

# An Exploratory Study of How Older Women Use Mobile Phones

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**Abstract.** This paper reports on issues related to the use of mobile phones by women aged 60 years and over. The study started with a series of focus group discussions, which covered usage patterns, problems, benefits, ideal phone design, and desired and unwanted features. It then moved to an exploration of the group's cooperative learning process when encountering an unfamiliar mobile phone. The issues raised in the discussions were translated into an online questionnaire, which was responded to by 67 women aged 60 and over. This study makes two main contributions to the field. First, it is one of a very few studies that provides a diagrammatic representation of older mobile phone female users' cooperative learning process and strategies. Second, the study presents a combination of quantitative and qualitative data, which provides more nuanced interpretation and understanding of the use of mobile phones by older women.

**Keywords:** Elderly, mobile phone, older adults, focus group, questionnaire.

## 1 Introduction

Mobile phones are rapidly becoming a feature of today's society. A report published by Ofcom (the Office of Communications, the independent regulator and competition authority for the UK communications industries) in March 2006 stated that 82% of UK adults owned mobile phones. The ownership drops slightly for older people, with only 60% people aged 65-74 years old and 36% people aged 75 years old and over owning mobile phones [26]. People over the age of 60 use mobile phones for very limited purposes, such as for calling or texting in emergencies [6], on average making five calls and sending two text messages weekly [26]. Older people avoid using complex functions, caused by displays that are too small and difficult to see, buttons and characters that are too small causing them to push wrong numbers frequently, functions that are too many and too complex, non-user-friendly menu arrangement, unclear instruction on how to find and use some functions and services that are too expensive [25].

Mobile phones can potentially play an important role in helping older people in many ways if the problems related to the use of mobile phones can be solved (Help the Aged society identified that "mobile phone is not too complicated to use compared

to the Internet and other modern technology that the younger generation is more used to using.” [2]). They provide a sense of security for older people as they can be reached practically anytime and anywhere [25]. Some companies use mobile phones to provide emergency location reporting for older people who are lost or require emergency assistance [21], which is potentially useful for family members who are worried about the whereabouts of their older relatives. Another study suggests that the main functions of mobile technology are for maintaining and developing social relationships and providing health and security services. [20].

It is unfortunate that there have been few studies that involved older persons in the development phase of mobile phones (an exception is universal design activities reported by Fujitsu – although the oldest participant was ‘only’ 60 years old of age [10]). Past studies showed that when asked, older people were quite vocal in specifying the functions they would like to have in their mobile phones, e.g., health monitoring [1], or a simple, easy to use phone with speech-control [25]. Older persons were also able to come up with innovative and out-of-the-box ideas on futuristic use of mobile technology, such as one-stop help centre or security bracelet that can send calls for help (although most participants were only willing to pay €4-10 and most said that they preferred to start those innovative services “sometime in the future” [20]).

This paper reports on the issues related to the use of mobile phone by older women. This study focuses on women for several reasons. Firstly and most importantly, women perceived mobile phones as providing a sense of safety in emergencies much more strongly than men did [25]. Secondly, the same study also pointed out that mobile ownership in women in their sixties was much lower than that of men of similar age group (36% vs. 47%). Therefore, there is a need to ensure that older women can use their mobile phones when the need arises, through an investigation of their usage patterns, problems, perceived benefits, ideal phone design, and desired and unwanted features. In addition, an informal observation revealed that there are differences in men’s and women’s uses of mobile phones (e.g., men tend to keep their phones in their pockets while women keep their phones in their handbags – which might have some gender-specific design implications). The retirement age is used as the inclusion criterion, which is 60 years old for women in the UK.

## **2 Methods**

This study combines quantitative and qualitative methods to explore issues related to the use of mobile phones by older women. Qualitatively, focus group discussions were used to extract the data. One session of the focus group discussions was used to reveal the group’s learning process and strategies. Quantitatively, findings from the online questionnaire designed in collaboration with the focus group were explored. By combining the analysis of the survey, the learning process and the focus group discussions, the study aims to arrive at a more nuanced understanding of the nature of the use of mobile phone among older women to meet their needs. This combination is expected to be able to complement the pictures provided by individual methods.

## 2.1 Focus Group

Focus group discussions were used in this study because they have a long history in market and medical research and had been shown to be very effective in drawing upon respondents' attitudes, feelings, beliefs, experiences and reaction in a way that would not have been feasible using other methods [7]. The use of focus group is one method to get large amount of information in a short period and it is particularly useful to explore the degree of group consensus on a given topic [23]. Interaction is the key feature of focus groups as it highlights their view of the world, the language they use about an issue and their values and beliefs about a situation [14]. Moreover, focus groups enable us to find out why an issue is salient as well as what is salient about it [24] and the gap between what people say and what they do [16].

