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Engaging Older People using Participatory Design

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ABSTRACT

The use of digital technologies is increasingly proposed in health and social care to address the aging population phenomenon but, in practice, the designers of these technologies are ill equipped to design for older people. We suggest participatory design as an approach to improving the quality of design for older people but, based on previous work and our own experiences, identify four central issues that participatory design approaches need to address. We describe an approach to early engagement in design with older people that address each of these issues and some of our experiences applying the approach in a variety of different design projects. We conclude by discussing some of the issues that have been highlighted when attempting to apply this approach in different design contexts and the issues that have been raised when working with partners who are less committed to the idea of engaging with older adults in participatory design.

Author Keywords

Older people; participatory design; empowerment; changing attitudes.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Designers of digital technology are being confronted with an increasingly significant challenge, or perhaps opportunity: the ageing population. Increased life expectancy yields enormous benefits for the individual and society. For example, the majority of caregivers are older adults, older adults in the UK work for longer and retire later and they are a key part of the make-up of many voluntary organizations [34]. However, with the increase in the numbers of older people comes with an increase in the resources a society needs to provide to care for them. This is caused by higher levels of incidence of age related diseases such as dementia and other health problems that are a consequence of the normal ageing process [13]. Of

additional interest for digital technology designers, the emergence of the “grey market” [6], the term used in economics to denote the increasing preponderance of purchasing power controlled by older adults is causing a rise in demand for digital products tailored towards older adults.

Although appropriately designed technology has the potential to address many of the needs of the ageing population, in practice, new technologies have been the cause of a number of problems that older people experience, rather than a solution. For example, the growing use of “Chip and PIN” technology and the rise of Internet shopping has resulted in plans to phase out the system of cheques in the UK. Consequently, it is widely anticipated that this will cause significant problems for the older members of society, many of whom still rely on cheques [33]. The lack of quality when designing new digital technologies for older people is well documented. Previous work [11] noted that younger designers sometimes struggle to create appropriate technologies for the diverse population of older people.

The social model of disability [28] provides some explanation for this occurrence noting that someone with impaired health or cognitive function is in fact only transformed into someone with a disability through barriers that are created by the society around them. For example, a hearing impaired man watching a film presentation with subtitles in a museum is *impaired* but not *disabled*. But if the museum fails to provide subtitles, he becomes disabled as a direct consequence of the actions or inactions of the technicians, curators, and managers of the museum. The disability is a consequence of a failure in design. We suggest that inappropriate design is a mechanism through which society disables people with impairments by ignoring them. By understanding why older people are frequently neglected in digital technology design, we may start to take steps to address their needs.

This paper presents a case study that illustrates: (i) a simple, participatory approach to design tailored to work with older people that focuses on experiential aspects of day-to-day life and interactions with digital technologies which can be implemented by design teams with no prior experience of participatory design or engaging with older adults; (ii) an examination of some of the issues that arose applying this framework and; (iii) reflections on the issues that were encountered trying to advocate wider uptake of the approach and reflections on why this may be.

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RE-EXAMINING THE DESIGN DOMAIN

Joyce et al. [15] propose that ageism is a significant contributing factor leading to poorly designed artifacts being produced for older adults due to neglecting their experiences, needs and desires. Older people are frequently perceived and portrayed as being resistant to technology [30]. For example, there is an attitude amongst some computer trainers that older people are not the intended recipients of new digital technologies and should not bother to learn to use them [30].

However, the reality is that older people do not conform to the ageist stereotypes that evidence suggests many people hold. In fact, they are willing to accept novel digital technologies into their lives. The issues that arise with acceptance do so because the ways in which older people construct their decision to use or not use these technologies are fundamentally different to the ways younger adults do. Wilkowska et al. [35] studied the acceptability of a personal digital assistant and, through this process, found that older adults acceptance of technology is a complex process but that the key difference between them and younger users was that the older adult was more likely to perceive the device as not being useful and being afraid of failure when using the device more than the younger users involved in the study. When these issues were addressed, the older adults readily engaged with the new technologies.

Furthermore, while eyesight, hearing, memory and physical coordination impairments are a common consequence of the ageing process [13] and make digital technologies harder to use, we would suggest that they are not the most fundamental problem. In fact, placing undue emphasis on the functional characteristics that make older people different to younger people can distract designers from considering older people as complex individuals with their own sets of social and emotional needs and desires. As Keith and Whitney state *“an old person is not just the sum of their acquired impairments”* [16]. This issue arises in part because of the historical legacy of human-computer interaction (HCI), which originally framed the user as “information processor” with little consideration given to the different qualities of their experience of technology.

