OLDER PEOPLE, MOBILE TECHNOLOGY AND CULTURE: AN INVESTIGATION OF APPROPRIATE METHODS AND PERSONAS IN MALAYSIA AND THE UK

SOFIANIZA BINTI ABD MALIK

PhD

UNIVERSITY OF YORK

COMPUTER SCIENCE

JUNE 2011

Abstract

This research is concerned with the use of mobile technology by older people and the main focus is the appropriate methods for collecting data. There are a number of problems with conventional techniques when using older people as participants. This is due to the fact that older people have an extremely wide range of characteristics and impairments compared to other groups. A main objective of this research was to find the best methods in this context, though it is recognized that there may not be one best method or technique for any given situation. In Study 1, two similar experiments were carried out, in Malaysia and the United Kingdom. The experiments focused on two methods: interviews and focus groups. In addition, the use of personas as a tool in elicitation has been explored. A questionnaire was also prepared for the participants in an attempt to achieve the same objectives from different perspectives. On the basis of the results, further analysis was carried out in Study 2 to ascertain whether this was a real effect that might be due to cultural differences. Consequently, card sorting was conducted in the second stage in order to generate categories from 167 problems identified in Study 1. Results produced in Study 2 prompted further research to clarify whether the differences are truly culturally-related. The conclusion was that there were four categories of problems which show a difference between the two countries. This research has been focused in two areas, and has made contributions to both of them: methods of requirements elicitation with older people and cultural differences in the use of mobile technology by that group. It has been established that there were small but significant cultural differences in the effectiveness of these methods in the two countries.

Contents

List of Tables

Chapter 2

Chapter 3

Chapter 4

Chapter 5

List of Figures

Chapter 2

Chapter 3

Acknowledgments

This thesis would not have been possible without the guidance and the help of several individuals who in one way or another contributed and extended their valuable assistance in the preparation and completion of this research.

I am heartily thankful to my supervisor, Dr Alistair Edwards, whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of the subject. I will be forever grateful for your encouragement and support throughout this PhD programme.

I would like to give special thanks to Professor Helen Petrie and Dr Paul Cairns, for their assistance and guidance. Thank you for your insightful and instructive guidance with data analysis. Their expertise was greatly appreciated.

I would also like to acknowledge and thank the participants, who gave their time to participate in this research, without them, this work would have not been possible.

On a personal note, thank you to my mother and family for their encouragement and support. In particular, I would like to thank Jamaluddin Manaf, my husband, for his love, support and patience. Finally, I must acknowledge our two children, Umairah and Muhammad Thoriq, for they will always be my drive and inspiration.

Declaration

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

Parts of this work have been published as listed below:

Abd Malik, S. and Edwards, A. D. N. (2010). Investigation of cultural dependency in mobile technology and older adults. *Proceedings of the 28th of the international conference extended abstracts on Human factors in computing systems* (CHI EA '10), pp. 3835-3840. DOI=10.1145/1753846.1754065

Abd Malik, S. and Edwards, A. D. N. (2008). Mobile HCI and Older Population. *Workshop at British HCI 2008*, Liverpool John Moores University, Liverpool, pp. 21-22.

Chapter 1

Introduction

1.1 Overall Aims

The overall aim of the research presented in this thesis was to investigate methods of collecting data on mobile technology that are best suited to older people. It is known that mobile technologies have great potential and benefits to older people. The research aimed to investigate and identify more appropriate methods for extracting information from the target user group which refers to older people in the context of mobile technologies.

There are a number of different aspects to the research, principally:

1. Data elicitation on the technology experience of older people, focusing on talking methods;
2. Cultural differences in experience between a developed and a developing country;
3. Use of mobile technology by these groups.

Taking each of these in turn:

1.

Requirements elicitation is a notoriously difficult task. It is hard for people to express what they would want of technologies that are yet to be designed. It is easier for them to explain problems that they have had with existing technologies and then the designer's role becomes one of

avoiding those problems in future designs. This approach seems to be particularly relevant to older people since, on the one hand they often have more problems using technology, while on the other they may find it even harder to envisage future technologies.

A task which many older people are comfortable with is talking and in general functional limitations associated with age do not affect talking abilities (unlike writing, for instance). Hence, talking-based methods seem appropriate. Yet at the same time any talking-based method has to be controlled and focussed, which may pose a particular challenge with older participants.

2.

The researcher was from one country (Malaysia) but worked in another (the UK). This gave a unique opportunity to compare between the different countries and cultures. The important apparent differences are discussed further in Section 2.2, below.

3.

Mobile technologies are of increasing importance. If it is not already true. It will soon be the case that exclusion from access to mobile technology will be a significant handicap, socially and economically. Furthermore, though, mobile devices are necessarily physically small – and so create their own set of accessibility problems for people with some of the impairments often associated with aging.

1.2 Rationale

Older people are a growing percentage of the worldwide population. According to the United Nations, the world population of persons over 60 will increase from about 600 million in 2000 to almost 2 billion in 2050 (United Nations, 2002). In parallel with these demographic changes, technology is also changing and we are interested in the interaction between these developments. In particular, technology which was formerly available only in desktop computers is now available in mobile forms. Increasingly the technology is combined on mobile phones, which also offer communication in the form of voice and text. This research is concerned with the use of mobile technology by older people and the main focus is the appropriate methods for collecting user requirements data. There are a number of problems with conventional techniques when using older people as participants. This is due to the fact that older people have an extremely wide range of characteristics and impairments compared to other groups. For example, it has been reported that there are difficulties in handling focus groups consisting more than three older people (Lines and Hone, 2002). These difficulties can be associated with hearing impairments, attention problems and the ability to follow a discussion which hinders many participants' contributions. Furthermore, members of large focus group have a tendency to make conversation among themselves. There are also language and cultural differences that tend to make communication between older people and younger people difficult (Eisma, Dickinson, Goodman, Mival, Syme, Tiwari, 2003).

A main objective of this research was to find the best methods in this context, though it is recognized that there may not be one best method or

technique for any given situation; a combination of methods may be most beneficial.

The motivation for research in these fields was driven by the imperative to support the active participation of this growing section of the population in a society which is increasingly dependent on communication technology. That participation will only be achieved with the support of research into their needs. Moreover, it is hoped to throw some light on broader social context of mobile technology. This research focuses on mobile phone as one of the most popular mobile technologies.

1.3 Structure of Thesis

The research presented in this thesis has involved three studies that have been conducted in Malaysia and the UK. Use of personas has also been explored in the context of using it as a tool in order to get better understanding and information about the strengths of the methods. This thesis has 7 chapters, which are briefly summarized below to provide the reader an outline of its structure.

Chapter 1: Introduction

Chapter 2: Background and Literature Review

This chapter presents a review of the most relevant publications in the area of mobile technology, focusing on mobile phones and older people. It also includes publications on methods related to user requirements and data collection. It also outlines the limitations and assumptions inherent to the research. This chapter will provide an overview of the relevant literature and research as well as the rationale for the current research.

Chapter 3: Study 1: User Requirements Elicitation Methods (Interviews versus Focus Groups)

This chapter reports on two similar studies that were carried out, in Malaysia and the UK. The studies focused on two methods: interviews and focus groups. In addition, the use of personas as a tool in elicitation has been explored. A questionnaire was also prepared for the participants in an attempt to achieve the same objectives from different perspectives. Overall 167, problems were identified with mobile phone use. On the basis of the results, further analysis was carried out in Study 2 to ascertain whether this was a real effect that might be due to cultural differences.

Chapter 4: Study 2: Online Card Sorting

This chapter reports on further analysis that was conducted based on the results in Study 1. Card sorting was conducted in the second stage in order to generate categories from the 167 problems identified in Study 1. Sixteen participants took part in the online sorting study, all of whom were experts in the field of Human-Computer Interaction (HCI) with backgrounds in computer science and psychology. Four categories were identified that were passed on for further investigation. Based on the results, further analysis was carried out in Study 3 to clarify whether the differences are truly culturally-related.

Chapter 5: Study 3: Focus Groups and Questionnaire

Results produced in Study 2 seemed to prompt further research, which was to clarify whether the differences are truly culturally-related. There were four categories of problems which show a difference between the two countries. There were two methods involved in the study: focus groups and questionnaire. Focus group was conducted in UK only

meanwhile for questionnaire, it was distributed to participants in both countries: UK and Malaysia. Eleven participants from the UK took part in focus group sessions while for questionnaires, 47 participants were recruited in Malaysia and 34 in the UK.

Chapter 6: Mobile Phone Findings

This chapter reports on findings about older people use of mobile phones based on information that has been obtained from investigations of the methods. The findings presented in this chapter may have implications for the design of mobile phones in general.

Chapter 7: Conclusions to the Thesis

This chapter gives an overview of the work presented in the thesis. The research has been focused in two areas, and has made contributions to both of them. They are methods of requirements elicitation with older people and cultural differences in the use of mobile technology by that group.

Chapter 2

Background and Literature Review

2.1 Introduction

This chapter reviews the most relevant publications in the area of mobile technology, focusing on mobile phones and older people. It also includes publications on methods related to user requirements and data collection. It also outlines the limitations and assumptions inherent to the research. This chapter will provide an overview of the relevant literature and research as well as the rationale for the current research.

Before the literature is reviewed, however, this chapter will first provide an overview of the current and predicted demographic changes of world population as they have had an important impact upon the development of mobile technology.

2.2 Older People

Older people are a large and growing percentage of the worldwide population. According to the United Nations, it is estimated that there will be an increase in the number of people over 60 by the year 2050 (United Nations, 2002) as shown in Figure 2.1.

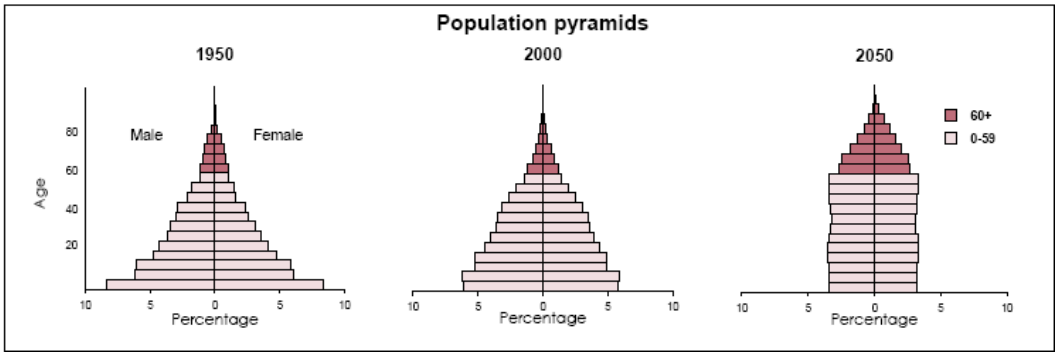


Figure 2.1 - World population

(Source: World Population Ageing 1950-2050, United Nations)

The older population is growing at a considerably faster rate than that of the world's total population, and will increase from 600 million to almost 2 billion for people aged 60 years and above (United Nations Division for Social Policy and Development, 2002). In relative terms, the percentage of older people is projected to more than double worldwide over the next half century. Indeed, people of 60 and over will account for 22% of the world population and those 65 and over will account for 16% (United Nations Department of Economic and Social Affairs – Population Division, 2009). In Malaysia, the proportion of the population 65 years and over in the 2000 census was recorded at 3.9% compared to 3.7% in 1991 (Population and Housing Census, 2000). It indicated that 1.452 million people were aged 60 or over and the estimate for 2004 was around 1.67 million people (Department of Statistics, 2001). Indeed, the percentage of Malaysian older people aged 60 and above will increase to 20.8 % in 2050 from 6.6% in 2000 (United Nations, 2002) as illustrated in Figure 2.2. This is due to the fact that for the past three decades, Malaysia has experienced improved health, longer life expectancy, lower mortality and declining fertility, all of which have resulted in a rise in the ageing population (Hisham and Edwards, 2007).

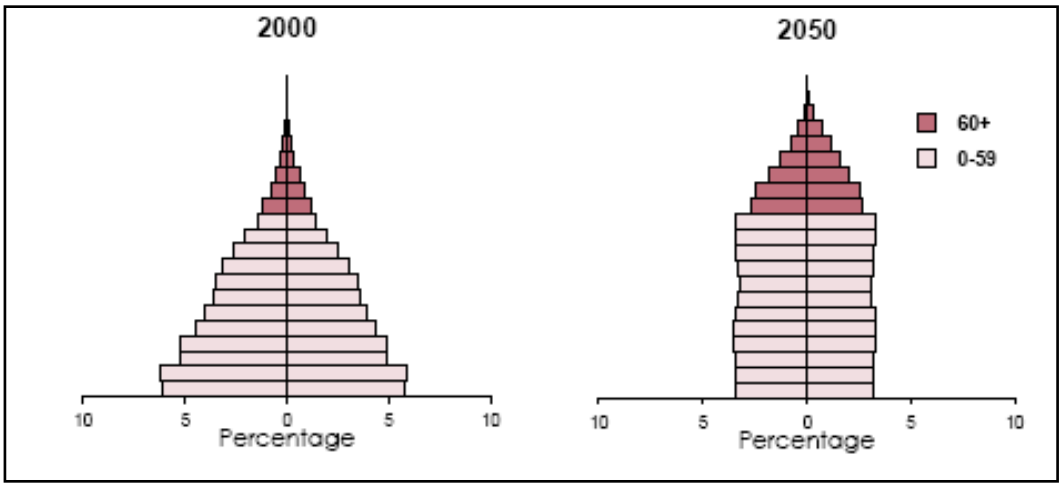


Figure 2.2 - Population pyramids for Malaysia

(Source: World Population Ageing 1950-2050, United Nations)

Currently, Malaysia is one of the developing countries aiming to achieve developed country status by 2020. In fact, by the year 2020, it is estimated that 9.5 per cent of the country's population is likely to be aged 60 years and over (Ong and Phillips, 2007). All these age variables indicate a continuation of the ageing population trend in Malaysia as shown in Table 2.1

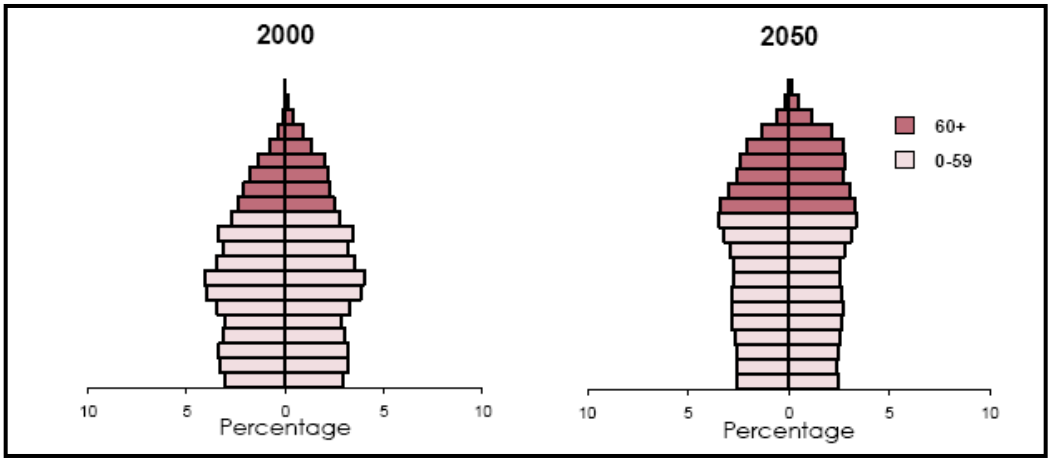
Table 2.1 - Population by age group, Malaysia, 2000- 2008

(Source: Population ('000) by Age Group, Malaysia, 1963-2008, Department of Statistics Malaysia)

Year	Age Group (year)		
	0 - 14	15 - 64	65+
2000	8,003.1	14,560.0	931.8
2001	8,112.4	14,940.2	960.3
2002	8,214.2	15,318.5	993.9
2003	8,313.7	15,702.4	1,032.2
2004	8,415.7	16,090.8	1,074.4
2005	8,525.3	16,483.0	1,119.4
2006	8,632.0	16,858.6	1,149.6
2007	8,748.6	17,237.9	1,187.0
2008	8,876.2	17,620.2	1,232.3

We have to accept the fact that we are becoming an older world. Figure 2.3 points out that the population pyramids for people over 60 are expanding and there will be a greater increase in the number of older females than males.