Focus group discussions had been used to investigate perceived context-related benefits of mobile phones for older persons. The focus group stated that the main benefits of mobile phones are to keep in touch with someone emotionally close who lives more than half an hour apart, to set time for a leisure activity with a friend, and to immediately share exciting good news [19].

The study follows the recommendation that the number of people per group should be between six and ten [18] and that the researchers met the same group several times [9]. We also arranged that each session lasted around two hours in a 'neutral' location, which was believed to be helpful for avoiding either negative or positive associations with a particular site or building [27]. Upon consultation with the focus group, it was decided to use the meeting room of the College of Third Age for the discussions.

The focus group moderators were carefully chosen to involve researchers from various backgrounds, i.e., two HCI researchers, one retired mobile phone company employee, and one social scientist (two doubled as note takers). It has been long known in the focus group tradition that the role of the moderators is very significant, as good levels of group leadership and interpersonal skill are required to moderate a group successfully [7]. These moderators extracted the information from a book on ethnographic study of mobile phone use in Norway [17] and other studies on the use of mobile phones by older persons (e.g., [20]) into six topics for the first focus group discussion session. These are: (1) usage pattern, (2) problems, (3) perceived benefits, (4) unwanted features, (5) desired features and (6) other concerns. A list of the sub-topics that need to be covered in the discussions was drawn.

Initially, the topics were introduced in an open-ended fashion (e.g., "Describe the problems you experience using your mobile phone.") Occasionally, the moderators prompted the group on topics that they had not covered, such as "Are there any features that you wish to have but you don't currently have in your mobile phone?"

The second session was dedicated to brainstorming design features of the 'closest to ideal' commercially available mobile phone through a review of the brochures of 25 models. The models were carefully selected to ensure that they were carried by at least two mobile phone shops and were priced at £150 or less. The moderators then went to several mobile phone shops to find a commercial model that most closely matches the required criteria to allow the group to experience the look and feel of the phone. The last session aimed at exploring how older women learn to use a new mobile phone.

The participants of the focus group were recruited through flyers placed in supermarkets and organisations for older persons such as the College of Third Age and Age Concern. In addition to their age and gender, the inclusion criteria required the participants to have some experience with mobile phone operation.

## 2.2 Cooperative Learning Observation

One obvious problem for anyone using a mobile phone is learning to use it. It has been widely accepted in HCI that observing how users learn to use a new system can have many theoretical and practical implications. To provide the learning context, some goal structures need to be established. There are three possible goal structures which can be implemented in a learning situation: competitive, cooperative and individualistic [11]. In a cooperative learning situation, when one learner achieves his or her goal, all of the other learners the learner is linked with also achieve their goals. In a competitive learning situation, when one learner achieves his or her goal, all of the other learners s/he is linked with fail to achieve their goals. In an individualistic learning situation, learners' goal achievements are independent.

In this study, the cooperative structure was chosen because the focus group suggested that in reality, learning to use a mobile phone for older women is mostly a collaboration project between them and their offspring or friends. Therefore, the cooperative learning setting would be most appropriate in simulating real life situation.

It should be noted that a successful cooperative learning requires several specific criteria from the group [3]: positive dependence (members of the group depend on each other in a symbiotic manner), individual accountability (each person must contribute and learn), group processing (reflecting on how the group is working), good social skills (communication, leadership etc.), and healthy face-to-face interaction. Only after observing that the focus group members fulfilled those criteria, was the decision to adopt the cooperative learning in this study finalised.

Cooperative learning has been applied in different subject matter and a wide range of population. Cooperative learning has been used in studying the conceptual data modelling [29] and in a programming course [3]. In the later case, the cooperative learning exercises were designed to help students learn about the key mental model processes of programming and problem solving. No published literature was found on the application of cooperative learning in learning to use mobile phones. However, it appears that cooperative learning approach may be beneficial for women and members of underrepresented minority groups [30].

There are three major theoretical perspectives on cooperative learning and achievement [30]. *Motivational perspectives* focus primarily on the reward or goal structures under which learners operate. Under this perspective, cooperative incentive structures create a situation in which the only way group members can attain their own personal goals is if the group is successful. Not surprisingly, motivational theorists build group rewards into their cooperative learning methods.

In *social cohesion perspectives*, learners help one another learn because they care about one another and want one another to succeed. Social cohesion theorists tend to

downplay or reject the group incentives and individual accountability held by motivational researchers to be essential.

