Designing Usable and Acceptable Reminders for the Home

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Abstract

Electronic reminders can play a key role in enabling people to manage their care and remain independent in their own homes for longer. The MultiMemoHome project aims to develop reminder designs that are accessible and usable for users with a range of abilities and preferences. In an initial exploration of key design parameters, we surveyed 378 adults from all age groups online (N=206) and by post (N= 172). The wide spread of preferences that we found illustrates the importance of adapting reminder solutions to individuals. We present two reusable personas that emerged from the research and discuss how questionnaires can be used for technology transfer.

Introduction

In the MultiMemoHome project (MMH, [1]), we work on reminder solutions that help older people remain independent and in their own homes for longer. In a highly personal space like the home, it is particularly important to adapt technological solutions to end users' individual needs and preferences.

Therefore, we performed a comprehensive mixed-methods user requirements study. Here, we report on one aspect of this work, a questionnaire survey. This method allowed us to reach an audience that was larger and more diverse than our focus group and home study participants. The questionnaire was designed to cover key factors that had been derived from a literature review and our own previous user requirements work. In order to maximize coverage, it was disseminated both online and by post.

Questionnaire Design

The questionnaire was designed to be completed in 15 minutes. It consisted of 23 questions, many of which had already been used in the MATCH project [2]. Seven questions focused on basic demographic data (age, gender, living arrangements), and the use of computers and related technology. This allowed us to spot frequently used technologies that might serve as the basis for a reminder system. Two questions provided space for comments about relevant health issues such as hypertension or diabetes.

Since we aim to adapt reminder delivery to the user as much as possible, we included questions about preferred reminder delivery modalities and delivery devices. Devices ranged from mobile phones to specialized screens; modalities included vision, hearing, touch, and smell. We also asked respondents about sensory impairments that might impact on the modalities they can access. Several questions focused on remembering, i.e., whether respondents felt they were experiencing problems with their memory, what tasks and events they needed reminding of, and what reminder strategies they currently used around the home. Finally, we asked whether respondents were caring for a person with memory problems.

We provided as much space for comments and suggestions as possible, both in multiple-choice questions and through open questions where respondents were asked to elaborate on earlier choices. Although many respondents did not take advantage of the open questions, those that did provided important insights into user groups that we had not anticipated.

Online versus Mailshot Sample

The online questionnaire was created using Surveymonkey [3] and published in November 2009. It was disseminated through email, social networking, and web sites. It was also sent to the email mailing list of the Centre for the Promotion of the Older Person's Agenda (COPA), Queen Margaret University, Falkirk Senosory Centre, and West of Scotland Senior's forum. The questionnaire is prominently

linked on the "Get involved" section of the MMH website [1].

The online questionnaire was revised and reformatted for postal distribution using a 16pt font to ensure readability. A total of 900 copies of the postal version of the questionnaire were sent out to the MMH user panel, colleagues, charities, Community Health Partnerships, and the postal mailing list of COPA. The questionnaire was distributed in mid May 2010; responses were still coming back in mid July 2010. Postal responses were entered in anonymised form into a database using Surveymonkey, which ensures uniform storage and allows people at several sites to share data entry. The present paper is based on a snapshot of the online and postal results taken on July 16, 2010.

Demographics

	18-30	31-60	61+	Total
Online	46 (22%)	128 (62%)	32 (16%)	206
Mailshot	2 (1%)	46 (27%)	124 (72%)	172
Total	48 (13%)	174 (46%)	156 (41%)	378

Table 1: Distribution of Age Groups

The return rate for the postal questionnaire was 19%. The best single response rate was achieved through our project volunteer user panel (75%), the response rate for the large COPA panel was 22%.

The postal questionnaire was indispensable for obtaining a good sample of responses from older people, as Table 1 shows. A third of respondents to the postal version were aged between 61 and 70, a third were aged between 70 and 85, and 8% were 85 or older. 44% of respondents to the postal version lived alone, as opposed to 23% of respondents to the online version.

80% of postal and 99% of online respondents owned a computer, and 69% of the postal and 90% of the online sample used their computer daily. While 73% of the online sample used

mobile phones daily, this was only the case for 40% of our postal sample. A similar proportion of people regularly watched cable or satellite television (37% online, 41% postal).

Although our postal sample allowed us to access a segment of the population that is less computer-literate, the proportion of people using technology is still comparatively high. For example, 62% of our postal respondents aged 71 or above used the internet, but in a recent survey of internet use in the UK, only 40% of people aged 65-74 and 20% of people aged 75 and over were online [4].

46% of the postal sample had long-term care conditions, as opposed to 17% in the online sample. Postal respondents also reported more sensory problems (40% vs. 25%) and more problems with their memory (40% vs. 15%).

Does One Size Fit All?

Half our younger and middle-aged participants and 44% of our older respondents stated that they sometimes forgot to do things around the home. While only 17% of younger participants said that they frequently forgot chores, tasks, or events, 31% of middle aged and 41% of older respondents noticed that they often forgot to do something.

Table 2 lists the types of tasks and events of which respondents would like to be reminded, sorted by age group. 44% listed special occasions and birthdays, followed by appointments (32%) and weekly tasks (28%). Although older people overall describe themselves as more forgetful, they are less likely to want reminders for almost all of the items listed. In particular, older people remembered daily routines and important, urgent tasks such as bill payments well.

