr>
<tr>
<td>Twice a week</td>
<td></td>
</tr>
<tr>
<td>Once a week</td>
<td></td>
</tr>
<tr>
<td>Every two weeks</td>
<td></td>
</tr>
<tr>
<td>Once a month</td>
<td></td>
</tr>
<tr>
<td>Less often</td>
<td></td>
</tr>
</tbody>
</table>

21. Who do you speak to most often on the phone/via computer?

..........................................................................................................................

22. DUKE-UNC Functional Social Support Questionnaire

I have ..................................... As much as I would like/much less than I would like

<table>
<thead>
<tr>
<th>Options</th>
<th>☐</th>
<th>☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>People who care what happens to me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Love and affection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chances to talk to someone I trust about personal and family problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chances to talk about money matters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invitations to go out and do things with other people</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Useful advice about important things in life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help when I am sick/in bed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
End of the survey
Thank you for your willingness to spare some time to answer these questions. We really appreciate your help.

Follow-Up Consent Form

I don't mind being contacted again for the next part of the study but I understand that I don't have to participate if I am asked again, and that I can refuse whenever I like without giving any reason.

Respondent name: ......................................................................................................................

Address: ........................................................................................................................................
........................................................................................................................................
........................................................................................................................................

Telephone number: ..........................................

Email address: ..........................................

Signature: ..........................................

Responsible investigator: ..........................................
### Appendix 3: Interview Framework

<table>
<thead>
<tr>
<th>Lead question</th>
<th>Possible follow up questions</th>
<th>To find out:</th>
</tr>
</thead>
</table>
| What is your opinion of the SMaRT/Care Messenger system? | • What do you like/dislike?  
• How hard or easy is it to use? | • General opinion of Care messenger  
• Technical challenges |
| The messenger system is through your television? Do you consider that there are benefits or disadvantages to this? | • Would it be better to send messages another way? | • The degree of benefit of a television based system |
| Have you noticed anything different to your way of life since using SMaRT/Care Messenger? | • Has there been no difference at all?  
• Has it increased contact with family and friends?  
• Do you feel more at ease because you can contact people?  
• Have you started using more digital equipment?  
• Has it made it easier for you to live in your own home?  
• Do you do more or less things now? | • Improvement of well being  
• Improvement of inclusivity  
• Effect on digital awareness  
• Impact on their life  
• Increased self-esteem and reassurance  
• Potential for an independent living aid |
| Now you have been involved with the trial, would you keep SMaRT/Care Messenger or be happy without it? | • What would you do instead?  
• Is it worth paying for the system? | • Value and impact on their lives  
• Worth of the system |
# Appendix 4: Questions sent over SMaRT Messenger