The major alternative to the motivational and social cohesiveness perspectives, both of which focus primarily on group norms and interpersonal influence, are the *cognitive perspectives*, which hold that interactions among learners will increase learner's achievement for reasons, which have to do with mental processing of information rather than with motivations. The two major perspectives under this umbrella are the *developmental* and the *cognitive elaboration perspectives*.

The *developmental perspective* assumes that interaction among learners around appropriate tasks increases their mastery of critical concepts. One category of practical cooperative methods closely related to the developmental perspective is *group discovery methods*, where learners work in small groups to solve problems with relatively little guidance. Under the *cognitive elaboration perspective*, learners take roles as explainer and listener, with research finding that learners who gained the most from cooperative activities were those who provided elaborated explanations to others.

Those theoretical perspectives have well-established rationales, and most have supporting evidence. All apply in some circumstances, but none is probably both necessary and sufficient in all circumstances. Research in each tradition tends to establish setting conditions favourable to that perspective. For example, most research on cooperative learning from the motivational and social cohesiveness perspectives takes place over extended periods, as both extrinsic motivation and social cohesion may be assumed to take time to show their effects. In contrast, studies undertaken from the cognitive perspectives tend to be very short, making issues of motivation moot.

In this study, the cooperative learning of the focus group will be observed to investigate whether the pattern of learning matches any of the three major theoretical perspectives. It can be informally hypothesized that given the characteristics of these perspectives, it is more likely that the learning pattern would match the cognitive perspectives. It would be interesting, however, to investigate which perspective under the umbrella of cognitive perspectives would be more pronounced in the specific context of older women learning to use a new mobile phone.

### **3 The Focus Group Discussions**

Seven older women participated in the focus group discussions (median age = 67.5 years old), four are diploma holders, three graduated from grammar schools. Six have been using mobile phones for several years; one started using it in the last 12 months.

Six did not use their mobile phones very often and therefore chose the pay-as-you-go (pre-pay) scheme with an average top-up frequency of once or twice a month. This finding repeats a study on consumer behaviour, which revealed that older people, who used a mobile phone only infrequently or for short calls in an emergency, generally liked to buy a certain amount of credit and then pay only for the calls they actually made. They believed their usage was not high enough to warrant paying a monthly fee [5]. The report also suggested that these people knew that choosing the pay-as-you-go

was scheme costly in terms of price per call but found it was useful for controlling their usage and ensuring that they were on top of the costs.

They topped up in mobile phone shops or at supermarket tills. They (or their spouses) paid the bills. Half of them said that their phones were gifts from their children or grandchildren, a finding that is also reported in [5]. One participant stated that older women's phones would not usually be the newest model because most of them received their phones when their children or grandchildren upgraded their phones.

In general, the group quickly agreed on an opinion suggested by one group member. It was observed that sometimes the participants made contradictory statements between or within sessions. For example, while everybody agreed that *texting* had a bad influence on people's communication skill, they all agreed that Short Messaging Service (SMS) is one of the 'must have' features in a mobile phone.

The whole sessions were voice-recorded and videotaped using Sony digital camcorder for later review and analysis. The focus group records were analysed using content analysis. The first comment to note is that the participants preferred to be called 'mature women', which they argued would be the view shared by most women of their ages. However, as the term 'older' would be more familiar for the research community, this term will be used throughout the paper. The following sections describe the issues raised during the discussions.

### 3.1 Usage patterns

Older women most likely would only use mobile phones in unexpected situations such as when their trains were delayed; they did not use their mobile phones for casual conversations. The exception is when the persons they needed to call only own mobile phones as the cheapest way to contact them is by using a mobile phone.

The participants mostly called their family members, and very rarely their friends (whom they usually called using landline phones or met face to face). They rarely used SMS, as they believed that SMS ruined people's literacy. However, they understood most of the abbreviations in the SMS their grandchildren sent them (e.g., gr8 = great).

All participants reported that carrying mobile phones increased their feelings of safety and security but could not think of any other benefits of having a mobile phone.

### 3.2 Physical Design Related Issues

Physical design preferences were explored through a combination of open-ended and prompted discussions. To aid the prompted discussion, a series of brochures of commercial mobile phones were presented to the group. They were then given a printout with snapshots of various models that differ in one dimension to help them focus (see Figure 1 for an example) and asked to comment on those options and to suggest other preferred options if necessary.

The following design-related issues were raised:

- Display: not as important as text size (which has to be large enough to read comfortably).