United Kingdom of Great Britain and Northern Ireland



Japan

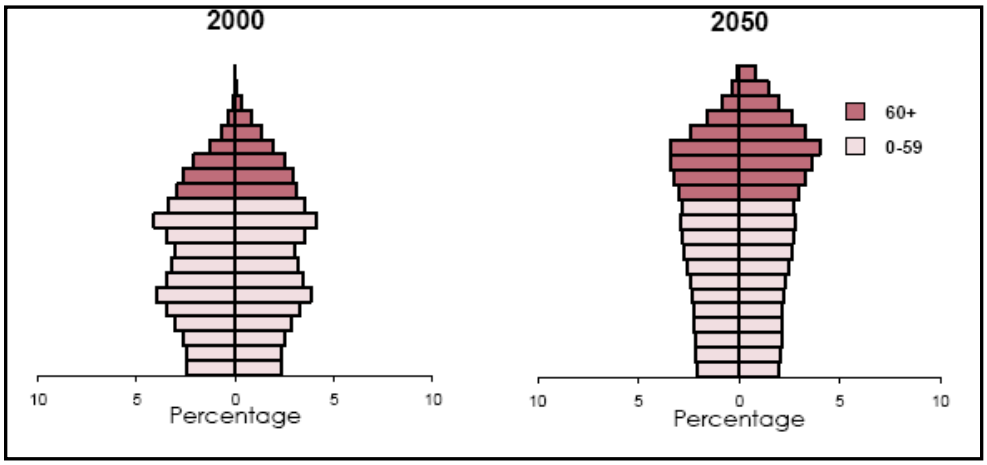


Figure 2.3 - Population pyramids

(Source: World Population Ageing 1950-2050, United Nations)

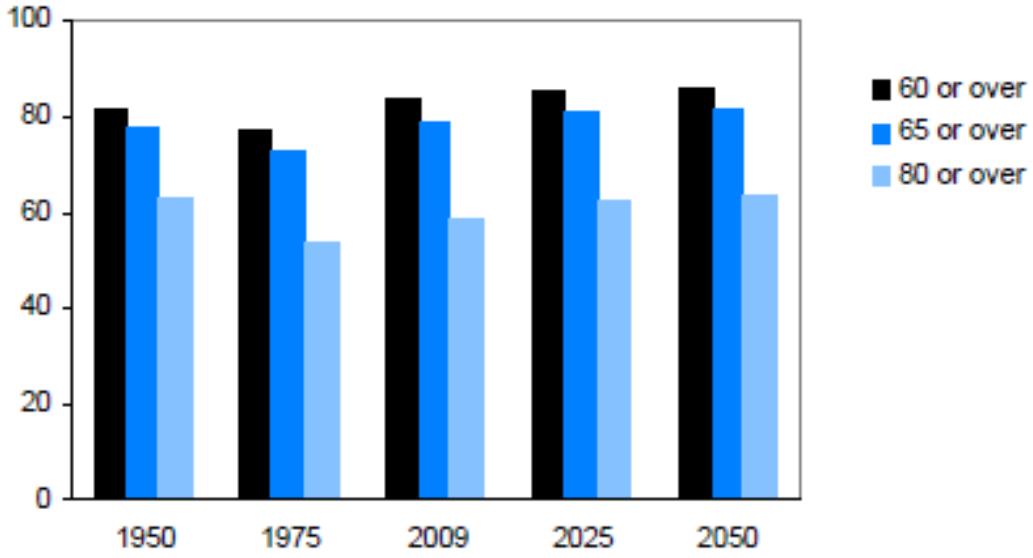


Figure 2.4 - Number of men per hundred women at ages 60 or over, 65 or over and 80 or over: world, 1950-2050

In view of the fact that women's life expectancy is greater than men's (United Nations Department of Economic and Social Affairs – Population Division, 2009), women seem to represent the majority of the older population and the main contributor to the age increase of that population as shown in Figure 2.4.

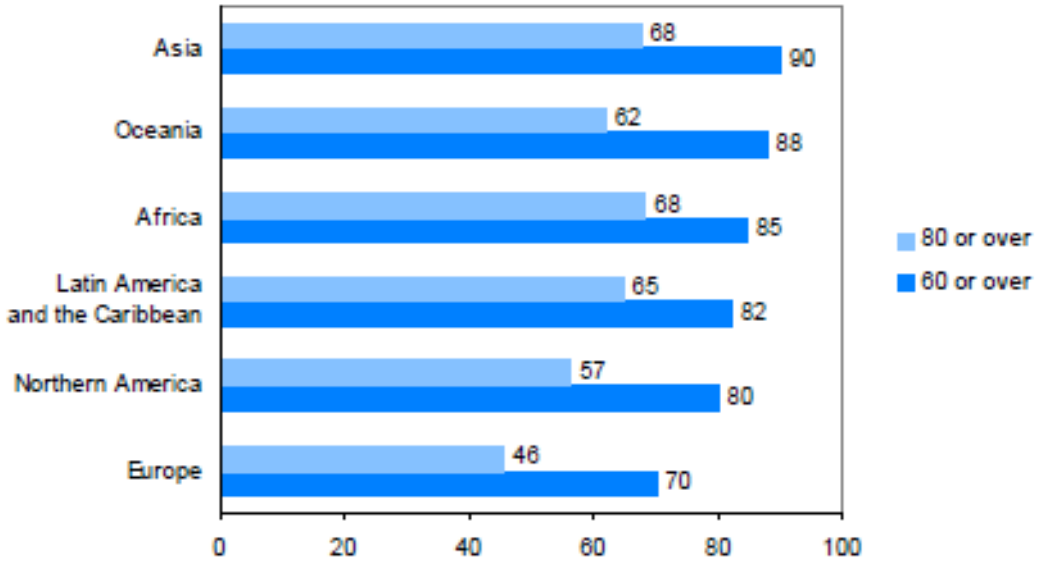


Figure 2.5 - Number of men per hundred women at ages 60 or over and 80 or over: major areas, 2009

(Source: World Population Ageing 2009, United Nations)

Figure 2.5 shows that Europe (including the UK) has the lowest sex ratio at older ages (70 men per 100 women among people aged 60 or over and 46 men per 100 women among people aged 80 or over). Asia, on the other hand (including Malaysia) has the highest sex ratio among people aged 60 or above (90 men per 100 women), whereas Africa and Asia have the highest sex ratios among people aged 80 or above.

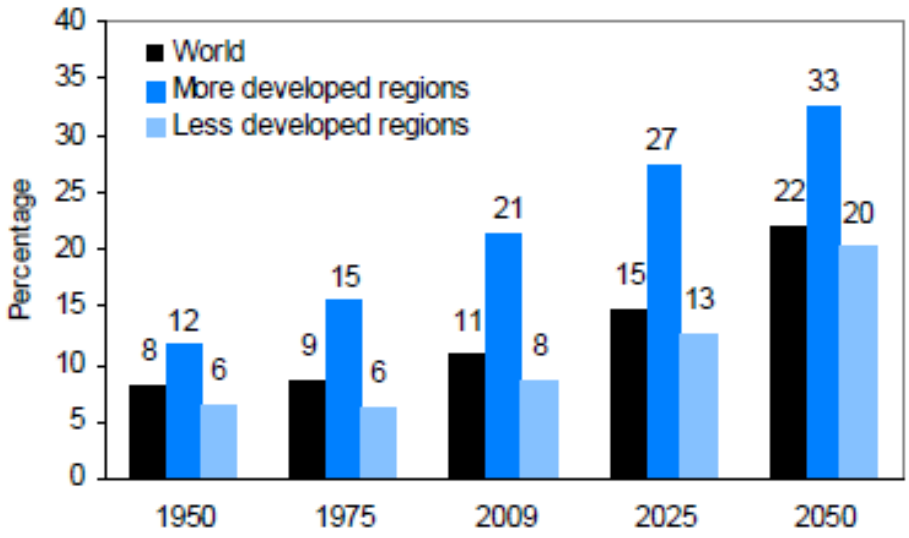


Figure 2.6 - Proportion of population aged 60 or over: world and development regions, 1950-2050

(Source: World Population Ageing 2009, United Nations)

Although the highest proportions of older people are found in more developed regions, for example the United Kingdom and the United States of America (Figure 2.6), this age group is also increasing faster in the developing regions. Hence, in the developing regions including Malaysia the older population will be increasingly concentrated. Currently, the median age in the more developed regions is approximately more than 14.4 years higher than in the developing regions. This difference is projected to reduce to 9.6 by 2050, as shown in Table 2.2.

Table 2.2 - Comparison of ageing variables among Malaysia, United Kingdom and United States (* Potential support ratio refers to the number of persons aged 15 to 64 per one person aged 65 or above)

(Source: World Population Ageing 1950-2050, United Nations)

Ageing variables	Malaysia			UK			US		
	2000	2025	2050	2000	2025	2050	2000	2025	2050
Median age (years)	23.3	31.2	37.8	37.7	44.5	47.4	35.5	39.3	40.7
Potential support ratio	14.9	7.5	4.2	4.1	2.9	2.1	5.4	3.4	2.9

As illustrated by the orange columns in Table 2.2, in terms of the median age and potential support ratio, there is approximately a 50-year lag between Malaysia and the UK. It is very important to highlight this point in order to have a better understanding of technology acceptance among Malaysian older people compared to older people in developed regions such as UK and US.

Comparisons between development stages are not only relevant in terms of demographics. Technology is also important. Malaysia's classification as a *developing* nation is significant in that it is expected to reach developed status by 2020. In other words, by then it will have 'caught up' with the UK. The level of development is measured on a number of dimensions – including demographics and technology. Even now it can be observed that specifically in the area of mobile technology, the two countries are quite close. This was not true fifty years ago. In other words, technologically the environments of our target populations in the two countries were very different in their formative years.

2.2.1 Defining Age

Age is deceptively difficult piece of information. On the one hand it is one of the most reliable and easiest items of data that we can have about a person (at least in countries with well-developed systems of registering birth). On the other, it is one of the most arbitrary, but established in law. There is a need for clarity in discussions and descriptions of work with this group of people in the literature, but also specifically in the context of current work comparing the older population in the UK and Malaysia.

People who think about these things (Laslett, 1991) often come to the conclusion that each individual is defined by a set of ages, only one element of which is chronological age. Other 'ages' include psychological age, emotional age, mental age (in the sense of 'how old you feel') and these are at least as important as the chronological age, while being much harder to measure.

It would also be wrong to treat age and culture as orthogonal. In fact the researcher is going to argue that age is culturally-related measure. There could even be an argument that (for instance) an older Malaysian is a member of a different culture from a young Malaysian. Indeed, it might be suggested that a young Malaysian's culture is closer to that of a young Briton than it is to an older Malaysian. It is not even possible to assume a culturally independent mapping from functional effects of aging to chronological age. For instance, the rate of physical decline will be different in a culture in which members are expected to pursue strenuous physical work as long as possible from that in a culture in which physical work is unusual or when there is an expectation of withdrawal from such work as people get older.

One culturally-related measure of age is the retirement age. The concept of retirement is not a new one. What is relatively new, though, is the suggestion that it is a right which should be afforded universally. Previously it was the case that those who could afford not to work in their latter years would have the opportunity to retire and be provided for by others – accumulated wealth or their family. It is only really in the twentieth century that the concept was accepted more broadly. Retirement is also seen as both a practical step (i.e. not expecting work from those who are too impaired to work effectively) and a reward for those who have contributed to society in their prime years, who can now rest in their latter years. So it is that there is an obligation for those who have not amassed sufficient wealth and who do not have descendants in a position to support them, to be supported by the broader society through the provision of a pension.

However, 'retirement age' is also not well-defined. The simplest definition is the youngest age at which a person is entitled to receive a (full) pension. In some countries there is a compulsory retirement age. This usually corresponds to the age at which a pension is payable, and is effectively the age at which an employer may dismiss an employee on the basis of age alone. Even in such countries, though, this does not necessarily represent a clear line; 'early' retirement is usually an option. Thus, it is to a large extent a fact that the effective retirement age generally depends on economic factors.

2.2.2 Retirement and life expectancy

The UK is unusual in having different retirement ages for men and women. Hitherto it was 60 for women and 65 for men. This has been ruled as illegal sex discrimination and therefore it is planned that from 2020 the retirement age will be equalized at 65 for both sexes. In practice that is unlikely to transpire because other pressures mean that the retirement age (for both sexes) is likely to be increased. Of course, nature is not constrained by sex equality legislation, so there is a real difference between men and women in that women usually live longer. Thus, even with an equalized retirement age, women generally spend a longer time in retirement.

In the USA the age for collecting full Social Security retirement benefits is gradually being increased from 65 to 67 over a 22-year period beginning in 2000 for those retiring at 62. Currently the retirement age is effectively 66.

As noted above, the greater the life expectancy the older the retirement ages tends to be. As life expectancy increases in developed countries there is a trend towards a higher retirement age. The connection is not direct, though, it is more complex demographically. At the same time as life expectancy is increasing in these countries, the birth rate is also decreasing. The effect is that there are more retired people being supported by the taxes and incomes of a diminishing number of young people. (As illustrated in the population pyramids above, Figures 2.2 and 2.3). Increasing the retirement age is an attempt to improve this balance.

The statutory or conventional age for retirement varies between different countries, which is evidently a cultural dependence, so it is convenient to class people beyond that age as 'old'.

