Forum Theatre as a Method for User Requirement Elicitation for Home Care

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Abstract. The chapter describes work done in MATCH on using forum theatre to facilitate the process of eliciting requirements from users and stakeholders concerning care technology for the domestic environment. Interactive theatre has been developed previously for requirements gathering purposes and this chapter describes how an interactive theatre exercise was developed for use with a diverse range of user groups and stakeholders. The piece was devised and produced by theatre professionals in collaboration with computer professionals with a focus on the development of home care technology to support older and disabled people. The chapter describes background to the use of theatre in this role and then, using script examples, it explains how the forum theatre exercise was used within MATCH.

Keywords. Interactive forum theatre, user-centred design, requirement elicitiation, multiple and diverse user and stakeholder groups, home care, telecare

Introduction

There is a prevailing assumption when reading the literature in general relating to telecare technology that older people prefer to age at home than in an institution and that telecare is an acceptable tool in ensuring that this can happen. When seeking to fit telecare technology to the reality of the lives of older people however it is important to revisit this assumption, to consider the conditions under which this assumption is true and to consider the wishes and aspirations of the older people when building practice and policy based on this assumption.

In a survey of 2000 people older than 45 years undertaken by AARP [6], Over 80% of respondents did feel somewhat strongly or very strongly that they would wish to remain in their own home as long as possible. Whilst this conviction becomes stronger with age, amongst those with no higher education, and for those who have lived more than 20 years in their own home, it was felt less strongly for those who have low incomes. Interestingly, this desire is not felt as strongly for those sampled that came from minority communities within the population as these respondents were more likely to expect to move in with the family of an adult child than the population as a whole. In general, however, 34% of 55 year olds and older were living alone. This rises to over 52% for those aged 75 or older.

When asked about where respondents would prefer to receive care, 82% stated that they would prefer to receive care at home, rather than move to a care facility. Only 4% stated that they would prefer to move to the home of another relative.

Importantly, home does not imply ownership, although around 85% of the people sampled were homeowners. Joseph Sabia has specifically analysed a variety of factors about homeownership that attract older people [42]. Firstly he draws on studies that

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suggest that older people seek to retain ownership of their home as financial security to cover the expense of future illness. Secondly, the home is the location of memories, principally connected with families and children. Thirdly, home is an asset to be passed on to a subsequent generation. Sabia goes on to explore the fact that in the majority of cases older people have no outstanding mortgage or loan payments on their home. Whilst care costs are a genuine concern as they could add a significant component to a relatively low-cost lifestyle, moving into a residential care facility carries the additional "rent" component not present in the majority of home-based care. Sabia then explored the factors most likely to result in older people moving from their home and those factors that would encourage them to stay. He concluded that people will move if their home is no longer economically viable to maintain or retain, if the family circumstances in the home change, or if the home cannot be made suitable for their changing health needs at a cost that they can afford. People will, however, attempt to stay longer in their homes if they can afford to or if they sense that the home is an asset that is maintaining its value, and if they have a strong sense of living within a relevant and supportive neighbourhood or community.

Looking more specifically at the transition from independent home living to a residential setting for people with dementia, Aminzadeh and colleagues [2] found that whilst some people responded to the challenge of "being a survivor" in the new situation, the move was generally experienced as "the end of an era and established way of life, a tangible sign of the downward trajectory of old age and a shift to a more protected, dependent, structured and communal lifestyle compared to their life at home".

These studies would suggest, therefore, that aging at home is the preference for the overwhelming majority of older people, but also that these people do have real concerns about their situation whilst living at home, and will consider moving under certain circumstances.

Examples of where the preference for aging at home is not the natural choice is for people on low incomes or the very frail according to Stephen Golant [22]. Aging at home implies the adaptation of the home to ensure that it is suitable for older people. For example, homes may need to be remodelled to ensure that toilets and washing facilities are on the same level as where the older person spends the majority of their time, that stairs are made accessible and that cooking and food storage facilities are adjusted appropriately. People on low incomes often live in older and less modernised housing stock, and they are concerned that they will not have the financial means to adapt their home should the need arise.

One of the earliest studies to attempt to measure the cost effectiveness of home-based care was undertaken by Mann, Ottenbacher and Fraas [24] in 1999, who concluded that although home care did slow functional decline and result in less care cost to the health system, there are costs to be borne in delivering care in the home. Those costs are associated with the adaptation of the home (Environmental Interventions (EIs)) and the provision of specific Assistive Technology (AT). Despite the benefits of home-based care for the older home dweller, the EI and AT costs are genuine concerns for older home dwellers.

