Chapter 1

Gathering Requirements for Mobile Devices using Focus Groups with Older People

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1.1 Introduction

Dedicated mobile devices have considerable potential for supporting older people in their day-to-day lives; devices such as memory aids, security alarms and navigation aids gain much of their utility from the security they provide by being with the user all the time. The imperative for developing such devices stems not only from their potential for supporting older people in maintaining their independence and quality of life, but also from the economic realities of the ageing population and the large new market it provides.

However, there are significant obstacles to the development of genuinely useful and usable mobile devices for older people, particularly to eliciting high quality requirements from such groups. To examine the use of mobile devices in the context in which they will be used, *i.e.,* in mobile settings, can be time-consuming and complicated, particularly with older participants. While such field studies are important in developing appropriate technologies, there are other approaches which can yield high quality supporting information from a stationary setting. One of these approaches, focus groups, is examined in this paper.

Focus groups are widely used to elicit requirements for technological devices, but the issue of using a stationary setting to encourage people to envisage and discuss mobile experiences is rarely recognised. Focus groups on mobile devices are seldom reported in the academic literature and their methods are rarely discussed (Kjeldskov and Graham, 2003). There are some exceptions and there are lessons that can be learnt from other fields such as Psychology, but the need remains to draw together a methodology for such work. In this paper some of the methodological issues are discussed, and a range of techniques are suggested for focus groups on mobile devices.

The focus group described in this paper was a variation on a classical discussion focus group, and included a number of activities taken from other areas of usability and psychological research designed to aid the process of requirements gathering in such groups.

This paper draws on observations from our work as part of the UTOPIA project (Eisma *et al.*, 2003b), in which we have worked with a wide range of older people to develop more effective methodological approaches to requirements gathering with such groups. In particular, the methodological techniques suggested in this paper were evaluated during a focus group on mobile navigation devices.

In Section 1.2 we briefly describe this focus group. We then discuss some general observations on focus groups in Section 1.3 and look at some of the methods that can be used in these situations in greater detail in Section 1.4. Both of these sections draw on examples from the focus group on navigation.

1.2 A Focus Group on Navigation

The techniques described in this paper were used during a focus group on navigation and the experiences in this group are used as examples of the successful, and unsuccessful, application of these methods throughout this paper.

The potential advantages of appropriate navigation devices for older people are considerable, helping them to maintain independence and quality of life. Older people are likely to experience more difficulty navigating sucessfully than younger people do, due to declining sensory and cognitive abilities, and a mobile navigation aid could help them to overcome these difficulties. Such aids can provide information appropriate to the location, present only the information that is necessary at the time and alter its display parameters to suit particular users' needs.

The focus group was run as part of the requirements gathering process for the design of such a device, with the particular aims of understanding more about how older people find their way around and of discovering how they prefer to have navigation information presented to them. The group involved seven participants over the age of 60. A variety of methods were used, as described below:

- Discussion sessions, some prompted by photographs of situations where participants may have difficulty finding their way around, as described in Section 1.4.1;
- Photographs were taken at regular short intervals along two routes. These were shown using a data projector, stepping through the photographs as if travelling along the routes on foot. Questions were asked and discussion took place at certain points along these routes. This is described in greater detail in Section 1.4.2;
- Smaller groups of two or three, each with a facilitator, in which participants gave travel directions to each other and described routes and places that they used to be familiar with in the past. More details can be found in Sections 1.4.3 and 1.4.4.

These methods were successful to varying degrees in eliciting information from participants, as described in further detail below.

1.3 Some Observations on Focus Groups

There are some things that need to be taken into account when running any focus group and these apply in particular ways to focus groups on mobile devices involving older people. This section discusses some of these issues and the considerations involved.

1.3.1 Choice of Participants

When running a focus group or workshop, the choice of participants is extremely important as it will affect the dynamics of the group and the usefulness of the results. Unlike some other methods, focus groups are not used to generalize results to a population, meaning that randomised sampling is not necessary and other factors should be considered in the choice of participants (Morgan, 1997).

One key factor to take into consideration when choosing these members is the homogeneity within the group. Most researchers suggest that this is desirable "in order to capitalize on people's shared experiences" (Kitzinger, 1995). Morgan (1997, p35) suggests that "meeting with others whom they think of as possessing similar characteristics or levels of understanding about a given topic, will be more appealing than meeting with those who are perceived to be different." This is particularly important for focus groups about navigation and mobile devices, as they are likely to contain discussions of topics about which participants may feel embarrassed or not confident, such as descriptions of times when they got lost and discussions about unfamiliar technology.