An alternative, apparently more objective benchmark might be a figure derived from life expectancy data. The retirement age for men in the UK is 65. The average life expectancy for a UK male is 80. Thus, the average UK male retires when he has lived 81% (0.81) of his life. By comparison, in Malaysia the average life expectancy is 78 and men retire at 58, when they have lived 74% of their life. On that basis it could be argued that Malaysian men retire earlier than UK men, in that they spend a greater proportion of their life in retirement. Living only two years less than the average UK male, then they should retire at age 59 (59.49 to be precise) to be on a par with their UK counterparts in the sense of spending an equal proportion of their lives in retirement. See Table 2.3 and Figure 2.7 for a fuller list of 'proportion of life' calculations for different countries. The UK data are used as the benchmark since the original motivation was to compare the UK with Malaysia. Note that these data refer only to males – because the retirement age applies to males in those countries in which there is a different retirement age as well as those in which it is the same for males and females.

Table 2.3 – Comparison of ages in different countries

	RA	LE	RP	ARA	Delay
UK	65	80	0.81	65.00	0
Malaysia	58	78	0.74	59.49	18
China	60	78	0.77	61.54	18
USA	66	81	0.81	65.19	-10
Bangladesh	57	76	0.75	60.00	36

Key:
RA: Retirement Age

LE: Life Expectancy

RP: Retirement Proportion (average proportion of live lived at retirement age)

ARA: Adjusted retirement age (age at which a person should retire in order to spend the same proportion of life in retirement as a UK male)

Delay: Delay = ARA – RA (in months)

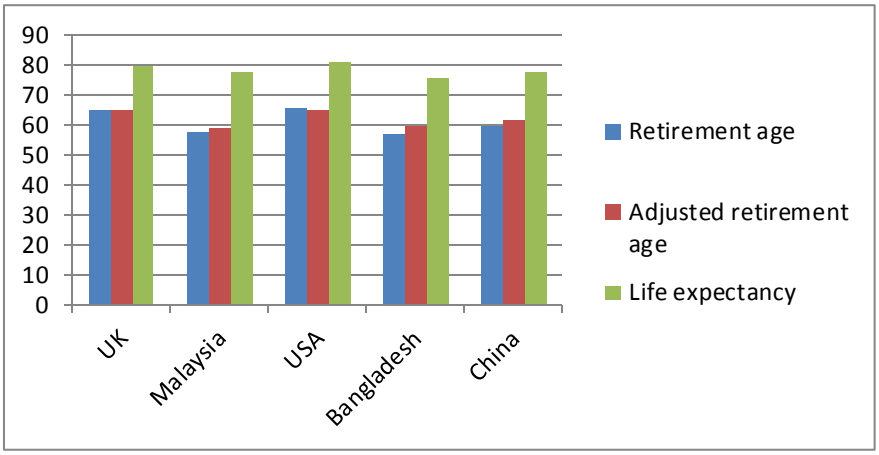


Figure 2.7 - Graphical representation of the comparison of ages in different countries, from Table 2.3.

Table 2.3 and Figure 2.7 also contain data for China and Bangladesh. China is included and an instance of a culture in which respect for elders is considered very important. As in the UK, there is a differential official retirement age for men and women. The legal retirement age for men is 60 and 55 for women. Bangladesh is included as one of countries classed by the United Nations as Least Developed.

Table 2.3 reveals that retirement ages as a proportion of life expectancy are quite similar in Western countries, which is no surprise. The Delay figure represents the difference in retirement age that would have to be applied to ensure that people in the different countries spend the same proportion of their life in retirement as a British man. Of the countries included, the USA is the only example in which men retire 'late' in terms of their proportion of life expectancy. In Bangladesh, though, we see a different picture. Male life expectancy is 76. The retirement age is 57 so a Bangladeshi is working for 0.75 of his life. If we adjust to the UK proportions, a Bangladeshi should retire at 60.

Yet making that very argument exposes the superficiality of the analysis. The time spent in retirement is not the only consideration. Again

we must consider cultural components. What is the quality of the retirement? Indeed, what is the quality of the working life? What is the position of the retired person in the society? Are they likely to remain active and contributing (perhaps in the role of the 'wise elder') or are they no longer treated as significant members of society?

Lastly, the delays differ between the UK (a developed country) and Malaysia (developing) by 18 months, and between Malaysia and Bangladesh (least developed) by another 18 months. As suggested at the beginning of this section, age is a deceptively difficult datum. It is argued that in defining the group of older people, it is reasonable to use the national retirement age and that is the pragmatic choice that has been applied in this thesis. If comparisons are to be made across countries at different stages of development, though, then care should be taken with this definition.

2.3 Mobile Phones

The mobile phone is becoming part of personal items in our daily life. It is perceived to be one of the important gadgets that people should possess. The majority of users assert that the mobile phone has played an important role in their daily activities and work (Wajcman, Bittman, Jones, Johnstone and Brown, 2007). The definition of what constitutes a mobile phone is imprecise and fluid. For instance it can also be perceived as mobile multimedia since it supports multimedia elements such as graphics for pictures, audio, video and interaction. There were approximately 1.7 billion mobile phone subscribers in the world in 2004 (Business Communications Review, 2005). By the end of 2009, mobile phone subscriptions reached around 4.6 billion and the International Telecommunication Union (ITU) anticipated an increase of 5 billion globally in 2010 (International

Telecommunication Union, 2010). Figure 2.8 illustrates mobile subscribers per 100 inhabitants for different regions, where Europe has the highest percentage of 98.1%. Meanwhile for the Asia-Pacific region, that includes Malaysia, the percentage can be used as an indicator to reflect a positive acceptance towards mobile subscription. In fact, mobile phone penetration in developing countries including Malaysia is only 10 years behind that of developed countries such as Sweden, which was ranked first in ITU's ICT Development Index (International Telecommunication Union, 2009).

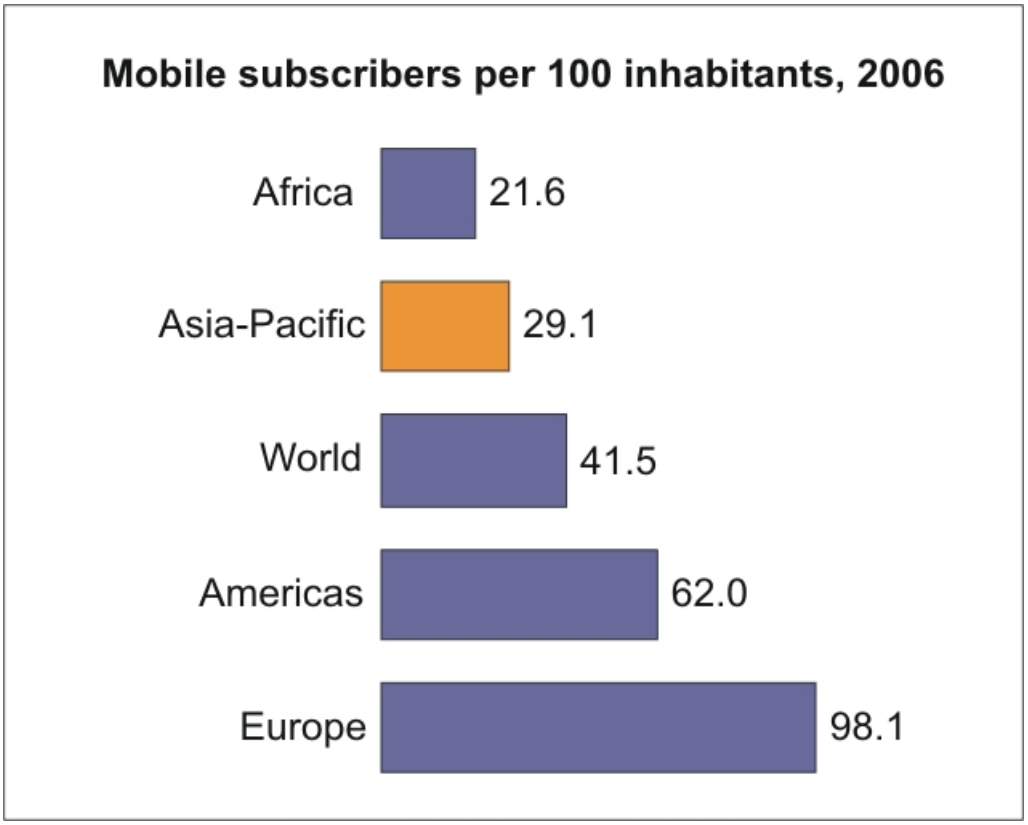


Figure 2.8 – Mobile subscribers per 100 inhabitants, 2006

(Source: International Telecommunication Union, 2006)

In Malaysia, mobile phone penetration rates have increased rapidly in recent years from 21.8% in 2000 to 108.1%[1] for the first quarter of 2010 and at the same time, fixed line penetration rates dropped from 66.4% in 2000 to 43.6% for the first quarter of 2010 (Malaysian Communications and Multimedia Commission, 2010). In 2007, mobile phone penetration for Malaysia was around 85.1% compared to Singapore (126.7%) that had the highest percentage among the Asian countries (see Figure 2.9). The latest statistics presented below signify towards positive acceptance in mobile subscriptions.

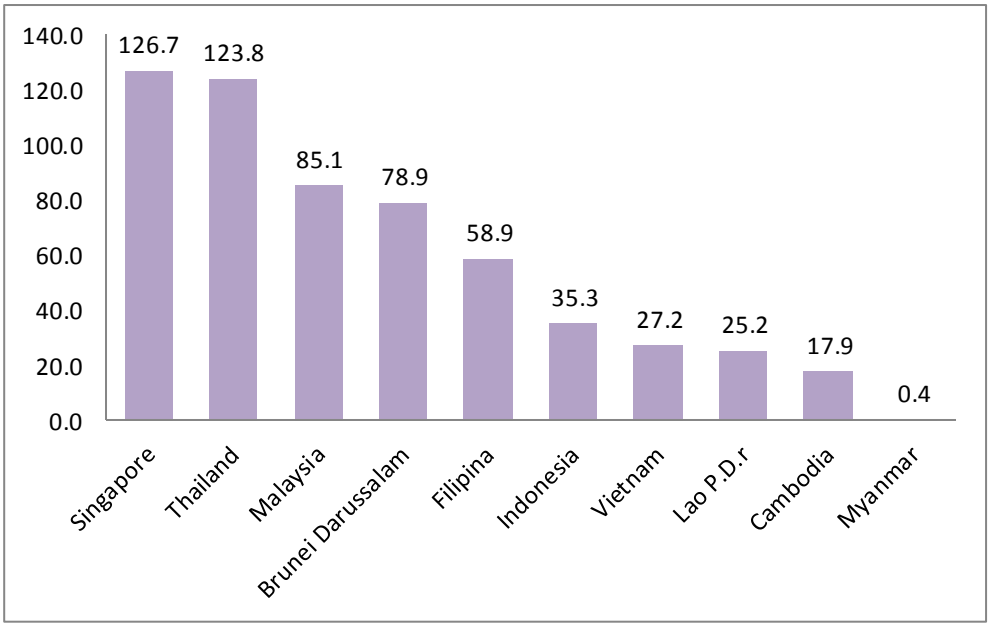


Figure 2.9 - Mobile phone subscribers per 100 inhabitants, Asean (Association of Southeast Asian Nations) countries, 2007

(Source: Malaysian Communications and Multimedia Commission, 2008)

Almost thirteen percent (12.6%) of people aged 50 and above in Malaysia subscribed to a mobile phone in 2006. The subscription had increased significantly from 8.7% the previous year (Hand Phone Users

[1] In quoting penetration rates, it is conventional to allow percentages greater than 100, representing ownership of multiple phones by individuals.

Survey, 2006). Though the percentage is still small for Malaysian older people, it is a positive indicator of acceptance of the use of mobile phones. The older population is growing while at the same time there is an increasing importance of technology, including mobile technology. The trend is towards an increasing incorporation of mobile technologies into our daily lives and this includes older people.

As the proportion of older people increases, they will of necessity become more independent, which will have economic consequences. In other words, they must also stay economically active longer than before due to the same effect.

For the purposes of this research, the mobile phone is considered as a mobile device that carries the feature of mobile technology, which is mainly used for communication in the form of voice and text. Currently, features like the camera, multimedia messaging service (MMS), internet and email are considered as standard. As further features are added, interfaces of mobile phones might become even more complex in the future – which may have the effect of further restricting the potential of mobile phones for older people.

While it is generally acknowledged that older people are less likely to accept new and unknown technology than younger people (Eisma, Dickinson, Goodman, Mival, Syme and Tiwari, 2003), studies have indicated that some older people are actually motivated to use mobile applications (Melenhorst, Rogers and Bouwhuis, 2006; Mynatt, Melenhorst, Fisk and Rogers, 2004). Older people are reported to be willing to use the technology if the benefits outweigh the complexity and cost of the device.

2.4 Problems

The role of mobile phone for older people has varied from basic communication to other tasks such as use during emergency (eg: car breakdown) and provide sense of security and safety. However, there are also various problems restricting the potential of mobile phones to provide support to older people. Several physiological but also cognitive changes may occur in older people's life through increasing age (Inglis et al., 2002). The problems could be associated to the age effect and cognitive complexity.

2.4.1 Age Effect

It is important to emphasise that the population of older people is at least as varied as the population of younger people, especially in the scope of abilities. This non-uniformity of ability exists not just for individuals but also within groups. There are huge differences among older people at different chronological ages. According to Gregor, Newell and Zajicek (2002, pg.151), older people can be divided into three groups:

- "Fit older people, who do not appear – nor would consider themselves - disabled, but whose functionality, needs and wants are different from those they had when they were younger."
- "Frail older people, who would be considered to have one or more 'disabilities', often severe ones, but in addition, will have a general reduction in many of their other functionalities."
- "Disabled people who grow older, whose long-term disabilities have affected the ageing process, and whose ability to function can be critically dependent on their other faculties, which may also be declining."

These classifications of groups can be used in the study to characterise various representatives of users among older people. It is very important to acknowledge the fact that older people may have significantly different needs and wants due to the stage of their lives they have reached (Gregor et al., 2002). A few studies have been conducted to examine the age effect related to the use of the mobile phone (Midford and Kirsner, 2005; Ziefle and Bay, 2005 and 2004). Ziefle and Bay (2005) conducted an empirical study to examine aging effects on the usability of different mobile phones. Sixteen younger (23-28 years) and 16 older people (46-60 years) took part in the study where they were required to solve common phone tasks such as calling a number from the phone directory, sending a text message, hiding own number and editing a number in the phone directory. Their research indicated that the younger group had better performance compared to older people. However, this study also found that older people's performance was improved significantly with a less complex phone. The findings were consistent with a study conducted by Schieber (2003) where it was identified that decline in working memory was related to age and complexity of task. Nonetheless older people were at a disadvantage compared to younger users in their capability to execute precisely when complex material was repeated where they demonstrated to have a lower knowledge of mental model than younger users.