More recently, as computers have moved out of the workplace and into the home and wider world, new paradigms have arisen that prioritize experience-centered technology design methodologies [36] but such third wave HCI thinking has had little impact on the design of technologies for older adults. However, experience centered design hold vital lessons for those who wish to work with older adults. Designing digital technologies for older people is not simply a matter of addressing the immediate consequence of the most obvious functional impairments.

In addition, digital technology designers need to consider that the fundamental paradigms of interaction that they design around are not the ones that the older generation have necessarily been brought up with, or indeed even have

any knowledge of. An example of such a metaphor would be the desktop of a personal computer mimicking an office desktop with files, folders and a bin to place unwanted material in. These metaphors are not intuitive and need to be learnt through use and for the older user, or indeed anyone unfamiliar with the metaphor, they can be unsuitable [12]. When designing any technology that is intended to be used by older people, designers should carefully consider the metaphors it leverages to avoid producing systems that, at a fundamental level, present the older user with a metaphor they do not understand.

Even more significantly for designers, there is a tremendous diversity within the population of older adults and people with dementia. Considering them as one homogenous group ignores the fact that the over 65's are diverse with respect to cognitive ability, living arrangements, age (as within this group there are in fact multiple generations), income and health. In fact, as a collection of individuals, people above the age of 65 years old, comprise a group that is considerably more diverse than members of the general (younger) population [12]. As such, the experience of each individual older person is unique to them and shapes their expectations when they encounter a new technology in ways that an interaction designer does not necessarily account for [27].

OUR EXPERIENCES ENGAGING OLDER ADULTS

In our previous work with older adults we have found that they are capable of engaging in participatory design activities but working with them can be different to working with younger adults. Our previous work engaging with people with dementia and their older caregivers in the design of safe walking aids demonstrated that they could struggle when trying to envision new technologies [18]. Massimi et al [22] observed similar results when engaging older adults in the development of mobile phones. This work also demonstrated the need to respect individual's contributions to the design process. We conducted in-depth analysis of participants narratives from participatory design sessions but found that, at times, this led to ignoring their directly articulated requirements. While some older adults can struggle to articulate themselves, interpreting their utterances without properly engaging them in the design process is not an appropriate solution.

This work, along with work with individuals with Parkinson's Disease [23], highlighted the importance of being flexible when engaging older adults and engaging with them as early as possible in the design process. If a designer starts down a path that any participant does not feel is valuable to them, they will struggle to engage with the process or feel like they are being taken seriously. We have also found that some older adults struggled to focus during these design sessions, particularly if the session goes on for too long as they did not enjoy deep exploration of issues being forced on them by the designer. This is particularly true of cases where they are hypothesizing

about future technologies that do not already exist. In contrast, older adults were typically delighted by the opportunity to discuss their own experiences in great detail and were much more engaged when doing so. Finally, the language used in design sessions and the structure of the sessions needs to acknowledge that the older adults are presenting their own life experiences. They are not discussing a task they perform and their activities do not fit into the structure participatory design methods assume.

The Challenges in Engaging with Older People

The motivation to improve the level of engagement with older adults can arise from a theoretical view of the political underpinnings of design [25] or from working with them and seeing their perspective on design [1]. Previous work in this area [8] correlates with our own experiences and led us to identify four challenges participatory design approaches need to overcome when engaging older adults in design.

Maintaining Focus and Structure in Meetings: Keeping older participants focused on the topics of discussion and giving them clear opportunities to present their ideas in meetings is a major challenge. Their conversations could wander onto unrelated matters such as recounting anecdotes that are not relevant to the design. If not addressed, the topic of conversation can drift and the discussion skips important aspects of the design domain.

Representing and Acting on Issues: In our previous work, we tended to over-analyze our participants utterances, giving them a complexity that the participants did not intend. However, the formal Thematic Analysis approach that we used [3] did reveal interesting and relevant insights into their narratives. The design approach that we construct utilizes analysis but, at the same time, allows participants to influence design as directly as possible.

Envisioning Intangible Concepts: Older participants are frequently observed having some issues either envisioning future technologies or envisioning intangible concepts [22]. This is an issue that we have encountered in our work as well. Design approaches that aim to engage older people will need to address this by supporting their creative thinking on intangible issues and future technologies.