One way to obtain such homogeneity is to use "naturally occurring groups". It has been suggested that these have additional advantages as participants can "relate to each other's comments to incidents in their shared lives, and can also challenge each other on contradictions …" (Kitzinger, 1995). Examples of such "naturally occuring groups" within the older population are social and educational groups and clubs targetted at retired people.

In addition, navigation around an unfamiliar environment is often an activity performed in small groups, particularly couples, as well as by individuals. We feel that the inclusion of such navigation-specific "naturally occuring groups", such as older couples, can provide important insights into the navigation experience, which would otherwise be missed. In addition, it is likely that some future mobile devices may be shared between couples, and it is therefore important to consider the opinions of both halves of the "couples" and not just those of one half.

Patton (1990) suggests that purposive or theoretical sampling is an appropriate sampling strategy for focus groups, and that it is important to set predetermined key characteristics of group members to suit the purpose of the study. Suitable characteristics for a study of mobile devices include social and financial status, as the target market for a mobile device would have to be able to afford such a device. It is also important to select participants with a reasonable level of mobility as mobile devices are of more use to those who travel and are physically active.

There are also characteristics that are useful to include as heterogeneous variables in order to gain a sufficiently wide insight into the differing experiences of the target population. For example, gender may be such a characteristic as gender differences have been shown to occur in navigation (*e.g.,* (Lawton, 1994)).

For the focus group described in this paper, we therefore chose participants who already knew each other as they came from the same social group. We included a mix of both genders, two pairs of married couples and chose participants with sufficiently high social and financial status and mobility levels to be interested in a mobile application.

The composition of the group is very important to the success or failure of a focus group or workshop and whilst the final composition of the group may be ruled by other factors such as difficulties in recruiting and cancellations, the importance of getting the right group composition should not be underestimated.

1.3.2 Different Sizes of Groups

One advantage of focus groups over one-to-one interviews is the wide range of responses elicited from the multiple interactions of members within a group where, importantly, responses are not directed exlusively to the facilitator (Catterall and Maclaren, 1997). Whilst this method is effective, it may require adaption for particular groups and particular topics. For example, Morgan (1997) suggests a group size of between six and ten participants, but there is some recent evidence that the optimal number for involving older adults in focus groups may be lower (Lines and Hone, 2002).

In addition, eliciting information on particular topics may not be well suited to a traditional focus group. There are some kinds of information that are difficult to elicit from groups of six or more. For example, personal, in-depth information, especially in narrative, is better suited to individuals relating their experiences to a facilitator rather than to discussions involving several people. In the context of navigation, examples of this kind of information include descriptions of navigation incidents, for example, where the participant has got lost or confused, and examples of how participants give directions and navigate round environments.

Obtaining such information in a focus group setting may require participants to be more passive, with less opportunity to contribute, leading to loss of interest and consequently an elicitation of data which is of poor quality or at least not as insightful as it could be.

It is therefore useful to adapt the traditional focus group method by dividing the group into smaller groups, each with a facilitator, for parts of the session. This allows a smaller group interview approach to be used for specific exercises, such as the navigation exercises described in Section 1.4.3.

Schensul *et al.*(1999) suggests that the success of a focus group depends on "balancing depth and breadth of participation". We therefore suggest that different sizes of groups be used within a single session. The main group can be divided into smaller groups for certain activities and brought back together for others, which benefit from the interaction of the group as a whole. This mixture of group sizes

means that a variety of activities can be used within a single session and that different kinds of information can be obtained.

1.4 Focus Group Methods for Exploring Mobile Settings

There are many possible activities that can be used within focus groups, including standard discussion sessions and participatory design sessions (Forlizzi and McCormack, 2000). This section describes some methods that we believe to be particularly useful in the requirements gathering stage of the design of a mobile device. They are not all separate methods and can be used in combinations within a group. We discuss how they can be best used to bridge the gap between the stationary focus group setting and the mobile situations under discussion, particularly for older people. These methods were used in the focus group described in Section 1.2 and we give examples of their successful and unsuccessful application from that group and other areas of our research.

1.4.1 Visual Probes

It is important for participants in a focus group to be able to remember and imagine situations and experiences in order to relate them to the rest of the group. This is particularly difficult when investigating mobile situations because participants have to imagine themselves in a completely different context. The challenge for those running such groups is to aid this remembrance and to make the situations and issues salient to the group members. This can be dealt with to some degree in discussion, with verbal and textual prompting. However, additional cognitive prompts or probes, such as images, can encourage participants to remember experiences and situations relevant to the topic under investigation (Seale *et al.*, 2002). The use of such visual probes is particularly important for the investigation of mobile situations, as experiences are often closely tied to the location in which they occurred.