2.4.2 Cognitive Complexity

As people grow older, their abilities can be affected by major and minor decline in the cognitive, physical and sensory functions (Pattison and Stedmon, 2006). This may comprise a combination of different disabilities that include vision, hearing, memory and psychomotor abilities (Hawthorn, 2000).

As far cognitive complexity is concerned, technology usage requires a certain level of procedural knowledge. In fact, when using a novel feature people rely on knowledge of procedures that is stored in their long-term memory (Holzinger, Searle and Nischelwitzer, 2007). Nevertheless, in order to master new features, new knowledge must be attained. This requires cognitive effort and as cognitive performance tends to decline with age, simplifying the complexity of mobile phone for older people could be an essential aspect for design and development of mobile phone.

Ziefle and Bay (2004) conducted a study to find out the reasons for older users' greater difficulties using mobile phones compared to younger users. Results indicated that the nature of the mobile phone menu needs to be made more transparent. This was supported by the fact that older people were found to experience greater difficulties during navigation (Lin, 2001 and Pak, 2001) and therefore a less complex menu structure should be introduced to suit their abilities.

2.5 Previous Studies on Mobile Phone Usage by Older People

Despite the increasing rates of mobile phone usage among older people, there are few studies conducted on usage of mobile phones by older persons (Kurniawan, 2006; Massimi and Baecker, 2007). As a result, there are still many unsolved issues revolving on their needs and usage. Another aspect of the problem will be the design issue in terms of mobile phone features such as buttons, screens and menus (Kurniawan, Mahmud and Nugroho, 2006; Massimi, Baecker and Wu, 2007; and Pattison and Stedmon, 2006).

Kurniawan et al. (2006) conducted an exploratory study of how older women use mobile phones, where usability problems related to buttons, screen and design layout were revealed. Nevertheless, their findings cannot be generalized because of the narrow selection of participants – all British females. Another study was conducted on how older people experience their mobile phones in their daily lives and the design aspects that best meet their needs (Kim, et al., 2007). The study revealed that overall older people, regardless of their ability to operate technology, used few features on their mobile phone and showed little interest in additional mobile phone features beyond communication functionality, such as internet and text messaging. This study of various user types, therefore, supported previous research findings that suggested older people limited phone usage compared to the majority of mobile phone users (Kurniawan et al., 2006; Mann et al., 2004).

2.6 Data Collection Methods

At present, there are many different methods of data collection available for mobile technology as shown in Table 2.4.

Table 2.4 - Existing methods for data collection used in mobile technology

(Source: Hagen, Robertson and Kan, 2005)

Method	Description	site
Artefacts	The use of objects or documents as sources for data collection. They may be objects (or photos of objects) from daily life or documents that users have created.	Field
Diaries/Photo diaries/Scrapbooks/ Probes	Users document information about their actions or thoughts, or impressions, often daily, for a period of time. Entries can be open and interpretive, or highly structured depending on the study.	Field
Think-Aloud	Participants describe out loud what they are thinking while they complete tasks using a device or prototype.	Field, Lab
Focus groups	Smalls groups of people are facilitated in discussion about an issue.	Field, Lab
Interviews	Interviews capture subject data from talking directly to participants. They can be open or structured and conducted in the field (including contextual interviews), online, over the phone and in labs.	Field, Lab
Questionnaires	Quantitative or qualitative questionnaires are used to collect user opinions, feedback in evaluation, create user profiles or collect data about existing use practices. They can be done in person, or via phone or web.	Field
Scenarios	Scenarios provide information about use situations giving examples of how technologies are used in practice.	Field, Lab
Role playing	Users and researchers play out different roles, or act out tasks or scenarios to explore existing and future use concepts.	Field, Lab

In relation to various methods of data collection, some examples of studies involving older people as participants are shown in Table 2.5.

Table 2.5 - Studies involving older people

Study	Topic	Methods Used
Kurniawan, 2008	Investigates issues related to the use of mobile phones by people aged 60 years and over and characteristics of an ageing-friendly mobile phone.	- Interview - Focus group - Online survey
Massimi, Baecker and Wu, 2007	Informs the design of mobile phones for older people.	- Participatory activity
McCreadie, 2005	Assesses the experiences, needs and preferences of older people in finding their way to places using mobile phones.	-Semi-structured interview
Ziefle and Bay, 2004	Investigates the interrelationship between mental models of a mobile phone menu and performance depending on age.	- Card Sorting - Simulation
Eisma, Dickinson, Goodman, Syme, Tiwari and Newell, 2004	Illustrates some of the difficulties encountered when working with older people, and introduces the concept of mutual inspiration.	- Hands-on session
Mikkonen, Vayrynen, Ikonen and Heikkila, 2002	Concentrates on finding out the key service needs for older people.	- Ideation session
Palen, Salzman and Youngs, 2000	Investigates how and why people use mobile phones in a range of situations.	- Interview - Voicemail contact

Nevertheless, not all the methods are suitable to use in the context of involving older people as participants. This is due to the fact that older people have an extremely wide range of characteristics and impairments compared to other groups of participants. Furthermore, according to researchers on the Utopia Project, "the cultural and experiential gap" can be especially large when developing new technology for older people (Eisma et al., 2004).

In relation to this, a summary of existing methods for data collection used in studies involving older people has been listed in Table 2.6, taking into account the pros and cons of each method.

Table 2.6 - Difficulties with the methods in the context of involving older people as participants

Method	Site	Advantages	Disadvantages
Artefacts	Field	-Gain better understanding of the users' activities in real life situation	-Time-consuming
Documentation -Diaries	Field	-Gain better understanding of the users' activities in real life situation	-Time-consuming -Validity of data
Cultural probes	Field	-Gain better understanding of the users' activities in real life situation	-Hard to interpret
Think-Aloud	Field, Lab	-Encourage spontaneous feedback	-Difficulties in elaborating the details of the feedback during the session
Focus groups (Source: Lines and Hone, 2002)	Field, Lab	-Motivate participants to engage in a discussion through social interaction and group activity -An informal type of approach to gain information for older people	-Difficulties in managing focus groups comprising more than 3 older people -Impairments that affect older people's attention and ability to follow a discussion -Older people have the tendency to make conversation among themselves -Difficult for them to stay focused on the topic

Method	Site	Advantages	Disadvantages
Interviews	Field, Lab	-Opportunity of talking to participants directly / ongoing dialogue -An informal type of approach to gain information for older people	-Time-consuming
Questionnaires	Field	-If personally administered, many useful insights can be obtained -Potential wide coverage -Low cost	-Unrealistic for large population if personally administered -Make good impression, give desirable answers
Workshops/Hands-on sessions (Source: Eisma et al., 2003)	Field, Lab	-Can be conducted during focus group session -Participants are able to see and try in order to gain better understanding	-Older people might tend not to complain or criticize
Scenarios	Field, Lab	-May focus on an ordinary user task	-Bias the discussion depending on scenarios created, based on particular area
Persona	Field, Lab	-Engage user in discussion	-Bias the discussion depending on persona created, based on particular area

Method	Site	Advantages	Disadvantages
Role playing	Field, Lab	-Encourage open dialogue among the groups	-Bias the discussion depending on role created, based on particular area
Drama-based Scenarios - Forum theatre (Source: Newell, Arnott, Carmichael and Morgan, 2007)	Lab	-Designers are able to interact with users during design process -Removal of ethical issues	-Require professional actors and good script -Cost -Availability

There are other difficulties in some of the methods used. For example, it has been reported that there are difficulties in handling focus groups consisting of more than 3 older people (Lines and Hone, 2002). These difficulties can be associated with hearing impairments, attention problems and inability to follow a discussion, which proved to hinder many participants' contributions. Lines and Hone (2002) also reported that members of large focus groups have the tendency to make conversation among themselves. It was also difficult for them to stay focused on the topic.

Massimi et al. (2007) reported that during participatory activities, older people, who had participated in building their own imagined mobile phone system, produced the type of mobile phone based on researchers' expectations and not theirs.

There are also language and cultural differences that tend to make communication between older people and younger people difficult (Eisma et al., 2003). Older people in the Utopia Project had the tendency not to complain or criticize products due to their modesty and respect for the researchers. Jargon and technical terms can also be difficult for them to

understand or use in describing products. Also, Utopia researchers (Eisma et al., 2004, pg. 132) commented that "people who are familiarized to older technologies may not be aware of the possibilities of new technologies, which can severely limit their capability to contribute actively to a discussion".

2.7 Use of Personas

The use of personas is explored in the context of using it as a tool. "Personas are fictional people. They have names, likenesses, clothes, occupations, families, friends, pets, possessions, and so forth. They have age, gender, ethnicity, educational achievement, and socioeconomic status. They have life stories, goals and tasks. Scenarios can be constructed around personas, but the personas come first. They are not 'agents' or 'actors' in a script, they are people" (Grudin and Pruitt, 2002, pg.146). In other words, a persona is a representation of a user that is given name and a face, and it is carefully portrayed in terms of needs, goals and tasks (Blomquist and Arvola, 2002). In most cases, personas are synthesized from data collected from interviews, observations and/or quantitative data analyses (Pruitt and Grudin, 2003). They are captured in a range of formats that typically include behaviour patterns, goals, skills, attitudes, thoughts and feelings (Blythe and Wright, 2006). In general, personas are rich representation of users that act as a trigger for empathy.

Personas are known as an extremely valuable tool for marketers and have been used widely for commercial purposes. They help the designer to ensure that the design matches the needs of the future users. On the other hand, personas introduced by Cooper (2004), have become increasingly popular among usability practitioners, but hitherto have been used mainly as a design tool, and not as much in requirements elicitation (Markensten

and Artman, 2002). Personas are complementary to other design methods and techniques. The technique builds upon the existing method of *scenario-based design* (Carroll, 1995), 'enhancing engagement and reality' (Grudin and Pruitt, 2002, pg.146) and thereby improving the effectiveness of the scenarios. However, they did not produce any evidence to support that the effectiveness is improved.

There are benefits of using personas as reported by Grudin and Pruitt (2002). Those benefits are:

- Personas generate a strong focus on users and work contexts through the fictionalized setting
- Personas utilize our mind's powerful ability to extrapolate from partial knowledge of people to create coherent wholes and project into new settings and situations
- The act of creating personas makes explicit our assumptions about the target audience
- Personas are a medium for communication
- Personas focus attention on a specific target audience

Conversely, there are significant methodological difficulties for personas. Some of the risks of personas as reported by Chapman and Milham (2006) are:

Methodological Weaknesses:

- It is difficult to verify that personas are accurate
  - Possibility that personas are not capable of being tested and verified by experiment or observation
- Personas represent only a small portion of the potential user space
  - Issue related to numbers of users that a given personas would be able to describe

2.7.1 Previous Work using Personas

A summary of previous works in the context of using personas is presented in Table 2.7.

Table 2.7 - Previous works using personas

Study	Topic	Methods Used
Hisham, 2009	Gathers information about older people needs and requirements for the development of a prototype email application.	- Personas - Focus group
Swallow, Blythe and Wright, 2005	Examines several techniques to analyse and evaluate user's experience of interactive technology and demonstrates how a grounded theory approach can be used to generate design ideas.	- Personas - Case studies - Interview -Scenarios -Voice note diaries
Loke, Robertson and Mansfield, 2005	Involves the development of movement-oriented personas and scenarios for representing multiple users of an interactive, immersive environment, designed as an artistic work for a public space.	- Personas - Scenarios
Pruitt and Grudin, 2003	Extends the use of personas to make it a powerful complement to other usability methods.	- Personas - Scenarios
Grudin and Pruitt, 2002	Presents a theoretical case for personas.	- Personas - Scenario
Blomquist and Arvola, 2002	Reports participant observation in an interaction design team.	- Personas - Scenarios

Below are examples of personas from previous research.

1) Hisham, 2009

This use of personas was most similar to that in the current research, in that it was part of requirements elicitation.

PERSONA: NENEK SIBER AMINAH

Aminah is a 60 years old widow who lived with her daughter's family…

The main reason she goes online is to communicate with her son And granddaughter who studying in the UK and Japan.

Aminah has difficulty in typing, understanding the computer language, controlling the mouse and using the Web browser to access her Yahoo! Email account. She finds the mouse is sometimes disobedient…

Aminah hopes she can be more independent and not rely on her grandchildren to solve her computer problems.

Figure 2.10 – Nenek siber aminah

(Source: Hisham, 2009)

"A persona named Nenek Siber Aminah (Aminah the cyber granny) was presented to a group of older people who have never used a computer before. She was based on one of the participants' profiles from interviews conducted at the beginning of the study. The persona comprises some background about Aminah and her family, her computer activities and

scenarios about the problems that Aminah encountered while using a computer and an email application. The researcher gave some introduction about computer and email before introducing the personas. The participants were given hands-on access to the researcher's laptop and played around the wireless mouse" (Hisham, 2009, pg.334).

2) Swallow, Blythe and Wright, 2005

PERSONAS ON ORANGE WEBSITE

Persona Characteristics	Persona Matched Task	Task Completed?	Task Enjoyed?	Do Something-Choices
Louise, 20, Student 	Download film trailer	✗	✗	"FUN"
	Use MSN Messenger	✓	✓	"TOGETHER"
	Personalise SPV E200	✓	✓	"LOVING"
	Download game	✗	✗	"BORING"
	Show to a friend	✓	✓	"ANNOYING"
	Download MP3	✗	✗	
	Take a picture and e-mail it	✓	✓	
Jill, 42, Mother of two 	Use Task List	✗	✗	"NEW"
	Send an SMS text message	✓	✓	"YOU ARE PROUD OF"
	Use integrated camera	✓	✓	
	Organise gallery	✓	✓	"FRUSTRATING"
	Send a picture via MMS	✓	✗	"SILLY"
	Send a Voice Note via MMS	✗	✗	"ANNOYING"
Miguel, 28, Exchange Broker 	Synchronise phone with PC	✗	✗	"FUN"
	Use Internet Explorer	✓	✓	"NEW"
	Send an e-mail	✓	✗	"FOR SOMEONE ELSE"
	Use the speaker phone	✗	✗	
	Use the calendar	✓	✓	"ALONE"
	Use MSN Messenger	✗	✗	"BORING"
	Back up the phone to the PC	✗	✗	

Figure 2.11- Personas on orange website

(Source: Swallow, Blythe and Wright, 2005)

The mobile phone company Orange has provided on their website several persona-based examples of how typical SPV E200 owners use their mobile phone. "These 'real-life stories' were documented as a number of scenarios in the lives of 'Louise', 'Jill' and 'Miguel' – student, mother of two, and exchange broker, respectively. The SPV E200 was potrayed as an extremely flexible and desirable devices that was suitable for a whole range of different users and uses" (Swallow, Blythe and Wright, 2005, pg.92).

These personas were originally a marketing device, meant to help potential purchasers of mobile phones to identify with them and thereby to realize the benefits of the phone. However, the personas were subsequently used as the basis of a research study on user experience by Swallow, Blythe and Wright (*ibid*). Participants were recruited in the study to resemble as closely as possible the demographic features described in the Orange personas.