Designing for Non-Tasks: When designing specifically for older people, the design is often not situated in a workplace domain. This poses problems for designers wishing to leverage existing participatory methods as they are imbued with inherent assumptions about the domain in which they are applied [5]. The design methods can focus on understanding tasks of work-flows and often assume that users are experts in the domain design occurs in. This means the methods need to be modified before they are suitable for addressing experiential aspects of design.

THE OASIS APPROACH

The OASIS (Open architecture for Accessible Services Integration and Standardization) approach (Figure 1) to

designing with older people was developed as part of a wider project aiming to develop technologies for older adults. While the individual methods used were not novel, the formation of the process, particularly the attention we pay to less tangible issues around establishing an appropriate atmosphere in the meetings, facilitate younger designers' novel insights into older peoples day to day lives.

Initial scenario work is used to gain a sense of the design domain and the issues that the participants encounter in their day-to-day lives. The designers can create potential solutions to these issues or challenges informed by the analysis of the groups. These issues and designers' ideas about interventions feed into a low fidelity design workshops conducted with the same people that took part in the exploratory session. The goal of these workshops is to validate the designers' assessment of the domain and to start gathering insights into the specific design of an intervention. The approach was created and documented with those who have no experience with participatory design in mind and is kept as brief as possible to allow designers who implement it to start to engage with older adults early in their design work with minimal effort.

The creation of a friendly atmosphere in this process is particularly important as it helps participants to mutually inspire each other through the social interactions and collaboration. The facilitator must not "drive" the activity rigidly but communicate to participants that in the early stage of design there is no "correct" answer and that all opinions are can be explored. Previous work on the subject has shown that group interaction, particularly amongst older people, plays an important role in determining the quality of output from a focus group process [2,10].

The facilitator needs to be mindful of using appropriate and accessible language when guiding discussions and providing instructions and seek to keep focus on the activity during group work. They must ensure that all of the participants are given the opportunity to contribute and be aware of the fact that many older people are not familiar with state of the art consumer technology [9]. The facilitator should be aware that there may be a lot of discussion not related to the subject matter. In these cases, they should be patient and engage in the conversation.

The creation of a *common frame of reference* between participants and designers is an important part of establishing the right atmosphere in group work. Establishing the common frame of reference leads to the creation of a new set of jargon that helps the participants express their thoughts in the design domain, contributes to democratizing the meeting. This helps create a sense of community or shared purpose within the group by giving them their own 'insider' language and can inspire a sense of agency in the older adult group [17].

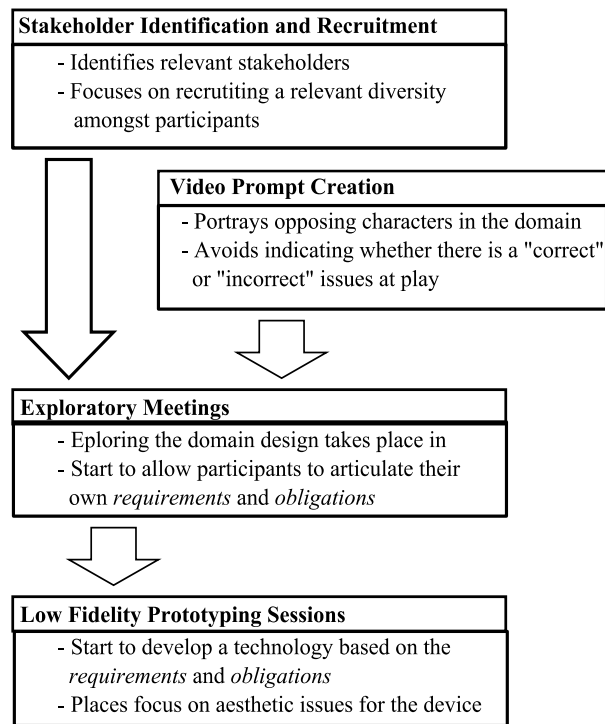


Figure 1. The OASIS Process.

The design exercises should be located in a building that is familiar and accessible for the participants. General deficits in sight which occur as part of the normal ageing process [13] mean that rooms in which the meetings are conducted should be well lit, preferably with natural light. Locations should be quiet and free from distractions or high levels of ambient noise. Participants should have ready access to toilet facilities that they should be made aware of at the outset. The selection of an appropriate timing and structure for activities depends on the participants but they should be made aware of the structure and timing of the meetings when they are being recruited and then reminded at the start of the meeting. Even when sessions are going well, the stated time schedule should be followed to guard against the risk participants feel pressured to participate to a greater degree or for longer than they intended.