Another issue of concern is that of the quality and availability of required home care services at a local level. For example, Jane Aronson, [4] reporting on experiences in Canada but related to similar provisions in the USA and UK, describes how access to community or home-based care is often triggered by medical episodes treated in hospitals. Home-based social care management on behalf of or particularly by

individual older care people is less uniformly structured and resourced than medical care. As a result, social care is perceived to be, and may actually be, harder to access, requiring considerable effort on the part of the older person. As a result, some older people simply give up and take up places in residential care because they have "lost the battle" to access the care that they are entitled to in their own home.

An intermediate step that may be considered as home-based living rather than institutional living is for older people to move in with their adult children or other relatives. As well as involving change and the potential loss of personal choice and independence that they previously had in their own home, this solution carries with it a number of disturbing attributes. There is growing evidence that older people in this situation suffer neglect or even abuse [9]. Adult children may initially embrace this solution out of a sense of obligation or responsibility, but may be completely unprepared for the reality of providing care, in addition to the other activities of life, particularly as what was seen as a temporary situation extends for many years with gradual but increasing dependency. From the perspective of the older person, there may be real unease with the idea of their own adult children assisting them with intimate care and personal hygiene tasks.

On the other hand, it is reported that older people do have a real concern about the possibility of dying alone in their own home.

An assumption and policy initiative that may be driving the home and community care agenda is the notion of active ageing or the "Third Way" [20]. This suggests that people will want to stay in their homes for longer in order to play a more active role in society and have a busy life. This may be true for active young older people (50-70) but there is evidence to suggest that older old people, in their 80s or beyond are not integrated in this perspective and are in fact less active, lonely and isolated, but not wanting to leave their familiar dwelling.

Aminzadeh [1] reports that older adults use emergency health services proportionately more than other sectors of the population. This use is characterised by greater urgency, more frequent visits and more likelihood of an admission following the emergency visit. The work of Barnabei and colleagues [8] provides additional evidence that hospital admissions and movement into institutional care (and the associated costs) can be reduced by effective integrated health and social care provision. Community and home-based care may therefore be a strategically important component of future care of older people. If the issues that concern the older people themselves are to be addressed, however, home-based care services, featuring the community nurses, may be pivotal in a mediating role.

In summary it is clear that in general older people do value their independence and do prefer to age at home in familiar surroundings. They do, however, have concerns about coping in an unadapted home or being able to afford appropriate adaptations, and of being isolated both from friends and loved ones and from care services when they need them. Ageing at home, therefore, depends on a viable and effective support network, generally mediated by a carer such as a community matron.

Importantly, a blanket assumption that home-based care, particularly telecare, is an obvious and acceptable solution for all older people cannot be made without listening to the opinions and concerns of older people.

In the same way, both professional and informal carers have genuine concerns about how the demographic changes are going to affect their roles as carers, particularly where a temporary care situation has the potential to become a long-term

and increasingly dependent one, without supported respite. The care of carers is also clearly a topic that needs to be embraced within the provision of telecare services.

For these reasons it is important to engage in both the debate about telecare and the requirements gathering and design exercises prior to the deployment of telecare for all the relevant stakeholders. A variety of methods have traditionally been used to do this, including interviews in the community, focus groups with selected representatives of the stakeholders and public forum events. Requirements gathering for telecare systems also differs from that needed for more traditional computer systems in a number of ways:

- Designers, engineers, health and social work professionals, older people and family carers are very diverse groups. Each group will have its own context, agenda and jargon, which is understood within each group but not necessarily across groups.
- Interdisciplinary consultation and discussion within such diverse groups can create challenges because of the differences in context, agenda and jargon.
- Power and/or knowledge relationships between stakeholders may well inhibit full disclosure of opinions.
- Older and frailer people will have their own context, agenda and language, which will usually be non-technical and often highly individual, according to each older person's needs.
- Older people will often not understand the technical aspects and language of the designers and possibly be dubious about the (often conflicting) agendas and necessarily wider perspectives of the health and social work professionals.
- Interdisciplinary discussion can also be hindered by older people and their informal carers feeling intimidated and inhibited in a formal public discussion with professionals.
- There will be different levels of concern about the costs of the system by the various stakeholders.