The Orange personas were accompanied by scenarios of their use of the phone "For example, the website presents a short story in which the mother of two, 'Jill' uses the task list function of her SPV E200 to organise a children's birthday party, takes a picture of her children using the integrated camera, and then sends the pictures to her husband via a multimedia message.' (*op. cit*, p.92). In the experiment participants were given 'Do something…' challenges, based on their choices from a set of emotional adjectives. For instance, they might choose to *Do something fun*. They then had to attempt to complete a corresponding task and it was recorded as to whether they completed the task and whether they enjoyed it.

This is an interesting use of personas. In the first instance the personas were designed for marketing purposes. The rationale for the

designs is not available, but presumably they were meant to cover a broad range of the target market for the SPV E200 phone. They were then adopted in a research project but in a way that "questions rather than accepts the claims that those marketers make." (*op. cit.,* p.92).

3) Loke, Robertson and Mansfield, 2005 ,

AN EXAMPLE OF A PERSONA AND CHARACTER DESCRIPTION FOR MUSEUM / GALLERY VISITOR

Persona - *Old folks, often go together. Slow-moving, contemplative visitors.*

Character - Betty is a retired librarian. She lives in a small house about 20 minutes by train from the middle of the city. When she was first trained she worked in the state library cataloguing bequests from the estates of writers. Once her kids were old enough to go to school she got a job in her local library and worked there for years. She organised the switch from the old card catalogue to the computer catalogue and did all sorts of training courses so she could understand the changes and use the new technology. She bought herself a computer at home and uses email all the time to stay in touch with her friends and family. She is writing a book about her life for her family to keep.

When the weather is nice she gets an all day concession ticket and goes into town. She likes to have lunch by the water and then go to the library, one of the museums and maybe a gallery or two. It is getting harder for her to get around now. She has a bad hip and the city is so busy – everyone is rushing and the traffic is awful. She worries about falling or being knocked over and knows that her eyesight and hearing are not as good as they used to be. Still, she is not ready to give up yet! Sometimes she meets up with her old friend Val who she met at the maternity hospital when they were both having their first babies.

Figure 2.12 – Personas and character description for museum/gallery visitor

(Source: Loke, Robertson and Mansfield, 2005)

The study involved the development of movement-oriented personas and scenarios for representing multiple users of an interactive, immersive environment such as museum and gallery. In this study, multiple examples of basic personas were developed based on behaviours observed in a previous study. For instance, Figure ??.? is based on the persona *Old folks, often go together. Slow-moving, contemplative visitors,* but for each persona, a range of individual characters was created. The characters were designed to carry the characteristics of the personas through multiple instances within the testing environment. "These personas descriptions evolved from traditional description of user history, skills and goals to include two distinct characteristics specific to the kind of interactive, immersive environment under design: 1) a motivation for why that persona might be interested in the exhibit, either alone or with others; and 2) the movement characteristics that reflected the persona's unique bodily expression and movement styles, and the kinds of movement that this person might perform in a specific situation encountered within this particular setting " (Loke, Robertson and Mansfield, 2005, pg.5).

The characters were used to develop scripts in which they interacted in a museum space. The objective was to illustrate patterns of likely inter-character interaction to designers to enable them "to experience aspects fo the work that had not been possible until they could immerse themselves in the piece." (*op. cit.* p.8).

2.7.2 Use of Personas in the Research

As is evident from the above examples, personas can be used in a variety of ways. Within this research, their role has been closest to that of Hisham (2009) as a part of requirements elicitation. The purpose of using personas in the study was to personalise and engage the users into discussion where they were able to be more open in providing feedback about mobile phone usage. Personas were also used in order to get better understanding and information about the strengths of the methods used in the first study (Chapter 3) based on classifications. These classifications were categorized into 4 different methods: 1) Focus Groups, 2) Focus Groups with Personas, 3) Interview and 4) Interview with Personas. At this stage, comparisons of methods took place.

2.8 Culture

2.8.1 Definitions of Culture

There has already been a discussion in this chapter that 'age' is not as easy to define as it may first appear. The same is true of 'culture' – except that the arguments are even more complex as we do not have something as simple as a number as a starting point. The word 'culture' is used freely in every-day conversations and the concept that the conversational partners have of culture is probably sufficiently close as to cause no confusion. However, if one is going to research potential cultural differences, then one really would want a precise definition of culture. Definitions do exist – but there is the rub – there are many of them.

According to Hall (1990), culture as a whole is a form of communication that is so deep that is often beyond the conscious awareness. For Hall, culture controls the way that people organize life, their

attitudes, society and human kind. He developed the iceberg analogy of culture in 1976.

Culture can also be defined as "Collective programming of the mind that distinguishes the members of one group or category of people from another." Hostede,(2001, pg 9).

In fact, culture is considered as a pattern of basic assumptions – invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration – that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems (Schein, 1992, pg. 12).

Given this plethora of definitions, the practical decision was made in this research not to adopt any one of them and thereby risk obscuring the results. Rather the attempt was to control for all other, more tangible variables and then ascribe whatever is left to culture.

2.8.2 Hofstede and Hall Cultural Model

In the field of anthropology, many cultural variables have been proposed to differentiate and classify diverse cultures derived from various cultural models like Hofstede and Hall. The following sections will briefly examine two cultural models as defined by Hofstede (2001) and Hall (1976).

2.8.2.1 Five Dimensions of Culture by Hofstede

Hofstede's study claimed that there are national and regional cultural groupings that affect the behaviour of societies and organizations which are consistent across time. It was first started when he conducted a large research project into national cultural differences across subsidiaries of a multinational corporation (IBM) in 64 countries. As a result, Hofstede

identified four independent dimensions of national cultural differences, with a fifth dimension added later (Hofstede, 2005).

There are five dimensions of national cultural differences. These dimensions are:

- **Small vs. large power distance**

- Refers to the extent of power inequality among members of an organizational society. For example, in cultures with small power distance (e.g., the United Kingdom), people connect to one another more as equals regardless of formal positions. Subordinates are more at ease with those in power, and demand the right to contribute to and critique their decisions. In cultures with large power distance (e.g. Malaysia), subordinates concede the power of others based on their formal, hierarchical positions.

- **Individualism vs. collectivism**

- Refers to how much members of the culture classify themselves apart from their group memberships. In individualist cultures, people are expected to expand and exhibit their individual personalities and to choose their own affiliations. In collectivist cultures, people are defined and perform mostly as a member of a long-term group, such as family.

- **Masculinity vs. femininity**

- Refers to the extent of role division between sexes. In 'masculine' cultures, people (whether male or female) value competitiveness, assertiveness, ambition, and the accumulation of wealth and material possessions. In 'feminine' cultures, people (whether male or female) value relationships and quality of life.

- **Weak vs. strong uncertainty avoidance**

- Refers to the extent to which members of an organizational society feel threatened by and try to avoid future uncertainty or indistinguishable situations. In cultures with strong uncertainty avoidance, people prefer explicit rules (e.g. about religion and food) and formally structured activities, and employees tend to remain longer with one employer. In cultures with weak uncertainty avoidance, people prefer implicit or flexible rules or guidelines and informal activities. Employees tend to switch employers more frequently.

- **Long vs. short term orientation**

- Refers to the importance attached to the future versus the past and present. In long-term oriented societies, people value actions and attitudes that affect the future: persistence/perseverance, thrift, and shame. In short-term oriented societies, people value actions and attitudes that are affected by the past or the present: normative statements, immediate stability, respect for tradition, and reciprocation of greetings, favours, and gifts.

2.8.2.2 Hall's Cultural Iceberg Model and Primary Message System

Hall's works have played an important role in unfolding how people's view of the world and actions are mainly determined by a complex grid of unconscious cultural pattern. Hall, an anthropologist, tried to teach about culture to people outside the field of anthropology, such as Foreign Service employees and those working abroad. His research was motivated by a need for researchers to have a way to compare and contrast their results and to communicate them outside their own field.

Hall developed the iceberg analogy of culture and constructed Primary Message Systems (PMS). Unlike Hofstede, Hall never mentioned his method for developing his model.

Hall developed the iceberg analogy of culture by reasoning that if the culture of a society was the iceberg, than there are some aspects visible, above the water, but there is still a larger portion hidden beneath the surface (Hall, 1976). In other words, it means that the external, or conscious, part of culture is what we can see and is the tip of the iceberg that comprises of behaviours and some beliefs (see Figure 2.10). Meanwhile, the internal, or subconscious, part of culture is underneath the surface of a society and includes some beliefs and the values and thought patterns that lie beneath behaviour (Hall, 1976).

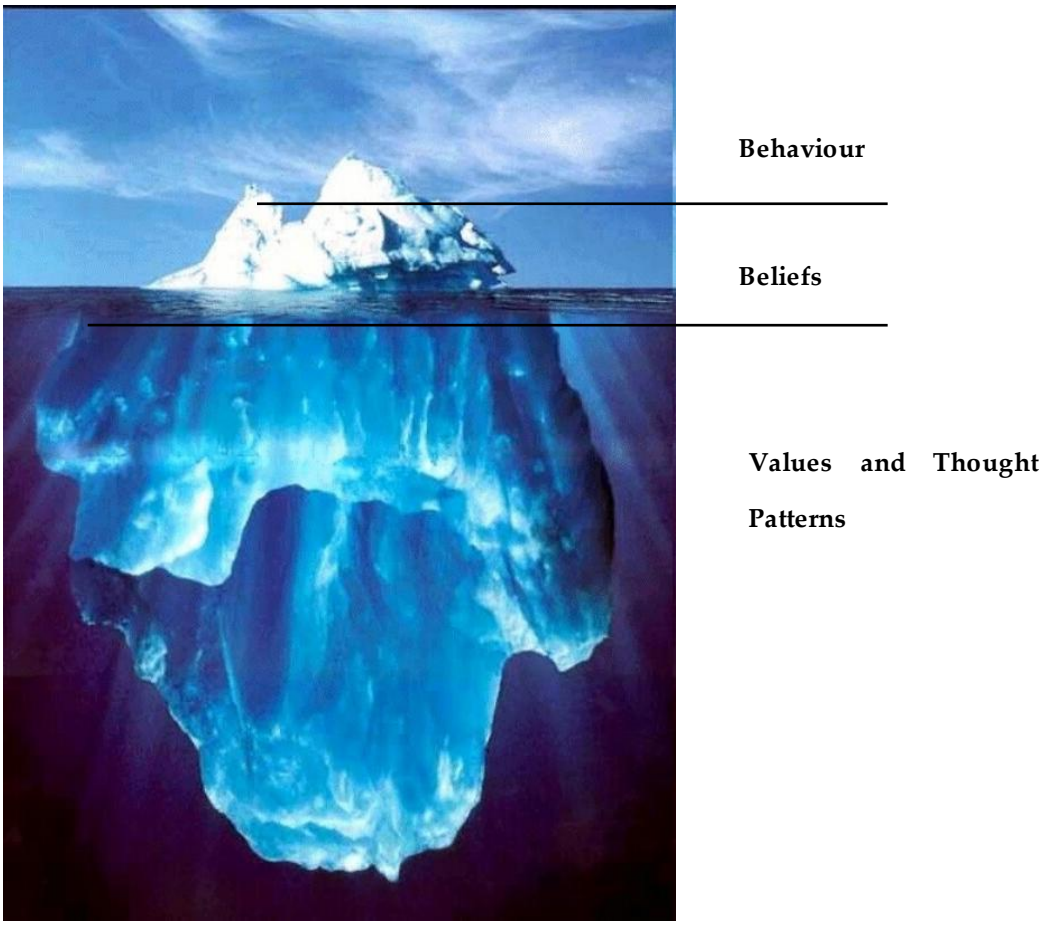


Figure 2.13 – Hall's cultural iceberg model

Hall proposed that the only way to learn the internal culture of others is to actively participate in their culture. A lesson learnt from the model is that any person cannot judge a new culture based only on what he/she sees when he/she first enters it. The person must spend some time to get to know the individuals from that culture and interact with them in order to discover the values and beliefs that underlie the behaviour of that society (Hall, 1976).

The Primary Message System developed by Hall made up human activity in a way that there were non-lingual forms of communication and were biologically based. He identified ten primary kinds of human activity in the system. Each one referred to a different aspect of human activity and how it structured culture (Hall, 1990).

1) Interaction – interaction is part of human activity, to interact is to live and everything grows from it

2) Association – interaction between groups and people, the way that societies are structured

3) Subsistence – from food to economics and the values placed on work and work status

4) Bisexuality – cultural differentiation between men and women that varied among culture; acceptable male / female behaviour

5) Territoriality – the relationship to possessions as well as the use and defence of territory

6) Temporality – the cycles and rhythms of life; the importance placed on time

7) Learning and Acquisition – culture is shared behaviour; most culture is acquired and therefore cannot be taught; learning came into its own when it could be extended in time and space by means of language

8) Play – humour and jokes and a strong link to learning

9) Defence – medicine, religion and war are all mechanisms of defence

10) Exploitation – use of materials, development of physical extensions to the body to meet environmental condition (eg: shelters and clothes)

2.8.3 The Drawbacks of Applying the Hofstede's and Hall's Model

The Hofstede Model of Cultural Dimensions can be referred to when it comes to analysis of a country's culture. Nevertheless, Hofstede's findings are limited. Some limitations of the approach are:

1) Issues about data accuracy and methodological flaws. The research instrument for the study was using surveys or questionnaires, which have their own limitations as discussed earlier in the chapter. Furthermore, the respondents were recruited from a single company – IBM. Even though two surveys were taken between 1967 and 1973 (Hofstede, 2001) and covered 66 countries, data from only 40 countries were used in characterizing national cultures (McSweeney, 2002).

2) The IBM data are old since they were collected between 1967 and 1973 (Hofstede, 2001). Thus, the odds are that the scores would now be different, caused by diverse economic, social and political

conditions (Kuchinke, 1999) even though it has been updated during the last decades.

3) Even though this model has demonstrated to be acceptable when applied to the general population, it is not necessary that all individuals or even regions with subcultures fit into the pattern (Abdou, 2004).

4) Issue about validity of the five dimensions. Re-examination of Hofstede's Value Survey Model in nine countries including Malaysia and the UK failed to replicate any of Hofstede's original dimensional distinctions with the exception of individuality (Oshlyansky, Cairns and Thimbleby, 2006). Without any such replication, it would be unsafe to place any reliance on Hofstede's methods or results.

Halls' works are often criticized since the cultural dimensions were proposed back in the 1970s and 1980s. Some limitations of his works are:

1) The cultural dimensions were considered obsolete. For example, there were possibilities that rigid categorizations of populations could promote stereotypes and the fact that the world has evolved since the time of the studies conducted.
2) According to Cardon (2008), Hall's work did not provide any explanation of the method or analysis he used in creating his contextual model.
3) Furthermore, no explanation was provided for his "ranking of various cultures along the con-texting continuum" (Cardon, 2008, pg.410), which has become a prominent part of nearly all intercultural texts and courses.