STAKEHOLDER IDENTIFICATION AND RECRUITMENT

Recruitment needs to begin well in advance of the design sessions as, although it is not labor intensive, it requires time. Beginning at least eight weeks before the design meetings is recommended and having concrete dates for the design sessions at this early stage makes it easier for older people to schedule meetings into their calendars. Based on our experiences, the recruitment for meetings can take as little as one week but unfortunately the variability in the time it takes to arrange them is vast. Groups should consist of between four and five participants, but it is better to over recruit because as older adults can cancel at the last minute. Our experiences and previous work both suggest recruiting twenty percent more older adults than required [2].

Recruitment can be performed through a variety of means like contacting charity or advocacy groups for older people.

The 65+ group is considerably more diverse than any other single age group so positioning the design work within this area is essential. It is important to try to ensure that there is *relevant diversity* in the participants. For example, when recruiting for a transport based study we recruited a group with a range of different levels of personal mobility and differing typical means of transport.

The 65+ group we typically refer to when talking about the older population is not a truly age homogenous group and has specific generational differences that impact on their attitudes, and previous encounters with technology, have different health problems, differ in their finances, and their views on social issues (such as privacy and gender roles). Recruitment must recognize differences in attitude and behavior due to generational differences that are relevant to the application and select participants accordingly.

In addition to variations in physical abilities the ageing process will cause deterioration in sensory abilities in particular eyesight and hearing [13,32]. Recruitment should attempt to span this range of abilities as appropriate and elicit participants' accounts of their degree of sensory impairment with a view to understanding the character of the group of participants and the likely impact of this on both the design itself and the design process. Furthermore, recruiters need to be aware of how the method of contact they employ to recruit elderly participants may affect participation [19]. For example, phone calls can prove challenging for the hard of hearing whilst letters can prove difficult to read for those with visual problems [2].

Finally, variation exists in the personal circumstances in which older people find themselves [31]. These should be considered separately from the social, cultural and national variation discussed previously. For example, the living arrangements of an individual can range from living alone, co-habiting with a partner, living with younger or older relatives, living with extended families, living in sheltered accommodation, or living in residential accommodation.

Practical Experiences Recruiting Participants

The OASIS design approach was applied in three domains. The first was in the design of a digital technology to promote healthy eating. Healthy eating is an area that can be problematic for older people because of issues such as the loss of a partner who used to cook, decreasing motivation to cook, decreasing mobility meaning that buying fresh food is difficult or a lack of funds meaning that buying ingredients is challenging [37].

The second area we designed in was personal mobility. Elderly people can lose personal mobility as they age due to conditions such as osteoarthritis, deterioration in musculature, loss in range of motion of joints and physical balance problems. In addition, the elderly person's personal

freedom to travel is often restricted through the loss of their ability to drive. Impairments in vision and hearing can make navigating new or altered environments, due to roadwork for example, much more difficult. These factors combine to make getting “out and about” very challenging for some older people.

The final area that we looked at was designing to promote feelings of personal security in the home. Older people have many fears and concerns about their personal safety, these fears are not necessarily borne from a high level of crime experienced by older people though as the number of older people who are victims of crime is actually quite low. These domains are all part of the wider context of digital technology applications for the home that have arisen in the third wave of human-computer interaction. This means that the issue is not work or task oriented but instead more around influencing the outlook and attitude of older people towards food preparation and consumption.

One issue that became apparent in recruiting for the healthy eating study was that the majority of the participants considered themselves to be more mobile individuals than the typical older population. This was problematic because the one of the relevant areas of diversity was the level of mobility of each of the participants. Later design work on personal security and transportation worked with Age Concern units in towns and villages that were attended by people with more diverse levels of personal mobility.

CREATING VIDEO PROMPTS

One of the four central challenges that we identify is supporting older adults when they envision new technology. The OASIS design approach uses a video prompting technique inspired by the *invisible design* concept [4]. Participants are presented with a video that illustrates a scenario in which actors have and discuss a fictitious future intervention for the problem domain. Videos have often been used as a tool in participatory design work to provoke response, such as the design documentary [29] and the creative response technique [14] which involve creating documentary film and allowing participants to edit the film to display their own responses. Other techniques have centred on recording participants to give them tools to portray their conception of technology [20]. Performances in other forms, such as theatre, have also been used to convey the needs of specialist user groups to designers who might otherwise struggle to understand their needs [26]. The invisible design technique has similarities to the concept of ContraVision [21]. The videos depict a situation in which characters have the device being envisioned in the design workshop.