**Fig. 1.** An example of the snapshots of various shapes of mobile phones

- Size: ‘bulky’, can be grabbed and held comfortably.
- Shape: a flip phone with an antenna as the antenna is good for picking up the phone from a crowded handbag. A flip phone also allows easy phone call pickups and terminations.
- Colour: although the participants stated that colour was a priority when choosing a mobile phone, bold or silver coloured phone would be easier to spot in a crowded handbag. There were contradictory opinions among group members on this issue: the members who preferred silver were worried that bold-coloured phones were more prone to theft or mugging. In deed, mobile phone theft was one of the main public concerns in the UK [22].
- Buttons: square, raised, metallic buttons arranged similar to landline buttons’ arrangement. A similar finding was reported in a study on mobile phone design for older persons performed by Fujitsu [10]. Small, rubbery buttons were disliked.
- Backlight: does not turn off too fast, as older users require longer time to think of what to type or to choose from many options.

Using the criteria proposed by the participants, a mobile phone which best fulfilled the requirements was purchased (an LG C3300 phone – see Figure 2). It is a flip phone, in silver and bold red colour, with metallic square raised buttons.



**Fig. 2.** The commercial model that is the closest to the ideal design specified by the group

### 3.2 Function-Related Issues

The participants raised concerns and preferences on the following functional issues:

- Memory aids: alarm, caller identification complemented with the picture of the caller, and multiple appointment reminders.
- Operational complexity: most commercial phones' menus are too many, often unnecessary, difficult to understand, complicated and thus impossible to recall, echoing the findings in [25].
- Layout: the home screen should only contain the most important functions, which are voice call, text, alarm and calendar. Textual menus arranged in a list are preferred to icon-based menus arranged in columns and rows. Frequently accessed functions should be grouped together and separated from others.
- Shortcuts: things such as a one button locking function to prevent accidental dialling, an easily accessible 'panic button' for emergencies, and a button to place a caller/number into a blacklist, should be provided.

### 3.3 Negative Effects

Finally, the following are what the participants consider as the negative effects of the use of mobile phones:

- Inadvertent listening: "ridiculous" choice and volume of ring tones, chatting loudly on stories listeners did not want to hear but forced to. Ling [17] reported that the latter case was the number one source of annoyance for people of all ages.
- Inappropriate use: using mobiles in prohibited places such as in restaurants, leisure places, public transportation, and cinemas (one participant said that "it glowed in the dark and the noise disturbed other viewers").
- Health scare: brain cancer and other health problem (e.g. RSI) in long term and heavy use. This brain cancer scare received such a high public airing that in 2002 the UK government launched a £7.4 million research programme to scientifically investigate this issue [22].
- Communication effect: it can reduce face-to-face interaction
- Negative effects on younger generation: texting is addictive, mobile phones impair their ability to plan, and some payment plans encourage excessive use without much consideration of the financial consequence (mostly for their parents).
- Unwanted functions: Camera and video phones were considered the 'most dangerous invention of the 21<sup>st</sup> century' as it encouraged bullying<sup>1</sup> and privacy violation, and therefore should be removed. Predictive texting should be easily disabled.

## 4 Exploration of the Group's Cooperative Learning

The last session was dedicated to the group's learning process exploration. For this purpose, the participants were handed the new phone in its original box and were

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<sup>1</sup> A craze called 'happy slapping' in which an unsuspecting victim is attacked while an accomplice records the assault (commonly with a camera/video phone) had worryingly become a nationwide phenomenon in 2005, despite police effort to combat it [9].

asked to pretend they just received a new phone from their grandchildren. No task was assigned to allow the group to explore functions that were salient and attractive to them. No specific role was assigned to each individual, either, as one of the aims of this observation was to determine which theoretical cooperative learning perspective(s) emerged. Following studies on how to induce cooperative learning (e.g. [12]), the group was instructed to work together to master the use of the new phone. The group discussion and interaction were transcribed in real time as well as through later review of the video tapes.

It became obvious that most group members took turn in becoming the central point (the person holding the phone) and the support persons (the person reading the manual and the ones offering their opinions and suggestions on what to do when the phone holder seemed to be having problems) in the learning process.

Three phases of learning were observed: exploration, action and configuration. In the exploration phase, the group first explored the phone's physical design before moving on to feature/function exploration. Physical design is the tangible attributes of the device, which include the overall aesthetic (colour, button design, and overall design), weight, thickness, handiness, screen size, keypad layout etc.

When the group encountered a new feature, they entered a loop of exploring and trying out, utilizing help either from the manual or from the researchers (external factor) or through an association with their existing mental model (internal factor) to understand how the function works. In this discovery process, the existing model was sometimes used to acquire further knowledge about the feature. Some new features were selected for further exploration, which caused the mental model to be updated.