2.8.4 Studies related to Culture Differences and Mobile Phones

As the use of mobile technology has spread globally, mobile phone usage patterns vary across different cultures. Cross-cultural issues are highly related to mobile phone adoption. However, little research has been conducted on cross-cultural issues in the mobile phone environment that are related to older people and methodology. This might be due to the fact that the majority of mobile phone users are young adults (Kaba, N'Da and Mbarika, 2008; Harris, Rettie and Kwan, 2005; and Satchell and Singh, 2005) and because of the difficulties in conducting culture research (Westlund, 2010).

Several studies have been carried out in an effort to understand the connection between cultural differences and mobile phones (Westlund, 2010; Dai and Palvia, 2009; Biljon and Kotze, 2008; Kim and Lee, 2007; Kim and Lee, 2005; and Katz and Sugiyama, 2006). Baron and Segerstad (2010) examined mobile phone use among university students in Sweden, the United States of America (USA) and Japan. Analysis revealed that there are two dimensions of mobile phone use by university students held constant across cultural contexts. The first was how participants perceived their mobile phones mainly as communication devices. Second, a clear conflict between the desire to be in communication with others and the desire not to be reached. Another interesting finding will be the methodological challenges as pointed out by Westlund, (2010). Analyses from data gathered in Japan and Sweden present a variety of challenges, from coordinating methodology, to translation issues.

In the area of mobile phone interface design, possible cultural differences between easterners and westerners have been shown to have an

impact on icon recognition, depending on the level of abstraction, as was seen in a study involving American and Korean participants (Kim and Lee, 2005).

The main focus of this research was to determine suitable methods of collecting data on mobile technology for older people, which focused on the use of mobile phone. One objective was to investigate whether there are (culturally-related) differences between Malaysia and the UK. Cultural differences have been researched by many anthropologists (Trompenaars, 1997; Hall, 1990 and Hofstede, 2005). Two cultural models as defined by Hofstede (2001) and Hall (1976) are briefly examined and discussed here. However, as will be seen, it was decided not to use these models in this research.

2.9 Content Analysis

Content analysis is a technique where communication contents such as speech, text and interviews are categorized and classified. It is a methodology in social science for studying the content of recorded human communications (Busha and Harter, 1980). To conduct a content analysis on a text, the text is broken down, into categories on a range of levels such as word, phrase, sentence, or theme and then examined using one of content analysis' basic methods: Conceptual analysis or Relational analysis.

In Conceptual analysis, a concept is chosen for examination and the number of its occurrences within the text recorded. While in Relational analysis, it is built on conceptual analysis by examining the relationships among concepts in text. For Relational analysis, it is important to decide on categories.

There were several advantages and disadvantages of content analysis as discussed in previous works by other researchers (Busha and Harter, 1980; and Weber, 1990). Some of the advantages were:

- It allows for both qualitative and quantitative operations
- It provides valuable insights into the central aspect of social interaction by looking at transcripts or texts
- It is considered as a modest means of analyzing interactions

There were also some disadvantages of content analysis as stated below:

- It is time consuming
- It can be difficult and subject to increased error when relational analysis is used to achieve a higher level of interpretation

2.10 Cost Benefit Analysis

Cost Benefit Analysis is a useful way of assessing the desirability of projects where it implies the enumeration and evaluation of all the relevant costs and benefits (Prest and Turvey, 1965). Cost benefits analyses have been applied in a number of other fields like development and defence. It has been used for cost-justifying usability engineering by examining various techniques of usability engineering (Mayhew, 1992). Many of the usability engineering tasks such as user profiling, task analysis and empirical measurement, can be carried out by drawing upon a small set of general usability techniques, including interviews, questionnaires, walkthrough and field observation (Mayhew, 1992).

Jeffries, Miller, Wharton and Uyeda (1990) have used cost benefit analysis as part of their analysis in evaluating user interface with a comparison of four techniques: heuristic evaluation, usability tests,

guidelines and cognitive walkthrough. The benefit/ cost analysis in this study was based on problems found per person – hour basis.

A cost benefit analysis will be used in the first study (Chapter 3) in order to compare the costs and effectiveness of the three methods (focus group, interview and questionnaire). It will be based on problems reported by each method in both countries (Malaysia and UK) and measured by hours.

2.11 Card Sorting

Card sorting is a way to involve users in grouping information. Card sorts can be used to study the way human subjects obtain and classify conceptual knowledge (Fossum and Haller, 2005). There are two different types of card-sorting: open and closed card sorts. Participants are allowed to create and name their own categories for the cards in open card sorts. While for closed card sorts, participants are given the names of the categories for them to sort the cards into. Card sorting can be conducted in a various ways: one on one, by mail or online. Names of items to be categorized are printed on individual cards. Participants are asked to group items in a way that makes sense to them. Participants may also be asked to name the resulting groups. According to Fincher and Tenenberg (2005, pg. 90), "traditional analyses of card sort data use semantic methods, those methods that rely upon interpretative judgements by individual researchers on the meaning of the respondents' utterances". However, these methods are time consuming though rich insights can be obtained. The other analysis method is syntactic. These methods are based on statistical features of the data set that can be automated (Fincher and Tenenberg, 2005). Currently, there are several tools and techniques have been developed to help with syntactic analysis. Tools such as WebSort allow researchers to

collect data from a large population. WebSort is a pay for use service run by Larry and Jed Wood from http://websort.net. The results of the online card sorting are then subjected to cluster analysis and viewed as a dendrogram.

Nowadays, researchers have the option of conducting studies either online or in person. When using an online tool, large numbers of participants can complete the exercise, lending additional statistical weight to the findings. In some circumstances, the statistical basis of online card sorting is helpful in dealing with huge number of categories. In-person card sorts provide the opportunity for researchers to interact with participants and ask probing questions related to the findings, as well as other follow-up questions.

The use of online card sorting (Chapter 4) will be explored in the context of generating categories from list of problems identified in Chapter 3. An online card sorting operation was created using WebSort, whereby it was possible to conduct remote card sorting online through a simple web-based interface.

2.12 Summary

Mobile technology has great potential and benefits for older people. It allows them to retain a high level of independence and control over their lives. 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. It is a consumer product that relates to theories of identity, culture and social structure. There are many data collection methods or techniques in eliciting information from older people, each with its limitations, advantages, and disadvantages. Which method(s) should be used depends on a number of different factors. There may not be one best

method or technique for any given situation. Many times a combination of methods may be most beneficial.

It seems that there should be more techniques adapted and used in gathering user requirements for mobile technology and older people. Since older people differ from the 'typical' group of users, it is a great challenge to identify methods that are effective in terms of gathering older people's needs. The process of acquiring user requirements data from older people is therefore not a straightforward process (Zajicek, 2004; Eisma et al., 2004). In fact, there is a need for an evaluation of existing methods with respect to older people, who vary in cultural and other aspects such as aging effects and cognitive complexity.

The review of the literature found that there were various problems restricting the potential of mobile phone to provide support to older people such as age effect, cognitive complexity and design issues. There were also other factors to be considered such as language and culture differences. Few studies have addressed difficulties with the methods where not all methods are suitable to use in the context of involving older people as participants. For this reason, the research challenge that exists is to determine suitable methods of gathering user requirements on mobile technology that are well suited to older people.

Chapter 3

Study 1: User Requirements Elicitation Methods (Interviews versus Focus Groups)

3.1 Introduction

This chapter reports on two similar studies that were carried out, in Malaysia and the UK. Both studies concentrated on two user requirements elicitation methods, explicitly interviews and focus groups. For convenience, to distinguish the studies, the one conducted in Malaysia will be referred to as MALS, and the second study, in the UK as UKS.

Interview is a technique that is used to discover user views. In other contexts, interviews are commonly used in order to understand 'user requirements and dreams' (Kantola, Tiitta, Mehto and Kankainen, 2007). Despite the fact that an interview is time consuming, it is still considered as an informal type of approach for gaining information on older people. The interview provides an opportunity to communicate to participants directly through ongoing dialogue. Another method which is similar to interview would be focus groups. Focus groups are a form of group interview that motivates participants to engage in a discussion through social interaction. Group discussions can assist participants to explore and explain their views in ways that would be less accessible in interviews (Kitzinger, 1995). Both interviews and focus groups are often referred to as 'talking methods'. In addition, the use of personas (see Section 2.7) as a tool in elicitation has been explored. The researcher investigated the two talking methods (interviews and focus groups) and also introduced questionnaire to provide

a baseline to those talking studies. The use of a questionnaire has been undertaken to investigate two different aspects: 1) To explore older people's preferences in terms of different types of rating scale introduced within the questionnaire, and 2) To find out whether older people are interested to participate in a questionnaire study compared to interviews and focus groups.

The main objectives of the talking studies that were carried out in Malaysia (MALS) and the UK (UKS) were:

1) To investigate whether there are differences between the expectations of Malaysian and UK older people with regard to mobile phones.

2) To investigate whether the two talking methods have different levels of effectiveness in the two countries.

3) To compare the talking methods against a non-talking method (specifically the questionnaire) in terms of method preferences.

4) To explore the use of personas as a tool in user requirement elicitation methods (in the context of interviews and focus groups).

5) To compare the costs and effectiveness of the three methods (interviews, focus groups and questionnaire).

The principal objective of this research, as outlined above, is to investigate the utility of the different methods. However, inevitably while conducting the studies, data has been collected on the use of mobile phone by older people. This data is worthy of analysis in its own right and this is reported in Chapter 6.

3.2 Pilot Study

3.2.1 Introduction

A pilot study of interviews and questionnaire with Malaysian participants was conducted first. It is an essential part of the research, primarily to validate the instruments for the main study. After the pilot study was performed and adjustments made, the main studies were conducted. This pilot study consisted of experiments with Malaysian older people visiting the UK. It was decided to carry out the pilot study in the UK for the reason of convenience. There were three different aims for the pilot study. The first aim was to test and enhance the interview questions which would be used as part of research instruments for the main study. The second aim was to test and enhance the focus group questions. The third aim was to test and enhance the questionnaire items which were to be used as a baseline in MALS. Questions for all methods were available in Malay and English. The MALS study was designed to evaluate user requirements elicitation methods, focusing on interviews and focus groups in the context of mobile phone usage among Malaysian older people. It was then proposed to the researcher to replicate the MALS and conduct it in the UK. The proposal was made after the completion of MALS. Thus, this pilot study only reflected the findings and recommendations from Malaysian participants. In other words, the UKS study was not specifically piloted. However, the first focus group and interview were treated as pilots, in that the data collected in them was discarded. In practice, the methods were not altered in any way after those first sessions. Also there was no pilot for the focus groups, given the low availability of participants.

3.2.2 Method

3.2.2.1 Participants

There were four criteria for choosing participants:

1) Malaysian citizen

2) Age 55 and above (based on Malaysia retirement age at the time of this pilot study, as discussed in Section 2.2.1 - 2.2.2)

3) Representative from at least one category of older group (fit, frail or disabled older people) which were identified earlier in Section 2.4.1

4) Owned a mobile phone and has some experience using it

Three Malaysian older people, who were visitors to the UK, took part in the pilot study, 2 females and 1 male. The participants' ages ranged between 55 and 61 years of age, giving a mean of 57 years. Two participants were married (to each other) and the other participant was a widow. They were all retired and holders of a General Certificate of Education (GCE, roughly equivalent to O-Level). All participants were fit and healthy at the time of this pilot study. Two participants wore glasses, one of them wearing them all the time due to short sight; while the other participant used glasses only for reading. All participants had been using mobile phones for more than a year and were able to converse in both languages: Malay and English.

3.2.2.2 Design

Part 1: Designing the interview questions

An interview schedule (Section A and B in Appendix A) of questions was developed with regards to mobile phone, regarding how older people use their mobile phones, and how do individual differences influence their mobile phone use and preferences. The interview questions were constructed by reviewing questions used in various previous studies (Kurniawan, 2008 and Lee, 2007). The interview schedule consisted of 24 questions, which were grouped under the following sections:

(i) Eight questions about the Participant's Personal Data (eg: age, gender and status)

(ii) Three questions about purchasing a mobile phone

(iii) Seven questions about mobile phone usage

(iv) Four questions on learning how to use a mobile phone

(v) Two questions about their ideal phone

In view of the fact that previous HCI studies reported that older participants found it difficult to identify anything other than general impressions (eg: Dickinson, Arnott and Prior, 2007), there was one additional section (Section C in Appendix A) introduced in the interview session only. The interviewees were asked to perform three tasks and answer questions related to each task during the interviews. Below are the details of each task:

1) Saving the researcher's phone number
   - Do you see any problems with your phone while saving my number?

- Do you have any suggestions on how to improve the problem?

2) Checking the contact list

- Can you retrieve the numbers in your contact list?
- Do you have any suggestions on how to improve the problem?

3) Using speed dial

- Do you know how to use the speed dial?
- Do you have any suggestions on how to improve the problem?

The first task was adapted from one of the tasks introduced in a mobile phone study by older people (Lee, 2007). The other two tasks were devised by the researcher. The three tasks were selected based on functions available in the mobile phone. The first two tasks were considered basic functions for mobile phone users. The last task was perceived to be beneficial for mobile phone users in terms of convenience despite the function complexity. Information was collected by identifying types of difficulties encountered while performing those tasks. It was an opportunity for the researcher to observe any difficulties related to the tasks and to encourage ongoing dialogue with the interviewees about the difficulties. However, it would have not been feasible to conduct the same tasks in focus groups because it would be difficult to manage in a group rather than a one-to-one interaction. Findings from the tasks were not included in the evaluation of talking methods (interviews and focus groups) since the tasks were not introduced in the focus groups, rather they are reported separately (Section 3.4.8).

Part 2: Designing the focus group questions

An equivalent set of questions as in interview was developed for focus groups schedule with the exception of the tasks (Section A and B in Appendix B).

Part 3: Designing the questionnaire

A set of questions (Appendix C) was prepared for the participants in an attempt to observe older people's preferences for different types of rating scale within the questionnaire, and ascertain whether older people are interested to participate in this type of study compared to interview and focus groups.

The questions were based on a questionnaire (Appendix J) used in another mobile phone study by older people (Lee, 2007). Lee (2007) conducted a study about older people's experiences with mobile phones in identifying user clusters and user requirements. In that study, existing literature was reviewed (eg: Ryu and Smith-Jackson, 2005; Ketola and Roykkee, 2001; Lewis, 1995 and Davis, 1989) and relevant questions were adopted with modifications for the questionnaire. The researcher compiled relevant questions related to user requirements and introduced three new categories and questions (refer pg 195-197) in the questionnaire. The new categories and questions were devised by the researcher based on mobile phone findings reported in these studies (eg: Kurniawan, 2008 and 2006; and Kurniawan et al., 2006).