The *invisible design* format of video or story does not constrain or direct users towards specific features or aesthetics for a device because *invisible design* never shows the device being used or makes any details of it explicit (hence the term invisible). The approach takes some effort

but can be of great use when working with older users because it leverages a convention they are familiar with (film and storytelling) in order to present them with a scenario that they will not be familiar with. The older people work well when critiquing physical artefacts and they respond to the device discussed in the video as if it were real more easily than they can imagine a hypothetical device, with the additional benefit of not getting caught up in criticising the particulars of a device as we previously observed. Participants can use the depiction of intangible issues in the video as starting points for their own discussions about intangible issues that relate to the design domain. Participants can also project their own reactions onto the characters and give voice to them through discussion of how they believed the characters felt.

However, like ContraVision, these videos must not present one point of view as the correct point of view. ContraVision calls for two videos, one good case and one bad case. The invisible design videos that were produced centred on a pair of characters and the interactions between them never showed a definitive right or wrong answer to the questions they raised. Closure in the videos came from the personal interactions between the character and the future device. Achieving this deliberate ambiguity requires thought and planning and design teams may need to recruit outside assistance to perform this work. By carefully guiding the script and direction of the video, the designers present the users with intangible issues and elicit a variety of responses.

Practical Experiences Using Video Prompts

The video we created for the healthy eating design sessions examined the interaction between a mother and her daughter in the mother’s kitchen as the daughter discovered that her mother was not eating properly. The film starts with the daughter part way through explaining her problems at home with a broken water main as she is preparing food for a group of friends. The daughter notices that the cupboards don’t have much food in them and this causes an argument with her mother about not eating enough. The argument implies that the mother has a device that is meant to help her eat healthily but she complains about it for a variety of reasons. The daughter demands to know why this is the case and why the mother was not using her “machine”. The script suggested that the “machine” somehow monitored and helped plan meals and was easy to use but the device was never shown in the film, only pointed at and the film concluded avoiding showing the precise functionality of the device and whether the mother would start to use the device so keeping the device ambiguous.

The video was extremely well received by the participants who enjoyed the scripted humor in the video and felt that some of the issues that it portrayed resonated with their own experiences, one female participant saying. “*I thought I could identify with it because I have children and they turn into the food police.*” The participants produced numerous



Figure 2: Alice and Bob sitting on their mobility scooters

ideas in both the early exploratory work and the later low fidelity prototyping work, in contrast with previous literature on the subject, this further demonstrated the utility of the video approach. In further work we would add an extra role to the video to turn it into a prompt to develop conversation around the subject of scenarios.

The video in the transport study portrayed showed two older characters, Alice and Bob (Figure 2), on their mobility scooters trying to get to a cafe to meet their friend. The pair used mobility scooters to get round and the video opened on Alice getting her new mobility scooter. Bob, who had already owned and used his scooter for a while was trying to show Alice his expertise but Alice rapidly learned to use her scooter much to Bob's annoyance. Alice had a small device attached to her scooter which Bob hadn't seen before; this device was our *invisible design* artifact. Although never clearly shown it gave Alice a variety of functions to use throughout the video giving her the edge over Bob at all times. The video culminates in a row between the two which leads to Bob going on his own route to the cafe rather than following Alice, this leads to all sorts of problems as he gets stuck at steps, goes down dead ends and gets blocked off by rubbish. Alice finds him and guides him to a new meeting place eventually having been told by the device their friend says their original meeting place is too crowded so has gone somewhere else.

The participants enjoyed the video and felt it resonated with their experience with Bob laughingly referred to as a *"typical man, doesn't listen!"* or a *"grumpy old man!"* by female participants. The video in this case portrayed the scenario which we would discuss for the rest of the session and this would significantly affect the results of the scenario work.

The work examining creating videos for personal security adopted a slightly different approach and created pastiche scenarios featuring well known TV characters. This was done in the hopes of lessening the impact of portraying older people who were afraid for their safety but appeared to backfire because the participants could not take the characters seriously, one female participant dismissively stating *"that for me is not serious"*.