The requirements gathering process for systems with these characteristics needs to identify the differing and sometimes contradictory views of all stakeholders/users, with a view to producing an agreed and possibly compromise set of requirements for the system. Ideally it would be valuable to allow people to interact as a mixed group including representatives of all stakeholders, but it is particularly important to set up a "risk free" situation in which stakeholders feel free to articulate their views without appearing to personally attack other stakeholder groups. There are further differences and characteristics regarding requirements gathering for telecare:

- Traditional requirements gathering focuses on how an individual user relates to the technology. Telecare however can relate to more than one person, for example where there is a "cared-for" person and a carer interacting through telecare. This is a dual-user situation with two inter-connected people.
- There are a number of different categories of stakeholder: the "cared-for" person, formal and informal carers, state or private providers, and technical support teams. These stakeholders can have very different motivations, characteristics, needs and wants.
- The central motivation for the use of telecare systems by all stakeholders is the same (providing technical support for disabled or dependent person(s) in order to enhance or enable their independence). At a detailed level, however, the needs and wants of the different stakeholders may be very different and, in

some cases, can be mutually antagonistic (e.g. a carer's main motivation might be the safety of the cared-for person, whereas the cared-for person might want to minimize surveillance and maximize freedom).

- The roles of particular stakeholders can change during the period of use of the system. For example, in the case of an older couple, changing medical situations might mean that there is an interchange of roles within the couple, between being a "carer" and a "cared-for" person, or both may be "carer" and "cared-for" depending on circumstances which can change several times during a day.
- The use of the system can fundamentally change the personal relationships between individual stakeholders. This will impact on the use of the system, and thus may be an important design constraint.

Requirements Gathering is an extremely important part of the development of such a system – and is also important in any design situation where the potential users of the system have very different characteristics to the designers of such systems. Thus, although they may have an excellent engineering perspective on what can be achieved both in terms of monitoring and support of a disabled person, engineers and designers may be less well informed about the practicalities and particularly the psychological and emotional impact of the deployment of such systems within a household. For this reason, in MATCH we sought to bring the discussion alive with the use of live forum theatre. Drama has been used [30, 33, 40] to stimulate and focus discussion to aid in requirements capture with a variety of design problems centred on older users. Drama employing professional actors has the ability to 'suspend disbelief', explore the use of future technologies and provide a safe space to share personal experiences by projecting them on a character.

1. Live Forum Theatre

Within the School of Computing at Dundee, there has been a research focus on designing computer systems to support older and disabled people [12, 17, 31, 35, 37]. The researchers were seeking highly engaging activities that would encourage dialogue within design communities, and between designers and users, as a way of changing the mind-sets of designers [39]. They were also seeking powerful communication tools aimed at designers with little or no experience of inclusive design. It was postulated that professional theatre could be very effective in transmitting important messages about user characteristics to this group. A range of theatrical techniques have been used previously including the documentary approach, actors performing various specified tasks with the technology and designers themselves acting out various scenarios in front of their peers. The use of actors in design development has been reported by Salvador & Howells [43] and Sato & Salvador [44], and Dishman [16] and others have used actors in unscripted live drama which Dishman calls "informance design".

1.1. Forum Theatre

In order to encourage dialogue within design communities, and between designers and users, as a way of changing the mind sets of designers, a theatrical genre which was specifically designed to encouraging audience engagement and participation was

needed. Theatrical genres were therefore investigated which were specifically designed to encourage audience participation. The ideas of "Forum Theatre" developed by Boal [10] were particularly attractive for this purpose, and these were further developed by the Foxtrot Theatre in Education Company (Dundee, Scotland). The Brazilian dramatist Augusto Boal had developed Forum Theatre on the streets of Rio de Janeiro initially as a way of permitting issues to be debated by ordinary people during the time of a repressive political regime. This approach has since been developed further by Morgan, a professional script-writer and theatre director, for use within health care and computer research environments [30].

1.2. Format

The format consists of a 'story' which is scripted in close collaboration with the researcher(s). Professional actors are carefully briefed to create 'real', believable characters both for the scripted performance and for the subsequent extemporary dialogue with the audience. A trained facilitator provides the interface between the 'story' and the audience, and encourages the audience to debate the issues raised and related issues. The format allows the audience to interact with the actors, who stay in role. Where appropriate, the audience itself can change the story, or propose changes which are then enacted. At crucial points in the story, the facilitator enables the audience to discuss, debate and further the ideas and concepts.

The Foxtrot Theatre Company and, more recently, M.M. Training (Dundee, Scotland) have used interactive theatre techniques extensively within professional training for communication skills (e.g. within palliative care, and in the training of medical students) and in community consultation (including with seniors). The companies worked closely with the School of Computing to develop a form of interactive theatre which was particularly appropriate for our application [15, 34, 32, 40], with Morgan being Artist in Residence at the School of Computing during 2005/06. To ensure quality, professional script writers, actors, directors, and film makers were used for all theatrical projects within the School.