The questionnaire consisted of a total of 52 questions. The questions were divided into two types, namely close-ended questions and open-ended questions. These questions were classified under the following sections:

A. Mobile phone usage

B. Current usage of mobile phone

C. Use of technology

Section A incorporated inquiries on mobile phone usage (eg: duration of mobile phone ownership, reasons for having mobile phones and methods of learning about mobile phone). For the reasons for having mobile phones, the questions were designed using five–point Likert scales. The ratings were based on the scale:

0 - Strongly Disagree
1 - Disagree
2 - Neutral
3 - Agree
4 - Strongly Agree

The questions developed were based on these issues: personal communication (eg: family and friends), business communication, information seeking (eg: news or driving directions), information retrieving (eg: personal notes and calendar), entertainment (eg: music and games) and safety and security. Participants were also asked to specify which methods that they used to learn to use their mobile phone (eg: reading manuals, asking family or friends, asking customer service and trying myself). The ratings were accumulated using a five–point Likert scales with the same labels as listed above. Section B consisted of questions related to the current use of their mobile phone. There were two types of rating introduced within the section. The first rating for Question 3 (refer to Figure 3.1) was based on these scales:

- Don't know
- Not available
- Never
- Rarely
- Occasional
- Frequent

The functions listed in Question 3 were based on current common features at the time of the study across different manufacturers. A five–point Likert scales was used for question 5 on a scale of 0 - Strongly Disagree and 4 -Strongly agree. Participants were also asked to mark all the features that they would wish to have on their mobile phone in the future. These features were included to match with questions related to an ideal phone which were asked in the other two user requirements elicitation methods. The features included were similar to Question 3 with four additional features that were predictive texting, email, emergency call button and audio display.

Section C was regarding use of technology where participants were asked about the frequency of using computer, internet and email.

3. How frequently do you use the following functions of your mobile phone?

Functions	Don't know	Not available	Never	Rarely	Occasional	Frequent
Make a call						
Receive a call						
Phonebook (eg: contacts)						
Speed dial						
Call history						
Voice message checking						
Text message service						
Voice memo						
Change ringer tone						
Calculator						
Calendar						
Alarm						
Multimedia Messaging Service						
Camera						
Game						
Internet						
Voice activation						
Clock						
Listening to music						
Speaker phone						
Others:						
Others:						

Figure 3.1 – Question 3 in Section B

Three new categories were introduced in Section B to address issues related to 1) anxiety or fear using a mobile phone, 2) mobile phone use as part of trend or fashion, and 3) cost as shown below:

1) Please answer to the following questions based on your experience with your current mobile phone.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Anxiety/Fear					
I am afraid to use mobile phone because I might be exposed to radiation	☐	☐	☐	☐	☐
I do not like to use mobile phone because I am not good in technology	☐	☐	☐	☐	☐
I feel anxious when using a mobile phone	☐	☐	☐	☐	☐
When I use a mobile phone, I am afraid that I will break it	☐	☐	☐	☐	☐
Fashion/Status					
Fashionable people use mobile phone	☐	☐	☐	☐	☐
Using a mobile phone is good for my image	☐	☐	☐	☐	☐
I use a mobile phone because lots of other people use one	☐	☐	☐	☐	☐
Cost					
Mobile phone is value for money	☐	☐	☐	☐	☐

A total of six new questions were included by the researcher in the questionnaire. Table 3.1 provides a list of new questions for Section A and B.

Table 3.1 – List of new questions (Section A and B)

Questions	Section
Question 3: How often do you use a mobile phone?	A
Question 2: Do you have a contract or pay as you go?	B
Question 4: On average, how many times a day do you make use of the following service?	B
Question 6: What are the most important tasks that you perform with your mobile phone?	B
Question 7: How many saved numbers do you currently have on your phone?	B
Question 8: Considering mobile phone usage, how would you describe yourself?	B

Table 3.2 shows the summary of questions asked across methods. One immediate difference between talking methods and non-talking methods, is the social dimension. It is expected that a conversation (albeit an interview or focus group) will commence with informal introductions. Hence, the interviews and focus groups started with general 'chat' about mobile phones and reasons for their purchase. This was not part of the investigation of mobile phone usage as such, which is why no corresponding question was included in the questionnaire.

Table 3.2 – Questions asked across methods

Interview	Focus Groups	Questionnaire
Questions related to: - Purchasing a mobile phone	Questions related to: - Purchasing a mobile phone	N/A
- Mobile phone usage	- Mobile phone usage	- All questions in Section A - All questions excluding Question 9 in Section B
- Learning how to use a mobile phone	- Learning how to use a mobile phone	Question 4 in Section A (second category)
- Ideal phone	- Ideal phone	Question 9 in Section B

3.2.2.3 Procedure: Interview

The interviews were scheduled and conducted at visitors' homes. They were conducted in a natural setting where the interview was meant to take place in an environment where the participants were relaxed and able to communicate better (Thompson, Locander and Pollio, 1989; Dickinson et al, 2002). Furthermore, it allowed the researcher to see the participants in context (Eisma, Dickinson, Goodman, Syme, Tiwari and Newell, 2004).

Participants were reassured that the interviews would be completely confidential. Interview times ranged between 45 and 80 minutes including the time to read the briefing and debriefing. The interviewer audio-recorded all interviews for transcription and data analysis purposes.

Before conducting the interview, participants were briefed about the nature of the study. Next, participants were asked if they had any

questions, and then to read and fill out the consent form and were informed that they could withdraw from the study at any time (Appendix D). Participants were told that they will be asked to perform three tasks at the end of the study.

The semi-structured interview was then conducted using open-ended questions as listed in Section A and B under Appendix A. Questions were asked randomly in any order that fitted in with the flow of conversation. The researcher ensured that all questions were covered by checking each question once it has been asked. Once the interview has ended, the participants were asked to perform three tasks sequentially (Section C in Appendix A).

First, participants were asked to perform the task of saving the interviewer's phone number and name into their mobile phone using the phonebook feature. Second, the participants had to check their contact lists and count the total phone numbers in their contact list. The last task involved using the speed dial.

Once the tasks had been completed, the debriefing session took place where the researcher explained in detail the purpose of the study and answered any questions raised by the participants.

3.2.2.4 Procedure: Questionnaire

A questionnaire (Appendix C) was distributed after the completion of interview. Participants were informed that they would be asked a set of questions once they had completed the questionnaire. The questions were related to rating scale and method preferences:

1) Which rating scale do you prefer?

2) Why do you choose this rating scale?

3) Are there any suggestions on how to improve the rating scale?

Apart from rating scale preferences, participants were also asked about method preferences (questionnaire versus interview or focus group). The questions were:

1) Which method do you prefer?

2) Why do you choose this method?

3.2.3 Results

The analysis for the interview was conducted by identifying types of problems related to mobile phone usage in general. It can be associated to three main issues as listed in Table 3.3. The analysis for the questionnaire was conducted manually without help from any software for qualitative and quantitative data analysis. This is due to small numbers of participant in this study. Difficulties in understanding the ratings were identified as listed in Table 3.4.

As mentioned earlier, it was impractical to run a formal pilot of the focus groups. Instead, the data collected in the first focus group was discarded, in case of any 'teething problems'. There was no reason found, however, to alter the method following this test. A summary of the problems identified in interviews is presented in Table 3.3.

Table 3.3 – Problems identified in interview

Issues	Problems
Design errors	- poor conceptual design - physical interface of the mobile phone
Cognitive complexity	1. Navigational problem with functions available - deeply menu driven 2. Problems adapting with new mobile phones - take longer time to learn and adapt
Language (eg: jargon and terms)	1. Language Problem - current Malay Translation is hard to understand since it is a direct translation from English to Malay Language 2. Difficulties to understand the manuals 3. Cost - cost of acquiring mobile phone - cost of service provider

Table 3.4 – Difficulties in understanding the ratings

	P1	P2	P3
Which rating scale do you prefer?	- Question 3 Scales (eg: Don't know, Not available and etc)	- Question 1 'Yes' and 'No' - Question 3 Scales (eg: Don't know, Not available and etc)self - purchased	- Question 3 Scales (eg: Don't know, Not available and etc)
Why do you choose this rating scale?	- Easy to understand - It was hard with the other scale (Likert scales)	- Simple compared to the rest - Quite confused with Likert scales	- Not complicated - It was hard to differentiate between the terms (eg: Strongly Disagree versus Disagree and etc.)
Are there any suggestions on how to improve the rating scale?	'Yes' and 'No' responses	Simplify the term	'Yes' and 'No' responses

3.2.4 Adjustments

As a result of the pilot study, several adjustments were made to the questionnaire for the main studies (see Section 3.3). First, start time and end time were included in the revised version for the purpose of calculating the total time spent by each participant for filling out the questionnaire.

Second, the rating scale for Question 4 in Section A (Appendix C) was revised. Previously, all statements in Question 4 were of five–point Likert scales. These are some examples:

For each of the following statements, please indicate the extent to which you agree.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Reasons for having mobile phones:					
I use mobile phone for personal communication (with family or friends)	☐	☐	☐	☐	☐
I use mobile phone for business communication	☐	☐	☐	☐	☐
I use mobile phone to seek information (eg: news or driving directions)	☐	☐	☐	☐	☐
I learn how to use a mobile phone by.....					
Reading manuals	☐	☐	☐	☐	☐
Asking family or friends	☐	☐	☐	☐	☐

However, the format had to be revised based on the feedback received from the participants because they had some difficulties in understanding the ratings (see Table 3.4).

The first nine statements in Question 4 were changed to YES and NO type of questions and the remaining statements still use five-point Likert scales with some modifications to the terms. Instead of using Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree; these terms were replaced with numbers that range from 0 to 4 where 0 represented 'never' and 4 represented 'most frequently'. These new ratings arrangements were introduced to assist the participants in terms of understanding the ratings better in a simplified version of direct responses and numbers. Here are some examples:

Reasons for having mobile phones:

---

1) Do you use mobile phone for personal communication (with family or friends)?
2) Do you use mobile phone for business communication?
3) Do you mobile phone to seek information (eg: news or driving directions)?

I learn how to use a mobile phone by…..

	Never				most frequently
Reading manuals	0	1	2	3	4
Asking family or friends	0	1	2	3	4

In the pilot, none of the participants stated that Anxiety/Fear or Fashion/Status were important factors (i.e. they were all rated Disagree or Strongly disagree). It was therefore decided that there was little to be gained from probing these aspects and therefore these two sub-sections from Question 5 in Section B were omitted from the questionnaire.

Some of the questions were re-arranged to accommodate the structure of the contents and practicality of the questions. For example, question 4 in Section B was moved forward and became question 3 in the revised version of the questionnaire.

The researcher also created a separate form for the Demographic Profile (Appendix E) for both the interviews and focus groups. The pilot study did not use personas. Subsequently it was suggested to investigate use of personas even though the researcher did not use personas in the pilot study. The use of personas was introduced in MALS and followed by UKS.

3.3 Main Study

3.3.1 Introduction

There were two studies conducted that involved two talking methods which were the focus groups and the interview. Personas were also used in order to get better understanding and information about the strengths of each method. There were thus 4 different methods:

1) Focus Groups

2) Focus Groups with Personas

3) Interview

4) Interview with Personas

The first study was carried out in Malaysia (MALS) and the second study in the UK (UKS).

Both studies endeavoured to answer three principal questions:

- How do focus groups and interviews differ when used with older people?
- What are the effects of using personas in focus groups when used with older people?
- What are the effects of using personas in interviews when used with older people?

To answer these questions, interview and focus group sessions were conducted in both countries. A questionnaire was also introduced in order to provide baseline data.

3.3.2 Method

3.3.2.1 Participants

Older people were identified in the two countries according to the respective retirement age. An extensive discussion and rationale about age retirement has been included in Section 2.2.1 and Section 2.2.2 in Chapter 2. At the start of the study that was 55 in Malaysia (subsequently raised to 58) and 65 in the UK. Participants' ages in Malaysia ranged from 55 to 78, giving a mean age of 62 years, whereas, participants' ages in the UK ranged from 65 to 90, giving a mean of 72 years. An additional requirement was that the participants owned a mobile phone and had some experience of using it.

Thirty-six participants from Malaysia took part in the MALS, 11 females and 25 males. All participants were retirees. Twenty participants were members of a Government Retiree Club. Thirty-two participants were married and living independently with their spouse, two participants were widowed. Two participants were single. Seven participants were identified as wearing glasses all the time, while 26 participants used glasses for the purpose of reading. Table 3.5 provides the number of participants for race, highest education attainment and language preference for MALS.

Table 3.5 – Number of participants in MALS

Race	**no**
- Malay	34
- Chinese	1
- Indian	1
Highest education attainment	**no**
- GCE	19
- Certificate/Diploma	8
- Degree	8
- Post-graduate/ Professional Certificate	1
Language Preference in everyday life:	**no**
- Malay	20
- English	2
- Both (Malay and English)	14
- Tamil/Urdu	0

Forty-six participants took part in the UKS, 26 females and 20 males. They were recruited through organizations for older people such as The University of the Third Age (U3A) and Hackney Silver Surfers. Twenty-six participants were married and living independently with their spouse, 12 were either single/divorced, eight participants were widowed. Thirty

participants wore glasses all the time while 11 participants used glasses for the purpose of reading. Sixteen participants reported various minor disabilities: eleven participants used hearing aids, two suffered from arthritis and the other three required a walking stick for mobility purposes. Table 3.6 provides the number of participants for highest education attainment for UKS.

Table 3.6 – Number of participants in UKS

Highest education attainment	no
- Primary School	2
- High School	13
- Certificate/Diploma	14
- Degree	10
- Post-graduate/Professional Certificate	7

All participants in both studies (MALS and UKS) were classified as fit because they still considered themselves able to perform daily routines independently, with significantly different needs and wants due to the stage of their lives they had reached. In the UK it was possible to obtain funding to compensate the participants for their contribution and so they received either a Marks and Spencers voucher or cash to the sum of £30. This was received from the Inclusive Digital Economy Network, sponsored by the Engineering and Physical Sciences Research Council (ESPRC). No corresponding funding was available in Malaysia and so no compensation was paid to Malaysian participants. There is no reason to believe that this asymmetry had any effect on the results.

Table 3.7 shows the conditions and number of participants involved in the studies conducted in Malaysia and the UK. Four focus groups with personas and three focus groups without personas were undertaken in

Malaysia. Seven participants were involved in interviews with personas and five participants in interviews without personas. In the UK, four focus groups with personas and four without personas were formed. There were fourteen participants involved in interviews (seven for interviews with personas and the other seven for interviews without personas). Each group in both countries had a minimum of 3 persons and a maximum of 5 persons.