EXPLORATORY MEETINGS

These sessions are based around the construction of scenarios to explore the problem domain and develop requirements for the design of a device. The sessions are derived from the Task Analysis Framework (TAF) [7] with significant alterations made to account for the non-workplace domain in which they will be applied. The TAF approach allows us to address the challenge of maintaining structure in design sessions. We give the TAF title of each stage, the time it should take to perform, the modified way we present it to the participants and its purpose:

Information Gathering (15 minutes)

"So to kick the meeting off we want to get to know you a bit better so tell us a bit about yourself, what sort of experiences you've had in <DOMAIN> and what sort of experiences your friends have had?"

The accounts of experience elicited help to inform the creation of a narrative around the participants' activities and are a source from which to draw quotes to support and enhance the requirements presented to other members of the design team. The information from this stage is also used in the next stage to inform the creation of scenarios.

Prompt Viewing (10 minutes)

"Ok we're going to watch a short, fictional video now that's set in the future where someone has actually gone ahead and made a device to help with issues in the <DOMAIN>. We're going to see what sort of affect it's been having on a couple of people and then after the video we'll have a chat about it."

The facilitator shows the participants the *invisible design* video. This promotes discussion and provides scaffolding for participants to describe their own thoughts about future interventions.

Scenario Generation (20 minutes)

"We'd like to move on now to try and discuss what we think are the main differences between Alice and Bob in the video. What are Alice's characteristics that make her so capable, what are the things about Bob that lead him into trouble? Outside of the story we've watched, how do you think the two behave?"

The facilitator moves the group on to the development of scenarios based upon the information gathered in the first stage. The characters of "Alice" and "Bob" are the characters in the *invisible design* video. The facilitator should record the scenarios being generated in some shared space in order to focus the attention of the participants, for example, on a white board or large sheet of paper.

Claims Analysis (20 minutes)

"Now we've come up with our stories about Alice and Bob it's time to try to work out why they are so different. What does everybody think might be the reasons which make the difference between them? Are there physical things or

mental things? Are there things that make Alice's life easier or things that make Bob's life harder?"

During this stage participants think about why the scenarios play out the way they do. This stage informs the feature envisioning by exposing some of the root causes of negative and positive experiences.

Feature Envisioning (30 minutes)

"Ok now we've run through those idea's let's move on to think about how we can help out Alice and Bob a little bit and make their lives easier. Alice has a few things that really help her out in her day to day life. What can we do to make sure those things keep happening? Bob on the other hand has lots of problems in his day to day life, so what can we do to get rid of them for him and make his life run a bit more smoothly, like Alice's?"

Participants describe features they imagine a new system having. The claims should be referred back to and feed into this stage as participants envision ways to reduce their negative and increase their positive impacts. Participants talk about their ideal solutions at this stage and frequently exceed the bounds of what is feasible. However, this stage reveals their aspirations which give important insights for the designers. The solutions that are proposed should be well understood by the members of the design team present in these meetings.

Scenario Envisioning (30 minutes)

"So we've thought of some ways to help out Alice and Bob now, the last thing we want to do is consider why these idea's might not work out the way we want them to, what sorts of problems might crop up if we imagine each of these pieces of technology in the stories we came up with about Alice and Bob to start with? We'll go through the different ideas on the whiteboard starting with..."

Finally, participants are asked to consider how their new idea might interact in the old scenarios and, through this, imagine new scenarios. This stage should be presented to them by asking them to speak about what could go wrong with their ideas when included in Alice and Bob's lives.

Analysis

The analysis process formalises the participant's comments in the first design session and helps generate a Topic Guide that will be used to guide discussion in the second design workshop. The process needs to be carefully performed as it must accurately represent the participants statements (one of the four challenges identified in our previous work) while allowing the designers to organise and think about their statements in an engaged, considered manner. The analysis of the information gathering stage draws out quotes and gathers them into themes. When working on the scenario generation and claims analysis the coding should look for comments relevant to the scenarios and group them around the characteristics of the two scenarios. Analysing

the later stages is guided by a simple process: codes related to potential features for a design are grouped together as *requirements* and codes related to potential problems with a solution that must be avoided are grouped under *obligations*. Requirements tend to emerge from discussion in the feature envisioning stage whilst obligations come from scenario envisioning.