<table>
<thead>
<tr>
<th>Type of message</th>
<th>Question (with possible alternative phrasing)</th>
<th>Responses</th>
</tr>
</thead>
</table>
| **Well being**  | a) Are you reassured that someone cares about your well-being when you get the message “Are you OK” | • Yes, I feel cared for  
• Yes, I know that I will get help if something is wrong  
• No, people are just asking me because it’s their job  
• No, it is annoying  
• No I do not like people checking up on me |
|                 | b) Do you feel that someone cares about you when you receive the Wellbeing message? | • I don’t feel alone  
• I already feel connected  
• I feel less alone  
• I feel part of society  
• It makes no difference |
|                 | How would you like to be asked about your wellbeing? | • By a brief general greeting such as  
  o Are you feeling well today?  
• By a specific question such as  
  o How does your back feel today?  
• By a general statement such as  
  o Tell us if you are unwell today |
|                 | How frequently would you like to be asked if you are OK? | • Twice daily, morning and night  
• Daily  
• Every few days  
• Weekly  
• Less often |
|                 | Would you like to receive general health advice from your GP or other care provider? | • Yes  
• No  
• Only if applies to me personally |
|                 | Do you feel visible? | • Yes, messenger makes me feel visible  
• Yes, I know people care about me  
• No, I feel forgotten by society  
• No, I think no-one pays me any attention |
| **Alarms and alerts** | Does it help you when you get a reminder message to take medication? | • Yes, very much  
• Yes, usually  
• No  
• I don’t need regular medication |
|                 | Does it help you when you get a reminder about bills and payments? | • Yes, very much  
• Yes, usually  
• No  
• I don’t need reminding about my financial affairs |
|                 | Is getting a message reminding you to go to an appointment helpful? | • Yes I would forget otherwise  
• Yes it helps me be organised  
• No, I am well organised |
|                 | Would you like to be alerted about friends or family birthdays? | • Yes, it would help me  
• No, I don’t need reminding |
|                 | Would you like to be told when there is a local event? | • Yes, I like to know what is on  
• No, I am not interested |
|                 | Would you like reminders about religious services? | • Yes, I like to know what is on  
• No, I am not interested |
|                 | Would you like alerts about your social events? | • Yes, it would help me  
• No, I don’t need reminding |
|                 | Would you like alerts about daily tasks such as locking the door, turning off lights, making sure the cooker is off? | • Yes, it would help me  
• No, I don’t need reminding |
|                 | Do you like being told when it is a special day? | • Yes, I like to be informed  
• No, I am not interested |
| **General**     | Would you like to know about local cinema or theatre performances? | • Yes, I like going to the cinema and theatre  
• Yes, I would be interested in signing |
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
</table>
| Do you like getting recipe suggestions?                                                          | • Yes, I try them out  
• Yes, they are nice to read  
• No, I don’t need them  
• No, I don’t cook |
| Would you like to know about library opening times?                                               | • Yes, I use the library  
• Yes, I would use the library if I knew when it was open  
• No, I do not use the library |
| Would you like to have recommendations for books or films?                                       | • Yes, I like reading  
• Yes I like watching films  
• No I like to make up my own mind  
• No, I am not interested |
| Would you like information on sporting events?                                                    | • Yes, I like sport and I might attend the event  
• Yes but only if it was local  
• Only if it was disability compatible  
• No, I am not interested |
| Would you like information on local groups and societies?                                         | • Yes, I might join one  
• Yes I might go if it was disability compatible  
• I might be interested if I had anyone to go with  
• No, I am not interested |
| Would you like to know about local pubs and restaurants?                                         | • Yes, it would help me to go out more  
• Yes, if it has disability access  
• No, I have no one to go with  
• No, I am not interested |
| How would you describe your feelings about receiving information about what is happening in your community? | • It makes me feel part of society  
• It makes me feel included  
• It makes me feel visible  
• I am not interested |
| About Messenger: Would you pay for the service, and if so, how much would you be prepared to pay? | • No, I would not pay for it  
• Yes, less than £5 per week  
• Yes, between £5 and £10 per week  
• Yes, between £10 and £20 per week  
• Yes, more than £20 per week |

Friends and family

How would you describe your feelings when you get messages from friends and family?  
• I feel included?  
• I feel remembered?  
• I feel important?  
• I feel isolated because I am not with them  
• I have no particular feelings

Who do you consider to be part of your family?  
• Direct relatives only (parents, brothers, sisters, children, grandchildren)  
• People married into your family (parents in law, brother or sister in law, son or daughter in-law, etc)  
• Indirect relatives (cousins, aunts, uncles)  
• Other very close friends

How many of your friends send you messages over care messenger?  
• Many of my friends  
• Some of my friends  
• None of my friends

Do you use the computer/ social media/ emails to communicate with your friends and family?  
• Yes, I am on Facebook or Twitter  
• Yes, I use emails  
• Yes, I use Skype  
• No, I don’t use the computer

What do you like best about messages from friends and family?  
• Finding out the latest family news  
• Keeping up to date with friends  
• Seeing photos  
• Feeling included