The characters in the drama must be credible. They are generally seen in the story trying to use technology, often with mixed success. The story will not be focused on the technology, however, but rather on the characters themselves and their relationship with the technology and the effect that it has on their lives. This helps the audience to engage with the characters and their situation, to project their own concerns onto the characters, and to express these concerns in the discussion sessions. Stakeholders in the audience can express views and comments in the context of the characters and the story, with less risk of offending other groups or individuals. The drama also gives a clear focus and reference for discussion, enabling the facilitator to return the audience's attention, when necessary, to the main thrust of the story. Theatre offers a way of engaging multiple stakeholders and different user groups in the requirements gathering process; contrasting priorities and agendae may be seen to emerge.

A central concern, however, when seeking to discern insights and needs from a diverse range of stakeholders is that some key issues may never be aired if the audience contains dominant individuals or stakeholder groups who mask or prevent participation from less assertive participants. Older people, for example, may be reluctant to express their concerns about services and service delivery if erudite carers or care managers are positively supporting the deployment of telecare services. The analysis of home-based care above clearly shows that different stakeholders have different perspectives and

some real concerns are emerging in studies, so the opinions and perspectives of the different stakeholders do need to be aired. The team of researchers in MATCH therefore sought an alternative approach that was proposed to minimize the dominance of one stakeholder groups (care managers for example) over another group (older old people for example). The proposal was to engage different stakeholder groups separately in a single forum theatre event at the same time by transmitting the event to different locations simultaneously.

2. Distributed Live Forum Theatre

The principle to be explored was that a live forum theatre event could be distributed to different stakeholder groups simultaneously so that each group could discuss and explore the issues raised within a common stakeholder cohort. Two questions therefore emerged from this proposal. Firstly, did separate audiences of stakeholder groups experiencing a live forum theatre event have a richer discussion than a single mixed audience of stakeholders even when those stakeholders were receiving the experience remotely? Secondly, could those with the responsibility for developing and deploying telecare services learning from the stakeholders information about requirements for a telecare system that would enable them to provide systems that better fit the realities of home dwelling older people and their carers?

2.1. Methodology

In order to understand the roles of different stakeholders and their interest in technology-supported home-based care a pilot study with the following processes were employed to elicit requirement from diverse stakeholders using drama as the catalyst for discussions.

Figure 1. Live performance in the research theatre.

To satisfy the criteria of eliciting comments from stakeholder groups meeting independently and in a mixed group with other stakeholders, the drama performance was run over two days in two different ways. Day one was comprised of a mixed audience (n=10) where the represented stakeholder groups included: professional carers, informal carers, older people, and technology developers (academic research). The audience watched the three scenes, pausing for discussion after each scene. The discussion was facilitated by an experienced discussion facilitator.

The second day comprised the same process, but with two separate stakeholder groups that viewed the live performance in separate locations. The older people (n=7) watched the performances in the theatre and the professional carer group (n=3) watched the performance transmitted live in a different location in the same building. Each group was able to have their own discussion after each scene. The set of participants in the audiences were different for the two different days. Care was taken to select participants that were representative of the stakeholders on each day, but the audiences could not be the same over the two days as we needed the participants to express opinions spontaneously in response to the drama that they were witnessing for the first time.

2.2. The Script: Shirley and Fred

Following discussions with the researchers the script-writer developed a background story. This was of "Shirley", who is disabled by arthritis, and her husband "Fred", who has given up his social life in order to look after Shirley. Their struggle to remain in their own home encountered a large problem when Fred had a mild stroke which significantly impaired his short-term memory. The Occupational Therapy (OT) service thus arranged for a telecare system to be installed to provide support for the couple. Three individual scenes (Scenes 1-to-3) were written to illustrate this story.

2.3. Scene 1. The need for technology.

The first scene established the status quo of a couple in need of home care technology. Shirley has arthritis and needs a Zimmer. Her husband Fred is, at that stage, in good health, but is rather deaf. This scene introduces the couple and illustrates the difficulties Shirley has with moving about and using remote controls. It shows how Fred, who does all the cooking, now acts as a carer, and is worried that Shirley will fall whilst he is out, but also that Shirley does not want to be a burden, and insists that he does go out. They are visited by "Mary" - an Occupational Therapist. An example of dialogue from the script for this scene is:

> MARY *What about safety? We could provide a community alarm in case you fell.*
>
> SHIRLEY *But Fred's here.*
>
> MARY *But surely he's not here all the time. How easily do you get to the toilet or make a cup of tea when he's out?*
>
> FRED *I don't go out for very long. I just nip down to the corner shop for the odd essentials.*

MARY   *But you must go out sometimes!*

           Difficult silence
           Shirley looks depressed. Fred looks embarrassed.