By searching the transcript from the meetings for the participants' statements of requirements and obligations, the participants are given a more direct impact on the designs that are produced. The requirements can then be supported by tying them to the codes taken from the output from the earlier scenario work and information gathering. In this way, the output from these sessions can also be presented to the other members of a project team couched in language they can understand but supported by the authentic voice of the user. These should be presented to the project team in a way that preserves the link as much as possible. This might be in the form of documents that compile selected quotes or through a website that links requirements to the sections of transcript that relate to them. In the low fidelity prototyping sessions the designers feed their analysis back to the users and let them comment on it, to validate their findings.

Experiences Running Exploratory Sessions

The initial trial of the approach in the design of a nutritional adviser did not leverage the video prompt to trigger discussion of a scenario; instead it only used it to promote discussion on future technologies. We observed that participants struggled to separate out the act of creating abstract scenarios from their own experiences, often talking about personal issues such as one female participant who was fixated on the quality of care an aunt received in a nursing home *"like I say you always look after someone the way you would like to be looked after, not like a dog"*. When the groups started to discuss future technologies they tended to think in terms of their own personal nutritional needs *"I don't need any help, I need information."* Rather than thinking about the ways in which they could help with someone in an abstract scenario.

However, the group did still excel when providing critiques of the ideas they had put forward, one male participant neatly surmising the feelings of the group by stating that the process needed to be *"Persuasive rather than mandatory."* When analyzing this work, the participants' statements clearly broke down. Table 1 shows how we choose to represent the participants' statements in a way that preserves their voice when examined by other people not present in the design meetings.

In the design meetings for the transport adviser, the participants were much more vocal when creating scenarios around the qualities they perceived Alice and Bob having. A central theme was confidence, as epitomized by one female participants comments *"Confidence does a lot of*

things for people“. The sessions yielded surprising results for the facilitator when they found that participants felt that personal levels of physical disability had very little to do with how well people were able to navigate their environment. As one female participant put it when talking about Alice “*she’s obviously prepared to follow instructions and make the most of the apparatus she’s got*”. The productiveness of the discussion contemplating design artifacts contrasted with our previous experiences and the experiences reported in other work [22].

Motivation: Suggestions	Participants felt that they might be more motivated if their device proposed new recipes and integrated the ingredients needed into their shopping lists
<i>“If the wife went and her husband was left he probably wouldn’t have a clue on where to begin. So therefore they either withdraw or they don’t cook”</i>	

Table 1. Requirements recorded for design team

LOW-FIDELITY PROTOTYPING

The goal of this session is to produce further requirements for a design focusing upon more specific features of the device. This meeting lets participants articulate their requirements around *functionality*, *aesthetics* and *experience* of a specific design as they engage in low-fidelity prototyping work. The session is conducted with the participants from the exploratory work about a week after those sessions and refines the high level goals developed in them following the PICTIVE process [24].

The sessions must be video recorded and so need to be conducted at a location with suitable facilities for this. When recording the participants should not be the subjects of the recording but instead the shared workspace they work on should be (e.g. the tabletop on which the workshop is conducted and around which the discussion is held). The consistent point of contact will prepare for the workshop through the creation of appropriate tools and materials for the exercise. Tools can be classified under two categories: (i) office tools such as pens, paper, post-it notes, colored pencils, rulers, erasers etc; and (ii) specialist tools, for example, paper in the shape of interface windows, or actual devices that can embody design domain and facilitate the activities of the workshop.

The facilitator should create a Topic Guide for the meeting in which they detail the key subjects to be addressed, but being realistic given the time allotted to each meeting as there is often a temptation to try to cover too many issues. The guide needs to select a design or suite of requirements from the previous design session to implement. This will be the first thing to establish in the meeting with participants and should be couched in the language that they used to suggest the idea when presented to them so that it is clear

that this is the process of realizing their ideas. When creating the Topic Guide the consistent point of contact should look for cases where there are directly opposing requirements drawn from the design process. The Topic Guide should promote discussion aimed at resolving, or at least understanding, this issue. Key subjects should be selected based on elements that are most strongly linked to the user interface aspects of the design, as this is the strength of the low fidelity prototyping.

The duration of the workshop will depend on the nature of the given task and the capabilities of the participants. If a group has shown itself to be creative and tolerant of extended discussion about the domain, these workshops can stretch to three hours. The attendees to a workshop should be provided with material that sets the scene of the participatory analysis and design and this should include the Topic Guide and a summary of the analysis of the exploratory work. This introduction serves to set the scene for the rest of the workshop to ensure that all the participants have a common frame of reference.