In the next phase, which was the action phase, the group created another loop of planning how to interact with the various functions and executing tasks. When the plan failed to achieve the result they desired, they changed strategy. The last phase was the configuration phase, which the users only performed after they were comfortable with the more basic functions such as making and receiving voice calls. In this phase they changed the original setting of the phone, such as the time and date and the alarm. Figure 3 depicts a visual representation of these phases. This diagram is a result of a brainstorming exercise of the focus group moderators and was later verified by the focus group (after some explanation of what a mental model is).

#### **4.1 Exploration of physical design**

Even though the group was instructed to work together, it was observed that there were traces of individualistic learning in this phase. One participant was excited and immediately reached out and opened the box. She picked out, closely observed, and removed the plastic wrappings of the items in the box. She was helped by the participants sitting on her immediate left and right. She asked the moderators whether the phone had airtime and power. Another refused to touch the phone when another participant handed her the box. She commented that she would go "blank" because she was always nervous of trying new technology, or encountering an unfamiliar device in general. One took out her mobile phone and started exploring the new phone by comparing it to her current phone.

However, there were some similarities in this exploration phase, as well. In general, the sequence performed by the participants was:

1. Inspecting and picking out items in the box.
2. Flipping the phone open and close to get a feel of its stiffness (some commented that the phone was too stiff).
3. Closely examining what happened when the phone was flipped open.
4. Inspecting various physical designs: its design (weight and size – the participants used their palms to gauge the weight of the phone), colour, size of button, characters on the button, and button assignment (camera, volume, clear and OK). All of them agreed that the tested phone was “nicer” than their own phones. The most common comments referring to the characters on the keypad were “I cannot see [them] without my lenses.”

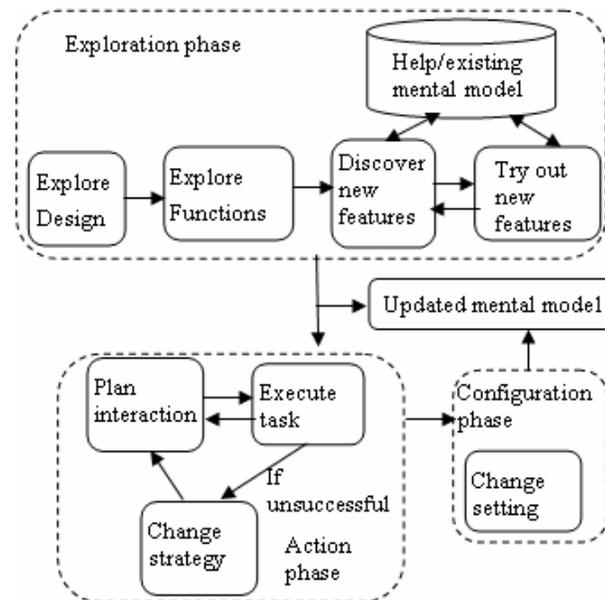


Fig. 3. The group's learning process when interacting with a new mobile phone

#### 4.2 Exploration of Functions

While the exploration of physical design tended to be an individual activity, the exploration of functions tended to be collaborative learning. When the phone holder found a new function or feature, she demonstrated and explained this function to everybody. The participant naturally passed the phone to the next person when she finished one activity. The activities that this group performed in this process were:

1. Making and receiving voice calls.

2. Taking, sending and deleting photograph. The participants had some difficulties due to lack of feedback of whether a photograph was successfully taken/sent.
3. Sending and receiving text messages. The participants commented that they hated the text prediction feature and had problems disabling this feature.
4. Setting alarm after asking the moderators how to find this function.
5. Changing time and date.

These five functions can be argued to be the most salient features, at least in the tested phone. Upon closer observation, only the first three functions were either on the home screen or 'hardwired' to one of the control buttons. It seemed that the feature exploration process was influenced more by their needs than by the interface design, i.e. the features explored were not necessarily the most accessible ones. This was verified by the fact that when the participants were unable to find the alarm, they asked for help rather than abandoning the exploration of this function and trying another function.

### **4.3 Cooperative Learning Strategies**

In general, the participants adopted four main learning strategies to help them learn to operate the new phone:

1. Transferring their existing knowledge/experience of operating their own phone (e.g., "I switched off and on my phone when I had problem. Let's try that"). The participants were generally quite successful in transferring their knowledge. For example, the participant who used her phone as an alarm clock was able to set up the alarm clock of the tested phone even though the procedure was slightly different from that of her own phone.
2. Performing trial and error (e.g., "Let's see what this icon does").
3. Reading the manual and following the instructions systematically. The participants complained about the jargons used in the manual, highlighting the need to consider who the prospective users are when designing user manuals.
4. Requesting opinion and help from the researchers.