SHIRLEY   *I don't want any of those microwaveable meals. That's all they're*
           allowed to do these days, according to what I hear. Look, I really
           don't like the idea of someone else in my kitchen. Fred and I, we
           manage fine between us. Don't we Fred?

Figure 4(a): Forum theatre: "Shirley" (left) and "Fred" (right) discuss their home situation with "Mary" the Occupational Therapist (centre), who suggests options, including technological options, to help make their life at home easier.

The issues raised by the scene include:

- Getting technology in place early, before crisis occurs
- Explanations – psychological as well as practical issues
- Asking what clients need to make life easier
- How to inform and demonstrate usefulness
- Training needs for professionals in community care

2.4. Scene 2. The Case Conference

Scene 2 shows a case conference happening. The case conference consists of "Joan", the care manager, "Sandy" a telecare company representative and "Fiona", Shirley and Fred's daughter (who lives 60 miles away from them).

In this conference it emerges that Fred has had a stroke that has affected his memory and he is not coping well. Shirley now has to keep checking up on him and reminding him to do things, but is terrified that they will be put in a home and separated. The care manager suggests a range of technology options, and discussions

include the challenges of Fred's poor hearing, and the "Big Brother" aspect of monitoring systems.

SANDY   So some sort of reminder system might be useful? And a sort of diary for the day?

JOAN   How would that work?

SANDY   Various methods. A screen perhaps, with the day's programme on it.

FIONA   Dad would have to have his glasses on to read it.

SANDY   It could have a voice function.

FIONA   What? A voice telling you it was time to have a cup of tea?

SANDY   It's possible.

FIONA   Not sure they'd like that. And Dad's a bit deaf too.

JOAN   Would the screen be in one room; which one?

SANDY   We'd need to look at how they use the rooms, their normal routine. A sort of ethnological study

          Joan and Fiona look blank

SANDY   We could have a number of screens if necessary.

FIONA   Dear me, that's very Big Brother, isn't it?

SANDY   Not if they have control over it.

FIONA   They're not very good with technical things. They struggle with finding the right TV channel – and Dad's always shouting at the microwave!

Figure 4(b). The Case Conference with (left-to-right): "Sandy", the telecare company representative; "Fiona", who is Fred and Shirley's daughter; and "Joan", the care manager. It emerges in this conference that Fred has had a stroke; Shirley has to remind Fred to do things but is terrified that they will be put in a residential home and separated. Joan suggests a range of technology options, which is then discussed with Fiona. (The actors played different roles in the separate scenes.)

Issues raised include:

- The different perspectives of the different stakeholders
- Communication between stakeholders
- Balance between what individual clients need, possible technology, cost.

2.5. Scene 3. Technology installed in the home

This scene represents a day in the life of Fred and Shirley after telecare has been installed. In this scene the tension between Fred and Shirley is illustrated (e.g. how often and in what form reminders should be presented), and how often Shirley has to remind Fred what the system does. Shirley is in the living room (on-stage) and Fred is in the kitchen (off-stage). A tune (Fred's reminder tune) is heard from off-stage.

SHIRLEY   *That ruddy tune (the reminder) will drive me bonkers!*
           (shouting) Time to take your medication, Fred!

FRED   *(voice off) I know! I saw it out here! (on a screen in the kitchen)*
           [Fred enters the room]

FRED   *Here you are, dear.*

SHIRLEY   *These reminder noises will have to go off while I'm watching the afternoon film. Anyway the kettle warning is loud enough for me to hear the kitchen one. I'm not as deaf as you.*

FRED   *What about our medication? We mustn't miss, you know.*

SHIRLEY   *Well, can't we turn that dratted tune off, but keep the message on the screen?*

FRED   *I like that tune! I chose it, after all!*

     [Shirley reacts]

FRED   *And I'll forget, if I don't hear it.*

SHIRLEY   *Well, when you're out. When I'm out, we could put the sound back on. If we can work out how to do it.*

FRED   *But who'll make your cup of tea when I'm out?*

Fred is going out for the evening, but has prepared the food.