21% of respondents did not specify a preferred modality for reminder systems, while 17% of did not specify a preferred device. The reasons for not answering these questions are diverse. While some respondents may not have understood the items or forgotten to answer them, others, especially older people and people aged between 45 and 60, made it clear that they did not need or want reminder systems, because their existing strategies worked well

for them or their memory was still good. Therefore, they felt that the questions did not apply to them. This is a common problem: Healthy active older users who take part in user requirements studies often do not identify themselves as the group who would benefit from the solutions offered.

	18-30	31-60	61+	All
Medication	11 (23%)	23 (13%)	33 (21%)	67
Daily Tasks	11 (23%)	24 (14%)	6 (4%)	41
Weekly Tasks	19 (40%)	54 (31%)	33 (21%)	106
Bills	20 (42%)	57 (33%)	15 (10%)	82
Appointments	17 (35%)	65 (37%)	40 (26%)	122
Birthdays etc.	29 (60%)	91 (52%)	58 (37%)	168

Table 2: What is Forgotten? (% of Age Group).

66% of those who specified a preferred modality voted for visual reminders, 37% for speech, 30% for non-speech sounds, 23% for touch and only 3% for smell. Older people were more likely to favour speech (46% positive, $p<0.01$, χ^2 test) and less likely to vote for vision (53% positive, $p<0.005$, χ^2 test).

58% of those respondents who specified a modality voted for only one modality (174 of 299). No strong default choices emerge. Only 54% of these 174 people chose vision, while the other 46% prefer non-visual reminders. Of the 38% who chose audio reminders, 22% chose speech, while 16% strongly preferred non-speech sounds. This result underscores the importance of offering users a range of modalities to choose from, as well as the importance of offering choice within modalities.

A similar wide range of preferences can be observed for devices. 55% of those who specified at least one device would like to receive reminders on their mobiles, 43% on their computers, 29% on a watch-like device, 25% on the TV, and 21% on a landline phone. 30% of respondents liked the idea of a screen in the kitchen, but only 15% favoured a screen in the hallway.

Again, the preferences of older people differed significantly from those of younger or middle-aged respondents. Older people were more likely to prefer landline phones (40%, $p<0.00$) and less likely to want reminders on their mobiles (33%, $p<0.00$).

36% (N=114) of those respondents who indicated preferred devices only specified one device. Those preferences are even more evenly spread out than the modality preferences. The most popular single device, the mobile phone, receives just below one in three votes in this particular group (31%), watch-style devices are favoured by 21%, landlines and computers are chosen by 14% each, 11% favour the TV, 7% like the idea of screens in the kitchen, and 3% want them in the hallway.

In conclusion, reminder systems should not just support a range of modalities, they should also be adaptable to a range of devices. The preferred device will also depend on what is available and acceptable at the time. A more representative sample of the population might not yield the relative ranks we observed here. In particular, we would expect computers to be less popular as reminder devices. The sheer diversity of strong preferences, however, will probably remain.

Personas

Assigning appropriate individual packages to users is crucial for increasing the likely uptake and fostering continued use of telecare solutions. However, it can be difficult to codify knowledge required to tailor packages to clients. Technology designers, developers, and care professionals can use personas to make an initial informed choice among the devices and care packages available.

Personas are intended to serve as a starting-point for discussion. If the client is a good fit to the persona, the initial care package associated with that persona should already be relatively close to the client's needs and preferen-

ces, and therefore only require minor adjustments. Personas can be revised and augmented to reflect the experience of health and social care professionals in the field. Here, we describe two personas that pose particular challenges for reminder system deployment, Rita and Derek.

Rita prides herself on being fit and healthy. She is very well organised, and does not need any automatic system to help her, so she does not have any opinion on devices and modalities. The medication reminder system that came as part of her standard telecare package, such a system is for old people, not for her.

Derek knows that he needs reminders, because he forgets a lot. But he simply cannot motivate himself to stick to any single system, especially when he has another bout of depression. Reminder systems will only work for Derek if they are coupled with appropriate support from the Community Mental Health Team.

Lessons for Technology Transfer

Questionnaires such as ours have great potential for informing technology development and care provision if the results are interpreted judiciously. We found that postal distribution is essential for reaching older users, even if they have and use a computer. To ensure acceptable return rates, it is also important to liaise with groups that have access to active user panels. Our own user panel consists of around 50 people who have been recruited through projects including UTOPIA [5] and MATCH [2].

Although our sample is not representative of the older population, the results vividly illustrate the range of devices and modalities that need to be accommodated in a truly flexible design. Small design decisions such as where to place the screen of a visual reminder systems matter greatly.

We were also able to identify useful and re-usable personas by looking for salient patterns in respondents' answers that can be linked to known properties of the target population. We found that giving respondents plenty of space to share stories, ideas, and remarks is crucial for identifying personas and making sense of patterns of responses, even though many

respondents will not take advantage of this opportunity. For example, the persona of Rita was based on answers to open-ended questions by some of the people who did not state any modality or device preferences.

We recommend using questionnaires for exploring high-level parameters of personalisation. Patterns and themes should be taken seriously even if they are based on only a few questionnaires, because these responses might be representative of groups that are less likely to participate in research or that are underrepresented due to the sampling strategy. For example, the persona of Derek was based on two questionnaires that gave a voice to older people with depression, who account for around 10% of the older population [6].

Our questionnaire items could also be re-used when configuring deployed systems. For example, the items designed to elicit device and modality preferences could be extended with pictures or small vignettes to elicit users' views on the configuration of their own system. If users are not willing to engage with those questions, this might indicate that they are not ready to use automated systems, and reasons for this resistance as well as alternative solutions need to be explored.

References

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