Experiences with Low-Fidelity Prototyping

The low fidelity prototyping sessions for the nutritional adviser and the transport guidance system proceeded smoothly. However, the sessions for the personal security system were less well received. In the earlier session participants had already shown their discomfort when discussing issues and relating them to their own lives” *I’m on me own and I would never put temptation in front of anybody. If anybody was coming, I wouldn’t leave me purse out lying*”. There had been considerable disagreement between the participants on what sorts of scenarios should be constructed that would represent a poor case for personal security when one participant had said she thought it would mainly affect people “*from poorer areas*”. The participants who identified themselves as being from poorer areas had debated this issue at length. When these groups met again in the low fidelity prototyping work, these issues came to the fore and the clash of personalities that had erupted prevented much productive work from occurring.

Issues such as these are not unique to engaging with older adults [22] but the atmosphere in these sessions is particularly important due to the need to elicit personal experiences. Therefore, when meetings break down in this way they can be particularly unproductive. Due to problems with scheduling there had been nine participants in the meetings and this may have made the process more prone to such clashes of personality. In the future we would particularly strive to keep the sessions small and intimate when discussing potentially sensitive issues.

DISCUSSION

The process of engaging older adults in participatory design has been at times challenging but always rewarding, because of its ability to produce insights into the older adults’ lives. The insights that we have gained have altered

our thinking about this domain. At the outset of many of these sessions it has seemed like we were dealing with areas that the participants could not contribute to; however, uncovering the older participants' perceptions of these domains always led to us having to fundamentally rethink our attitudes towards the design project. The process also forced us to try to respect the diversity of our participants and drives home the fact that these participants are not, by any means, a homogenous group.

The use of video prompting to portray people using invisible future technologies provoked a great deal of discussion and interest amongst our participants. When we initially contemplated using the videos our concern was that they might have been dismissed out of hand but the scripted humor in some of our productions seemed to genuinely amuse the participants and they engaged rapidly with the ideas in the videos. The video also worked as an introduction into thinking in terms of scenarios or working within scenarios. Explaining that we would be talking about the characters in the videos rather than trying to explain that we wanted to create "scenarios" worked much more naturally with our participants. Even when design sessions broke down due to personality conflicts we still learned about our participants lives through the debates they had and the views they expressed. In hindsight, it seems obvious that designing appropriately for this group demands engagement with them but, convincing those who have not engaged with older adults in design would prove to be much more challenging than any of the issues we encountered when working with older adults.

Motivating Engagement with Older Adults

While the participatory design approach that we employed worked well when we applied it, our attempts as part of larger projects to encourage the uptake of these techniques by other groups were often unsuccessful. Many large scale funding calls and bids mandate some form of user-centered design process or participatory process. Yet despite this, the partners in these bids have often been, in our own experiences, reluctant to engage with older participants. The formalized deliverables of work common to many of the large projects seem to sometimes encourage a tick-box attitude towards participatory design and project partners sometimes try to do as little as possible to meet these criteria. Our partners' reluctance to engage specifically with older adults was one of the defining characteristics of this domain and despite our efforts to produce a method that requires as little effort as possible; many designers were still reluctant to engage in the process.

The formalized deliverables of work often serve to stifle the contributions of older participant when they are engaged in the design process. We have frequently encountered older people keen to tell us that the ideas that we are proposing are "rubbish" or "unnecessary" but the rigid structure of the funding agreements have meant that this advice cannot easily be acted upon. Many partners in projects have treated

participatory design work as a tick box exercise solely present to demonstrate that what they are doing is valid, and as such are not willing to engage with older people in a genuine, open manner.

These issues are certainly not unique to the field of designing with older adults, but we suggest that they are particularly prominent in this domain because of the dismissive attitudes that some people seem to take towards older adults using technology [15,30]. Until there are more numerous examples of successful engagement with older people in participatory design, and the perception of older people's attitudes towards technology change, approaches such as the one we propose here will not be widely applied due to the latent belief that they will not yield novel or interesting results.

CONCLUSION

The OASIS process that we have described provides a simple starting point for design teams seeking to engage older adults in participatory design activities. However, our experiences trying to get others to apply the technique suggest that the outstanding challenge in this domain is not only one of appropriately framing design work with older adults, but also of motivating design teams to seek to work with them. With this in mind, the process that we present has been kept as "bare bones" as possible to try to encourage designers to engage with this group and it is our belief that once they do start to do this, the results will speak for themselves.

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