SHIRLEY   *Now, you've put that casserole in the oven, ready for supper. With the baking potatoes?*

FRED   *I think so.*

SHIRLEY   *I'll set the timer. Off you go! Don't miss the bus!*

FRED   *You'll be alright?*

SHIRLEY   *I'll be fine! There's nothing to go wrong!*

Figure 4(c). "Shirley" is adamant that "Fred" should go out for the evening to attend a long-standing social engagement, while "Fred" is concerned about how she will manage without him in the house. He eventually agrees, somewhat reluctantly, to go to the social event.

Shirley settles down to watch a TV program, but realizes that the system is set to turn the oven off automatically at 7.00 pm, which is well before Fred will return. She eventually telephones a help-line to ask how to operate the oven in the kitchen.

HELP   *Do you have an instruction book?*

SHIRLEY   *Yes, but I can't manage the pages. My hands, they're very arthritic.*

HELP   *I see. Well, perhaps I can talk you through it. Where's your control point?*

SHIRLEY   *The Control Box? I don't know! I think it's under the stairs! I can't get in there!*

HELP   *Sorry, I said 'Control Point'. Not the Control Box but where you can operate things from.*

SHIRLEY   *There's a screen thing in the kitchen*

HELP   *That sounds like it. Could you go and stand there?*

SHIRLEY   *Yes. Give me a minute.*

She painfully edges towards the kitchen.

SHIRLEY   *Sorry. I'm rather slow.*

HELP   *That's alright.*

She finds that the system will not accept this type of over-ride.

HELP   *Try saying 'Oven Cancel'*

SHIRLEY   *(very flustered by now) Oven cancel. Oven cancel!*

HELP   *Anything happening?*

SHIRLEY   *Don't think so.*
            Oh dear, this isn't working is it? I wish I'd never had it put in.

This culminates in a *cri du coeur* from Shirley:

SHIRLEY   *"What a scutter! And all so my poor husband can go out for the evening. I'm exhausted. And I've missed half my film".*

Figure 4(d). "Shirley" is on her own in the house for the evening, "Fred" having gone out. She struggles to operate the television remote control; she has impaired manual dexterity due to arthritis. She will later telephone a help-line to ask how to operate the oven in the kitchen. In order to operate the telephone, she will use the wooden spoon that is lying on the table (on top of the open magazine) to press the number keys on the telephone keypad to enter the help-line number.

Issues raised include:

- Amount of preset activity: ability to over-ride?
- Amount of personal control.
- Where should Reminders go? One place, all rooms?
- Should reminders be visual and/or audible? What's practicable, what's bearable?
- The need for backup support and help.
- Challenges of learning new things late in life.

2.6. Data Capture

To perform a detailed analysis of the discussions seeded by the drama there were a number of video cameras placed to observer the participants and audio recording equipment used to record the spoken interactions. On both days both audiences and performance sessions resulted in a total of 4 hours and 45 minutes of performance and discussion data.

On the second day, when the stakeholders were meeting in separate groups, there was an additional practical challenge of scheduling the performances to ensure all groups were synchronised and ready to watch the next scene. There was a desire to allow a degree of flexibility in this to avoid "cutting off" a group when engaged in interesting discussion. The QuickTime® broadcast technology employed to support the live broadcast of the performance was used in conjunction with a java-based analysis tool to allow the live A/V link to each group to be watched simultaneously and allow unobtrusive co-ordination.

2.7. Data Analysis

A qualitative analysis approach was used for this study as it was intended to explore the insights of the different stakeholders. As qualitative research is involved with exposing meaning and finding structure from open discussion, it was considered to be the appropriate analysis method for this study in order to explore opinions and insights of the stakeholders that may not have been recorded in previous studies. A variety of specific methods [41, 21, 14] exist for the analysis of transcribed interviews and focus group data.

The data analysis was performed directly on the rich A/V. Media-based qualitative analysis is increasingly attractive as it allows analysis to be performed directly on the discussion being analysed without the need for transcription. This removes a layer of translation, avoiding the introduction of judgements that may result in a misinterpretation of the raw data. This is also preferable over field notes as the raw data represent an unbiased and comprehensive recording of the simultaneous discussions that took place, assuming that the set of A/V streams can be reviewed together. The audio content captured was the primary medium that the analysis was based on. The video content served as a useful placeholder for browsing the media and removing a layer of abstraction. Although data from the video were used to assist in certain aspects e.g. "if you have a microwave could you put your hand up" it was not the focus of this study to exhaustively analyse the video.