The third strategy was the most used strategy, and was usually performed when strategy 1 or 2 did not work. The fourth strategy was performed only when everything else failed. The decision to change strategies usually happened very quickly. The participants did not give up easily and were always confident that they could complete the tasks if they were given sufficient time. The group did not ask for any help from the researcher except for finding the location of the alarm function.

### **4.4 The Group's Mental Model on Mobile Phone Operation**

During the learning process, some interesting mental models related to mobile phone operation emerged. One instance concerns the group's understanding on how mobile phone networks work. When the participants experimented with the texting feature of the new phone, there was a noticeable delay in receiving a text message. The group concluded that the delay was due to "different networks sending and receiving the

message.” This discussion extended to the differences between European and American networks and the limited coverage of British network as evidenced by the fact that one participant’s phone did not work in the Lake district. (note: the Lake district is one of the major tourist destinations in the Northwest of England). This example was interesting because it showed that the participants were aware of the existence and [in]compatibility of different networks (within the country and between countries), something that can be considered as quite advanced knowledge about mobile phone operation.

## 5 Analysis of Questionnaire Data

Based on the transcript from the focus group sessions, a set of questions for a larger survey was developed. These questions were then discussed with the focus group during a lunch where a £50 participation reward was handed to each participant. The discussion with the focus group highlighted several issues that would not otherwise have been captured. For example, the focus group suggested that rather than asking for exact age (which many older women would not be willing to reveal), a range of ages should be used as options (e.g., 70-75 years old). Similarly, asking about income was deemed unnecessary and might be offending for some respondents as many retired women do not have any income or are on small pension.

The questionnaire was placed in a website dedicated for surveys, hosted by the University of Manchester. Invitations were mailed to organisations for older persons, mailing lists and personal email addresses (with the owners’ permission). There were two inclusion criteria for participating in the survey: the respondents must be 60 years and over and have used a mobile phone before. To encourage participation, the purchased phone was given away through a lucky draw after the survey ended.

Sixty-seven women respondents participated in the survey, the majority (77.6%) of which were 60-65 years old and had used mobile phones for more than two years (62.7%). Half of them used mobile phones every day, and only 9% used mobile phones less than once a month. The respondents were split almost equally on the pay scheme (prepay vs. pay monthly). Their spending pattern was more varied: 38.8% paid more than £20, 25.4% paid £10-20 and the rest paid less than £10. The top three most called persons were partners, children and friends (a similar pattern was reported in a study of 300 older Japanese mobile phone users [25]).

The most used function other than voice call was changing the ringing setting, i.e., to silent, vibrate or loud (68.7%). The least used was video call (2 respondents). Around a third of the respondents frequently used 4-5 functions out of the eleven functions listed. The first two reasons for using a mobile phone were for emergency (59 respondents) and to let people know they were going to be late (54 respondents).

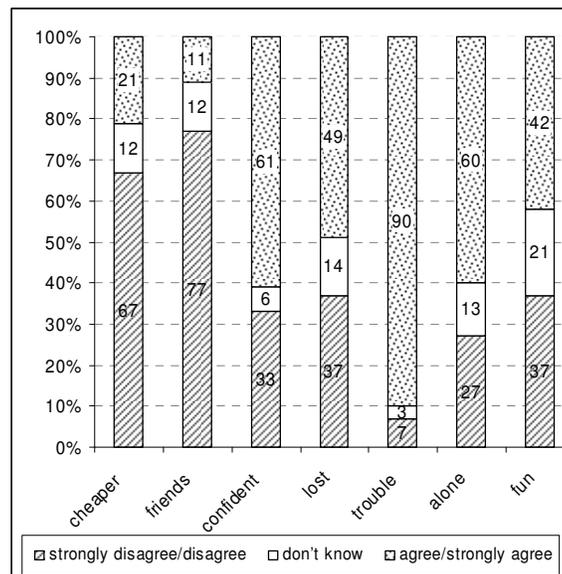
The respondents’ experience with various aspects of their mobile phones (e.g. physical dimensions, navigation, learning to use, etc) was captured when they rated each feature from ‘not a problem’ to ‘stressful’. They were instructed to select ‘don’t know’ if they never used a certain feature. Around one third of respondents marked ‘not a problem’ for almost all features and around a fifth checked ‘tolerable’. Very

few respondents considered using any feature as 'stressful'. The number of functions was the feature that receives the most number of 'annoying' and 'stressful' ratings (34.3%). Very few marked 'don't know' (1-5%).