Figure 1.1. An example of a visual probe

One form that such probes can take is that of photographs and other images of locations and mobile situations, as shown in the example in Figure 1.1. These can be displayed on cards, perhaps with captions, in handouts and using PowerPoint presentations, as well as through other means.

In our focus group, we used photographs of locations where people might get lost, such as hospitals and shopping centres, in order to prompt participants' memories of incidences when they did get lost. These were attached to cards with captions.

Such card probes have proven successful in the past, both in other people's research (*e.g.,* (Seale *et al.*, 2002)) and, to a limited extent, in our own. However, in this study, they proved ineffective in encouraging discussion. There are several possible reasons for this, including a poor match between the choices of situations and photographs and the situations in which the participants had actually had difficulty. Another possible reason is the lack of a structured exercise or task involving the cards. For example, Seale *et al.* (2002) used structured sorting task, which may have been an important factor in their success. Both of these are important factors to take into consideration if using card probes in a focus group.

It is also helpful to consider other presentation methods, such as a PowerPoint or other similar presentation. Elsewhere in our project, we found that such a presentation was more successful than displaying the same images on cards. This could be related to the more focused aspect of formal presentations, which helps all the group to focus on the probes together, and in which the facilitator takes the lead in the activity, leaving the participants able to focus more fully on the topic.

1.4.2 Scenarios

Another technique for eliciting requirements for mobile devices from stationary settings is the use of scenarios. Carroll describes scenarios as "informal narrative descriptions… stories about human activity" and notes that they are used "to conduct analysis and design in a vocabulary that permits end-user participation" (Carroll, 2000a, p 41). Scenarios are often specifically defined situations including a particular setting, a central character or "agent" and a plot, consisting of a sequence of actions and events (Carroll, 2000b, pp 44-45).

Scenarios are extremely flexible tools and can be used in a variety of ways within usability engineering. In particular, they can be used within requirements gathering, where they permit people to discuss situations without reference to specific technologies. This is particularly valuable when working with older people as their frequent lack of knowledge about technical language and different technologies can be often prove a barrier in requirements gathering (Eisma *et al.*, 2003a). Scenarios are also particularly valuable when investigating mobile settings because, like visual probes in Section 1.4.1, they help the participants to imagine a setting that is very different from the stationary focus group.

If these scenarios use real locations, this helps to tie them more closely to reality and thus generate descriptions of how the participants would *actually* behave. If known locations can be used, this likelihood is further increased, and the participants are better able to imagine the context surrounding the depicted

locations and scenarios - context which is particularly important in the use of mobile devices. Known locations may also help to elicit descriptions of actual past behaviour rather than how participants believe that they might behave.

Scenarios can be described in different ways, including text, speech, photographs and video clips. For the investigation of mobile settings, visual means are particularly important as discussed in Section 1.4.1. A visual description of a location is much more powerful and evocative than a written or verbal one.

These visual descriptions can be presented using a video or, alteratively, a data projector to step through photographs taken at short intervals along a route, as shown in the example in Figure 1.2. This method has been used in psychology to investigate navigation, *e.g.,* (Lipman, 1991), but can also be used in requirements gathering for technological systems. Although a video may provide a more streamlined overall picture of the route, stepping through photographs has some important advantages. It is easier to move around in the presentation and the presentation can also be paused more easily with a higher quality of image remaining on the screen, facilitating discussion of that point in the route or that part of the location. Such discussions can help to elicit information on particular features in an environment, how participants know which way to turn, or other location-specific issues.

Figure 1.2. Three consecutive images used to depict a route in a scenario

A variety of scenarios are appropriate for requirements gathering for mobile devices. In our investigation of navigation, we found one scenario in particular to be valuable, although others are also likely to be useful. In this scenario, the central character (the agent) navigates along a route. We varied this theme to create two sub-scenarios, using first a familiar and then an unfamiliar route.

In the first sub-scenario, the actor found his (or her) way along a familiar route in a familiar location. We paused at various decision points on the route (when the actor must decide which way to go) and asked participants in the group how they would know the way to go. A route familiar to most of the participants was used to help them to imagine the scenario most accurately and to relate their own experiences.