As it was desirable to peruse multiple synchronised video-streams simultaneously a qualitative analysis tool was developed to support this. This tool uses Quicktime libraries for Java to support the replay of a variety of media formats. Once the required media sources are synchronised (e.g primary audience cam and performance cam), the media streams can be played with conventional video-style play, pause, forward and reverse controls. In addition the ability to step back and forth through the media in different sized steps is also supported. Points of interest can then have codes attached to them which can be used as a hook or book mark into the media, these can be searched, sorted and merged throughout the analysis process.

The primary difference between the types of data generated by drama versus a focus group is the amount of information used to seed the discussion. The drama has been carefully crafted to raise discussion on interesting issues, therefore the method of analysis must have a means to determine the difference between the discussion about the story and the discussion seeded by but beyond the story. The actual method employed borrows various components of existing qualitative methods.

The initial phase involves familiarisation with the data. In this instance the majority of material was recorded on digital video tape with audio recorded on external devices. The post-production phase of generating the videos provided extensive opportunities for this familiarisation because this video production implies extensive browsing of the data.

The second phase involves free coding of the media streams. To allow the distinction between discussion about the drama content and discussion seeded by but beyond the drama content the three performances were coded along with the nine discussions from the three audiences. After an initial coding pass a phase of review and consolidation took place refining the initial free codes.

The third phase involved categorising the free codes into emergent themes. This phase was carried out by scattering the codes on a large sheet of paper where the codes were then grouped into emergent themes. Video vignettes were used to support this

process where necessary. This iterative process culminated in the themes being exposed, supported by a collection of grouped free codes. These different classifications are then described and form the basis of the subset of results that are outlined in the following section.

The fourth and final phase of analysis involved the discussion and comparison of emergent themes in contrast to the analysis of the script. New issues and requirements, the differences in themes between the populations and insights into the effect of mixed and separate audiences were exposed.

In order to validate the requirements gathering approach that had been adopted, the task became one of looking for richer sets of issues coming from the sessions where stakeholders were in separate locations compared with the session where the stakeholders were together, whilst at the same time looking for engagement in the drama even from the stakeholders who were not in the same room as the drama event.

2.8. Conference Performance

The three scenes described above were subsequently combined into a single, re-scripted play and performed at the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI '08). A video recording of that performance is deposited in the ACM Digital Library [28].

3. Results

In the mixed session on the first day, the professionals tended to dominate the discussion and this may have inhibited the other stakeholders. The opinions of the carers and users were thus less obvious from the data gathered on the first day. However the discussion in the mixed plenary session on the second day, which had followed the individual stakeholder discussions, was much more balanced. There were, however, different groups of people on the two days and this effect could have been due to the personalities within the groups. Nevertheless, the data illustrated the possibility of focus groups containing mixed stakeholders inhibiting discussion – particularly when there are knowledge or power hierarchies within these groups.

Thematic coding on the data from the discussion periods produced approximately twenty emergent themes. These are shown in Figure 3 as a matrix of themes categorized by the audiences in which they occurred. The mixed group of stakeholders on the first day produced less data (the discussion periods on both days were approximately the same - thus effectively meaning that there was three times more discussion time on the second day). The separate groups on the second day also produced much richer data and more domain specific comments.
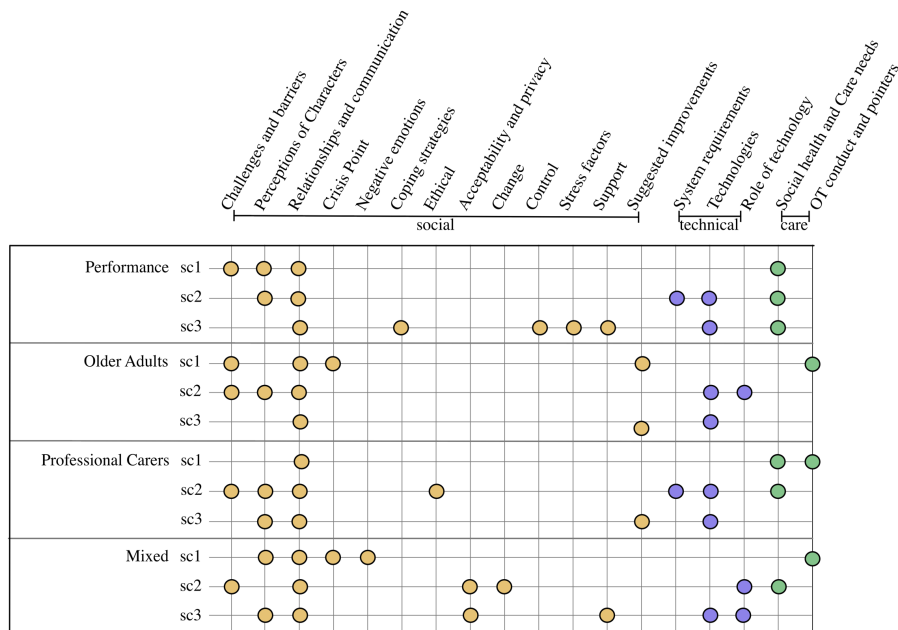
Figure 3. The matrix of themes for the overall performance and for the individual audiences in which they occurred for Scenes 1, 2 & 3 (sc1, sc2 & sc3) respectively. The themes are grouped into three groups: social, technical and care-oriented.