The respondents were also asked to rate, in a 5-point Likert-like scales from 'strongly disagree' to 'strongly agree' the various roles of mobile phones in their lives (as suggested by the focus group). These are:

1. It is cheaper to use mobile phone than to use landline phone.
2. I have more friends after having a mobile phone.
3. I feel more confident to go out by myself after having a mobile phone.
4. I am not afraid of getting lost after having a mobile phone.
5. I know I can always call somebody on my mobile phone when I am in trouble.
6. I feel safer to be alone because of my mobile phone
7. It is fun to use mobile phone

Figure 4 illustrates the distribution of ratings. As Figure 4 depicts, the most positively responded statement was one that suggests that mobile phones allow older women to call somebody when they were in trouble. The most negatively responded was that they had more friends after having mobile phones. There was almost an equal split of respondents agreeing and disagreeing that using mobile phones was fun.



**Fig. 4.** Respondents' opinions on the roles of mobile phone use in their lives

Finally, to understand older women's opinions on less common functions, a list proposed by the focus group was created, with the options of 'must be removed', 'good if removed', 'can live without', 'good to have' and 'must have'. The respondents tended not to choose the 'must be removed' option. The majority checked 'can

live without' or 'good to have'. The top three must have functions were music player, diary and map. Around one third of the respondents thought that the camera function must be removed or good if removed.

## **6 Discussion and Conclusions**

People often underestimate the interest of older women on mobile technology. It is undeniable that ageing-related functional decline has some impact on their use of mobile phones. In addition, the lack of exposure to more advanced features, even if it is merely due to their decision not to upgrade their mobile phones, means that they are less up-to-date with the ever-changing mobile technology. However, this study shows that older women are keen to understand, enthusiastic to learn, and are quite well informed about some advanced features of mobile phones such as MMS (multimedia messaging services). Terms such as network provider, roaming, and satellite communication were discussed, and the participants showed evidence of some degree of understanding of these terms, either through their interaction with the younger generation (mostly grandchildren) or their own experience (e.g. holidaying abroad).

### **6.1 Patterns of Use**

This study is an exploratory study of the use of mobile phone by older women. However, it presents very rich data gathered through a combination of several methods. As a research method, focus group discussions have been proven in this research to be quite successful in gaining an understanding of how some older women used mobile phone. Although focus group in HCI is less commonly used than other inquiry methods (e.g., contextual inquiry and interview), the focus group discussions were able to capture basic requirements of a mobile phone preferred by older women, prior to design. Studies suggested that when a focus group was involved in the decision making process, the participants felt that they benefited from being valued as experts, and being given the chance to work collaboratively with researchers [8]. When asked to comment on this statement, the focus group participants stated that the experience was empowering and "fun" and that they hoped they could see the fruit of their work in the form of an "older-women-friendly" mobile phone design.

The follow-up survey was intended to gain a balanced view of older women users with different expertise and patterns of use. Unfortunately, the data suggest that most respondents were frequent users, had used mobile phones for an extended period, and were familiar with some advanced functions. Undoubtedly, this was partly because the survey was online only. This, however, allows a peek into patterns of use and opinions of older women users at the high end of expertise level.

The survey data confirm the view of the focus group that mobile phones are for emergency rather than for casual conversation, and that it makes older women feel safer, especially when they are in trouble. The data also confirm the opinions of the focus group that camera and video features are deemed unnecessary, and that having

too many functions makes mobile phone operation an unfavourable experience (i.e., annoying or downright stressful).

There are small differences in preferences of the survey respondents and those of the focus group participants. While text messaging featured high in the focus group discussions, it was not the most favoured nor used feature by the survey respondents (who chose music, map and diary). It is possible, however, that this is merely due to the way the options were presented. In the survey, the respondents were offered eight features while in the focus group discussions it was an open-ended topic with no options – and therefore, the suggested ‘must have’ features were highly dependent on the focus group’s experience. However, considering that the options in the survey were suggested by the focus group, we can perhaps safely argue that the focus group was aware of these options.

In summary, these two data gathering methods have produced some expected findings and some surprises. These can be categorised into:

**Design.** Features that mediate ageing-related functional impairments appeared frequently (e.g. larger device, button and character sizes, simpler menus and manuals, memory aids, etc). Practicalities seemed to override aesthetics (e.g. bold colour was preferred for easy spotting, flip phone for easy call pickup, etc). This is perhaps the biggest difference between design preferences of older people and of their younger counterparts, which considered mobile phones as fashion statements [13].