The second scenario involved the actor navigating along an unfamiliar route. At the decision points this time, we gave participants examples of methods that could be used to indicate the way (see Figure 1.3). The particular examples used tied into the specific scenario under discussion. This strategy was successful, allowing participants to comment on what sort of directions they would find useful in a specific situation.

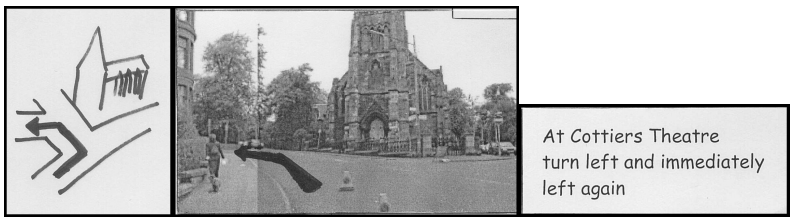

Figure 1.3. Examples of methods of giving directions used in the focus group

1.4.3 Exercises

Another useful method that can be used within a focus group is setting the participants exercises or tasks to do. This is not a completely separate method from those previously discussed and can be used effectively in combination with both card probes and scenarios. Their use within scenarios is discussed in further in Section 1.4.4.

There are a wide range of such exercises that can be suitable, including some of those used within cultural probes (Gaver *et al.*, 1999) and in interviews. However, in focus groups, some exercises, such as taking photographs of meaningful objects, are no longer applicable, others, such as indicating places on a map, can be used without modification, and some can be used with some alteration. Other exercises can also be used, taking advantage of the interaction opportunities provided by the presence of several people as well as the ability to use speech and movement as well as visual techniques such as writing and drawing.

For example, Bradley and Dunlop carried out an exercise with participants in an interview setting where they were asked to give directions along certain set routes, both verbally and in writing (Bradley and Dunlop, 2002). In our focus group, we adapted this exercise to take advantage of the group setting. Participants were divided into groups of two or three, in which they firstly gave each other directions and later described locations to each other.

The group setting allowed questions and prompts from the other participants. In the first exercise, it was hoped that this would mimic better the actual setting of giving directions in which the enquirer can ask for clarification. However, this did not always work in practice, perhaps due to lack of adequate explanation in advance and the fact that other group members were often also familiar with the route being described. In the second exercise, the group discussion generated more information about the locations as participants asked each other questions.

These exercises introduced more variety into the focus group, helping to engage interest, and allowed varying group sizes with their corresponding advantages as indicated in Section 1.3.2. They also helped to elicit more personal and more detailed information by encouraging participants to consider situations in more detail and from different angles.

1.4.4 Using Scenarios in Exercises

It can be very profitable to use scenarios to help set the scene for exercises and tasks in a focus group. For example, as described in Section 1.4.2, participants were given the scenario of finding one's way along a specific unfamiliar route and then given examples of methods of giving directions at decision points along that route. They were then given the task of choosing their preferred method out of those shown to them.

However, scenarios can also be used in a different way in an exercise, by using the outline of a scenario rather than a full description. For example, participants can be asked to describe or imagine a particular scenario that fits a more general description, or to fill in the details in an outline of a scenario.

In the navigation focus group, we used this method to generate scenarios with more personal relevance for each participant. For example, participants were asked to imagine themselves in a familiar place and to give directions to the rest of the group about how to get to a place nearby. By letting the participants themselves choose and then give the details of the scenario, places that they were familiar with could be used, making it more likely that they would visualise an actual route rather than talking about the ways in which they *believed* they navigated and gave directions. In addition, an easily-remembered and familiar location avoided many of the potential disadvantages of discussing mobility and navigation in a stationary setting; participants needed little prompting because there was less mental effort involved in visualising and describing a place that the individual was familiar with.

1.5 Conclusions

Focus groups can be a valuable method for obtaining requirements for mobile devices from older people, despite difficulties caused by the gap between the static focus group setting and the mobile context under investigation. There are a variety of techniques that can be used to bridge this gap and so improve their use and the quality of information obtained from them.

This paper has described and discussed some of these techniques, as well as some other important aspects of such focus groups. We believe that these methods constitute an effective range of techniques for the successful investigation of mobile situations in focus groups, and that our experience of using them in the focus group described in this paper provides an initial framework for identifying which techniques can be used immediately and which need to be adjusted for use with this particular user group in this situation.

However, further work on techniques is needed. We plan to continue to evaluate and develop the techniques described in this paper as well as other methods as part of our on-going work on navigation aids for older people.

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