As can be seen from Figure 3, some of the themes were discussed by all of the groups, the carers' group, in particular, being able to relate the issues in the play with their own situations. The drama prompted discussion that went beyond the functional utility of the system and included important social and emotional factors. Examples of individual comments from audience members relating to these themes are given here:

Scene 1 (sc1), mixed audience, informal care: "I identify with this quite strongly as I had an elderly father who died when he was 93. He was looked after solely by my mother."

Scene 2 (sc2), older people audience, older person: "One of the key things I think is at this meeting we have a 30-year old and two 40- or 30- or 20-year olds and the attitude to computerisation is quite different at the different stages …… as there is no 60-, 70-, 80- or 90-year olds involved you will get a solution that is theoretically correct but doesn't work in practice."

Scene 3 (sc3), older people audience, older person: "I'm a bit concerned that the control [of the data] moves from here to Perth, to Glasgow, to Bombay [Mumbai]."

Scene 3 (sc3), mixed audience, academic: "The bits of the technology that seem to be working are the simple things."

Scene 3 (sc3), mixed audience, informal carer: "Is this possible?" [Facilitator: "yes"] "It's amazing!"

A major theme to emerge was the relationships between the characters and how this was affected by the introduction of the technology. The stakeholders perceived that the technology had changed the relationship and interdependence between key characters in the drama, and that this should be an important consideration in the design and introduction of such systems.

Other issues that emerged were ethical implications of the introduction of technology, but an interesting difference in attitudes was noted – the researchers tended to over-exaggerate the users' response to the "big brother" aspects of "invasive technology". The carers and users, for their part, were much less against sensor technology - seeing these apparent disadvantages as more acceptable than the alternative of residential care. McKenna et al. [27] had also found that, once the user group understood what was actually involved in the sensor technology, they were content to have cameras in their home - if it meant that they would not have to go into residential care.

The advantage of using the drama was that it highlighted new or previously undervalued perspectives on aspects of using technology within domestic care situations. This was summarized by one stakeholder who commented that "anything in use will throw up more problems that you can't predict in advance".

As the study sought to explore the question about the effect of live drama and remote live drama on the discussion, the analysis suggested that there was no noticeable negative impact on the group that watched the streamed rather than co-located live drama. The only discernible impact was that the number of comments per participant was greatly increased. It is not possible from the size of this study to discuss reasons for this; it is however a phenomenon worthy of further investigation, as this would suggest that this approach yields more information than the more conventional co-located approach.

4. Conclusions

The rich qualitative results generated by this study suggest that the use of live forum theatre is a powerful technique to engage with multiple diverse stakeholders. The methods described are well suited to support the design of homecare technology as a detailed understanding of each stakeholder and how the network fits together is crucial to developing technology that can integrate into this complex domain.

The results obtained from the separate stakeholder groups show evidence that rich discussion *can* be stimulated by streamed (viewed remotely) live forum theatre with small heterogeneous groups. This shows promise as a technique for ensuring that all voices are heard and power relationships managed.

The contrast between the discussion about the drama content and discussion seeded by but beyond the drama content also shows that there is evidence of rich discussion about the drama content from the theatre performance but that it is possible to go beyond this and gain insights seeded by but beyond the theatre performance.

This chapter touches on a sample of results from this study to illustrate the methods described. The interesting phenomenon and insights obtained by this study suggest that further exploration and adaptation of these methods should be explored, but that this method of requirements elicitation could be valuable in mixed stakeholder situations, and as a valuable tool in "participatory research". This could make it a valuable technique when exploring the sensitive issues associated with long-term home-based care, particularly when exploring the tensions that can arise between carers and clients who are family members.

Acknowledgements

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