**Usage.** As expected, mobile phones were not the main communication choice for older women, and the payment plan choice, spending patterns, features used and so on reflect this fact. The interesting thing is to observe that this choice was not based on inability to cope with the technology itself. Very few online respondents considered any feature as stressful to use or were not familiar with even advanced functions. This opens an avenue of investigation of what really causes older women to hesitate to use mobile phones. It is also expected that the main roles of mobile phones were to provide a sense of security and safety when older women were alone (inside and outside the house) or in trouble.

**Roles within broader communication patterns.** From the discussions (and later verified by a larger survey) it was apparent that mobile phones were viewed as supplement of other communication means such as face to face meetings, letters or landline phones. Only when other communication means fail or are less practical (such as when on the move or when calling somebody on their mobile phones), would mobile phones be the communication media choice. The issue of where mobile phones are situated within broader patterns of communication is an interesting one. Wellman, for example, noticed that community relations are no longer forged by door-to-door contact but rather place-to-place contact online or by phone and that mobile phones have shifted the emphasis from place-to-place to person-to-person communities [31]. In a cross-national (UK, Spain, Finland, and Estonia) study of grandparents-grandchildren communications, face-to-face contact remained the most frequent mean, followed closely by landline telephone; there was moderate use of mobile phones, and many

used letters/cards occasionally; and a minority used SMS and e-mails [28]. The question that needs further investigation is, what factors influence the choice of communication means? For example, would geographical distance, the choice of technology used by their offspring, or communication costs affect this choice? This also opens another avenue for further study.

## 6.2 Cooperative Learning Observation

This study examined the cooperative learning process when the group interacted with a new mobile phone. The informal hypothesis that given the setting of the study, it would be more likely that the learning process would match the cognitive perspectives, was supported. A combination of the *developmental perspective* and the *cognitive elaboration perspective* were observed. The interaction among learners around some tasks did seem to increase the group's mastery of critical concepts related to the operation of an unfamiliar mobile phone. The group members took turn to be the explainer and listener. However, in this study, the knowledge gain was not measured, and therefore, which of the two gained the most from cooperative activities could not be verified. It should be noted that although the instruction was to work together as a group, unavoidably there were traces of individualistic learning, especially during the early physical design exploration. It can be argued this was caused by the individual difference in physical design preference (e.g. for some the buttons' layout was more important than the size of the phone).

Ideally, the study should compare the outcomes of competitive, cooperative and individualistic learning. However, with only seven participants in the focus group, it was impossible to split them into three groups. The cooperative learning was shown to successfully help them learn to use the new phone, arguably more than individualistic learning (as observed from the effect of the support provided by the persons sitting on the left and right of the phone holder). But until a comparative study is conducted, this should be treated as speculative argument.

The learning process was translated into a diagrammatic representation in Figure 3. A similar structure was observed in two quite different domains: older mobile phone users' menu navigation [32, 33] and the learning process of individual blind users when interacting with a new Windows environment [15]. This may indicate that there exists a basic structure of user's learning process of a new interactive system. The diagram indicates that older persons have a structured strategy of interacting with mobile phones. They first explored the physical design, and then started performing basic activities, where they could transfer their existing mental model to, before moving to new features. When exploring new features, they adopted several strategies, i.e., a combination of trial and error, relying on peer support for help (for advice or to find the information in the manual), and seeking expert help.

### 6.3 Limitations and Further Work

There are some limitations of the current study. The focus group participants are quite homogeneous: highly educated women, middle to upper class, and able-bodied. Although the use of mobile phones, to a certain extent, requires a certain economic and cognitive status, it would be interesting to conduct focus group discussions of older women from other socio-economic background, even if they are only exposed to mobile phones as the 'victims' of other people's inconsiderate use of mobile phones (e.g., loudly talking fellow train passengers). Another natural extension of this study is to replicate the study with older men to highlight gender-related differences in opinions, patterns of use and design choices. Although the online questionnaire was useful to capture quantitative data from a larger pool of older users, it largely failed to attract respondents who were novice mobile phone users. A study with paper-based survey will perhaps be more successful in capturing users with different characteristics.

This study visualises the learning process of a group of older women using a new mobile phone in a snapshot study. It would be more meaningful for mobile phone developers to understand the learning curve of this group, which will require a longitudinal study. As stated earlier, it would also be fruitful to compare the outcomes of various learning approaches.

This study has shown the importance of looking at under-represented population, at real-world practice. The knowledge gained can easily be translated into the development of mobile phones that would be usable and useful for older women. This study also shows that the methods used are have been successfully applied to, and can easily be adapted for requirement gathering exercises of future ubiquitous devices for this user population.

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