Table 3.7- Conditions and number of participants (Ps) in the MLS and UKS

	Country	Focus Groups	Interviews	Questionnaires
With personas	Malaysia	4 groups 14 Ps	7 Ps	N/A
	UK	4 groups 16 Ps	7 Ps	
Without personas	Malaysia	3 groups 10 Ps	5 Ps	13 Ps
	UK	4 groups 16 Ps	7 Ps	15 Ps

3.3.2.2 Design

Both studies (MALS and UKS) focused on two user requirements methods, explicitly interviews and focus groups. Comparisons were made between these methods in order to achieve Objectives 1 and 2. The use of personas was also tested in these methods as stated in Objective 4. The use of questionnaire was introduced as an alternative to the other two methods as in Objectives 3 and 5.

There are three parts in this design section. Part 1 is about Design of the Personas, Part 2 is MALS and Part 3 is UKS.

Part 1: Design of the Personas

There were two personas created: male and female. Both personas were in the form of a short story about a fictional character which was a representation of a user and was given a name and age, and portrayed in terms of his/her needs to use a mobile phone, difficulties that he/she had while using a mobile phone and a purpose for using a mobile phone. The design of the template for the personas was based on a template used in a course – Using Personas Effectively which was attended by the author (www.surfaceeffect.com/services/training/upe/).The age selection for the personas in both countries were based on the average age of potential participants who were recruited through retiree clubs and organizations, as mentioned in 3.3.2.1. Malaysian personas were younger compared to the UK personas due to the different retirement ages between both countries. Meanwhile the ages for female personas in both countries (Malaysia - 70, UK – 72) were older compared to the male personas (Malaysia – 65, UK - 70), based on the fact that women's life expectancy is greater than men's as reported earlier (Section 2.2, Figure 2.4).

Each persona consisted of background information that established a level of empathy. The main dimensions for the design of the Malaysian personas are shown in Table 3.8. It would be impractical to create personas for all possible combinations of these parameters, and therefore *two* personas (male and female) were created, corresponding to the two columns of the table. The *Living arrangements* dimension reflected Malaysian culture, in which older people usually live independently until widowhood, when they will usually move in with one of their children's families.

Table 3.8 Dimensions used in the design of the Malaysian personas

Living arrangements	Living independently	Living with children, following the death of the spouse.
Computer experience	No computer experience	Uses computer for email
Functional limitations	Visual impairment, making it difficult to see numbers on the keypad.	Memory problems in terms of misplacing the phone.
Motivation	Can be contacted at any time	Can be contacted at any time

Figure 3.2 shows the male personas used in the MALS. The male personas was portrayed as an independent older man with some knowledge of computer technology but still had difficulties in using the mobile phone due to vision problem.

Wan Kamaruddin (65)

Retiree

Has been using mobile phone for the last 2 years. Mainly used for voice communication and texting.

Lives all by himself after his wife passed away in Kuala Lumpur.

He has not used computer much except for email.

He has difficulties using the mobile phone because he could not see the numbers clearly on the keypad and also on the screen.

Goal: Can be contacted at any time

Figure 3.2 – Male Personas used in Malaysia, "Wan Kamaruddin"

Figure 3.3 illustrates the female persona introduced in the MALS. The female personas was portrayed as an older woman who lived with her child after the death of her husband with no knowledge of computer technology and had difficulty in using mobile phone due to memory problem. The selection of names and images for personas in Malaysia was based on the fact that Malaysia is a multicultural country with a very diverse population (eg: Malay, Chinese, Indian and other several indigenous groups).

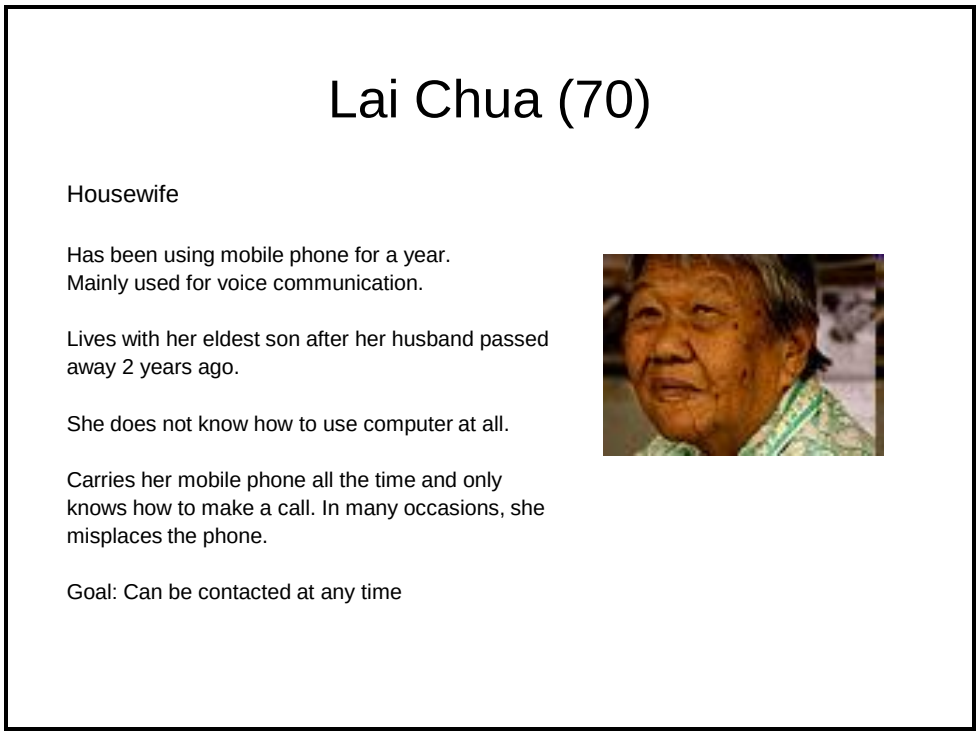


Figure 3.3 – Female Personas used in Malaysia, "Lai Chua"

The UK personas were designed in the same way as the Malaysian ones and largely accommodated the same dimensions as in Table 3.7a. The exception was that no mention was made of the Living arrangements, as a reflection of the different conventions in the UK (i.e. where it is much less common for older people to live with their children). Adjustments were made in terms of name and photo to reflect culture differences between

Malaysia and the UK. Each persona consisted of background information that established a level of empathy. The background information covered the main use of mobile phone which was voice communication. For male personas, an additional background information was the use of landline phone as first alternative (Kurniawan, 2006). Similar potential problems in Malaysian personas were explored. Similar motivation to Malaysian personas was used in the personas design. Figure 3.4 and 3.5 show the male and female personas used in the UKS.

Peter (70)

Retiree

Have been using mobile phone for a year. The mobile phone was given by his children.

Mainly used for voice communication.

Consider mobile phone as second alternative after landline phone.

He has difficulties using the mobile phone because he could not see the numbers clearly on the keypad and also some hearing problems.

Goal: Can be contacted at any time by his children

Figure 3.4 – Male Personas used in UK, "Peter"

Mary (72)

Housewife

Have been using mobile phone for a year.

Mainly used for voice communication.

Carries her mobile phone all the time and only knows how to make a call. In many occasions, she misplaces the phone.

Goal: Can be contacted at any time

Figure 3.5 – Female Personas used in UK, "Mary"

Part 2: Study conducted in Malaysia (MALS)

<u>Interviews</u>

There were two types of interviews:

1) Interview

For interview, the same set of questions and tasks as in the pilot study were used (Appendix G).

2) Interview with Personas

For interview with personas, personas were introduced with the same set of question asked in the interview. Personas were created based on the findings from the pilot study and also other studies conducted focusing on older people and mobile phones (Kurniawan, 2006; Kurniawan et al.,

2006; Pattison and Stedmon, 2006; Massimi and Baecker, 2007; Massimi, Baecker, and Wu, 2007 and Kurniawan, 2008).

Focus Groups

There were two types of focus groups:

1) Focus Groups

For focus groups, the same set of questions designed in the pilot study has been used (Appendix H).

2) Focus Groups with Personas

For focus groups with personas, personas were introduced and used in the same way as the interview with personas. The same set of questions in focus group was used with the personas.

Questionnaire

A revised set of questions from the pilot study was used (Appendix I). The questionnaire was available in Malay and English.

There were 4 different types of rating scales introduced in the questionnaire. Table 3.9 shows the summary of all rating scales used in the questionnaire

Table 3.9- Different types of rating scale used in the questionnaire

Rating	Scale
'Yes' and 'No'	N/A
Five–point Likert items	0 – Never 4 – Most Frequently
Six–point Likert items	0 - Don't know, 1 - Not available 2 – Never 3 – Rarely 4 - Occasional 5 - Frequent
Five–point Likert items	0 – Strongly Disagree 1 - Disagree 2 – Neutral 3 – Agree 4 – Strongly Agree

Part 3: Study conducted in the UK (UKS)

Interviews

There were two types of interviews:

1) Interview

For interview, the same set of questions and tasks as in the MALS study has been used (Appendix G).

2) Interview with Personas

For interview with personas, personas were introduced with the same set of question asked in the interview.

Focus Groups

There were two types of focus groups:

1) Focus Groups

For focus groups, the same set of questions as in the MALS study has been used (Appendix H).

2) Focus Groups with Personas

For focus groups with personas, personas were introduced and used in the same way as the interview with personas. The same set of questions in focus group was used with the personas.

Questionnaire

A same set of questions from the MALS study was used (Appendix I).

3.3.2.3 Procedure: Interview

Participants were reassured that the interviews would be completely confidential. Interview times ranged between 30 and 80 minutes including the time to read the briefing, debriefing and introduce the persona. The interviewer audio-recorded all interviews for transcription and data analysis purposes. There were two types of interview:

1) Interview

All interviews were conducted on an individual basis, in a natural setting. Most of the Malaysian interviews took place in the participants' own house and some interviews were conducted in a café. For the UK participants, most of the interviews were conducted in a quiet room at the Computer Science Department, University of York.

Before conducting the interview, participants were briefed about the nature of the study. Next, participants were asked if they had any questions, and then to read and fill out the consent form and were informed that they could withdraw from the study at any time (Appendix D). Later, the participants were also asked to provide Demographic Profile (Malaysia – Appendix E and UK – Appendix F). Participants were told that they would be asked to perform three tasks at the end of the study. All participants were requested to bring their own mobile phone and other supporting aids that they would like to share, such as instruction manuals and note book or diary for storing names and numbers.

The semi-structured interview was then conducted using open-ended questions as listed in Section A, Appendix G. Questions were asked in any order that fitted in with the flow of conversation. The researcher ensured that all questions were covered by checking each question once it has been asked. Once the interview has ended, the participants were asked to perform three tasks sequentially similar to the interview procedure in the pilot study (Section B in Appendix G).

First, participants were asked to perform the task of saving the interviewer's phone number and name into their mobile phone using the phonebook feature. Second, the participants had to check their contact lists and count the total phone numbers in their contact list. The last task involved using the speed dial.

Once the tasks had been completed, the debriefing session took place where the researcher explained the detailed purpose of the study and answered any questions raised by the participants.

2) Interview with personas

For interview with personas, the interviewer only introduced one persona to each participant since both personas served the same purpose for using a mobile phone (eg: can be contacted at any time). Both personas were used alternately. For example, if male persona has been used with the first participant, then the female persona would be used for the following participant and vice versa. The personas were used without referring to any gender specification of the participants. Each persona was introduced at the beginning of the semi-structured interview. Then, a brief discussion took place about the persona and issues raised, depending on the comments made and responses from the participants. The same interview procedure had been carried out after the discussion.

3.3.2.4 Procedure: Focus Groups

Participants were reassured that the focus groups would be completely confidential. Session times ranged between 30 and 80 minutes including the time to read the briefing, debriefing and introduce the persona. The researcher audio-recorded all focus groups for transcription and data analysis purposes. There were two types of focus group:

1) Focus Groups

All focus groups were conducted in a natural setting similar to the interview. For the focus groups sessions in both countries, most of the sessions took place in public area such as café and in the retirees' club. Before the focus group session began, participants were briefed about the nature of the study. Next, participants were asked if they had any questions, and then to read and fill out the consent form and were informed that they could withdraw from the study at any time (Appendix D). Later,

the participants were also asked to provide Demographic Profile (Malaysia – Appendix E and UK – Appendix F). All participants were requested to bring their own mobile phone and other supporting aids that they would like to share, such as instruction manuals and note book or diary for storing names and numbers. During the focus groups sessions, questions were asked in any order that fitted in with the flow of conversation (Appendix H). The researcher ensured that all questions were covered by checking each question once it has been asked.

2) Focus Groups with personas

The same set of questions in focus group was used. Similar procedures to interview with personas were performed with the exceptions of the tasks.

3.3.2.5 Procedure: Questionnaire

The participants were asked whether they would like to fill in a questionnaire once the interview or focus group session had ended. They were informed that a questionnaire could be used as an alternative method to interview and focus groups in terms of user requirements elicitation methods. Those participants who chose to fill in a questionnaire were subsequently asked which method they preferred. The participants spent 20 minutes on average to fill in the questionnaire.

The questionnaire had to be filled only at the venue where the session was held. The researcher assisted the participants with general queries only such as questions related to the start and end time, and rating scales. Similar procedures to the pilot study were followed.

3.3.2.6 Data Analysis

In this section, details related to the analysis have been presented.

1) Analysis of total numbers of problems reported

The analysis was performed to investigate whether there were differences between the expectations of Malaysian and UK older people with regard to mobile phones and whether the two methods (interview and focus groups) have different levels of effectiveness in the two countries. It was also used to explore the use of personas as a tool in user requirements methods. The analysis was based on the number of problems identified by the participant in relation to mobile phone usage in general. Problems were defined as difficulties or issues identified by the participant in relation to mobile phone usage in general.

2) Analysis of total numbers of design improvements /additional features suggested

The analysis was conducted to achieve the same objectives as in the previous analysis, based on design improvements or additional features suggested by the participants. The researcher explicitly asked two questions about an ideal mobile phone in order to gain information about suggested features and design improvements for mobile phone.

3) Analysis of total numbers of reasons for having mobile phones

The analysis was performed to compare whether there were more reasons for having mobile phones found among the three methods (interview, focus group and questionnaire), based on the number of reasons identified by the participant in each method in relation to mobile phone usage in general. This analysis was about comparing volume of data related

to reasons for having mobile phones that were produced among the three methods.

4) Analysis of total numbers of problems related to usability of the phone

The analysis was performed to compare whether there were more numbers of problems related to usability of the mobile phone found among the three methods (interview, focus group and questionnaire) based on the number of problem identified by the participant in each method in relation to mobile phone usage in general. This analysis was about comparing volume of data in relation to problems associated to usability of the mobile phones that were produced among the three methods.

5) Analysis of total numbers of suggested features for the mobile phone

The analysis was performed to compare whether there were more suggested features found among the three methods (interview, focus group and questionnaire) based on the number of suggested features identified by the participants in each method in relation to mobile phone usage in general. This analysis was about comparing volume of data related to suggested features for the mobile phone that were produced among the three methods.

6) Cost Benefit analysis

The analysis (refer Section 2.10) was conducted to compare the costs and effectiveness of the three methods (interview, focus group and questionnaire). This was measured by hours.

7) The use of Content Analysis

The researcher reviewed all transcriptions. The data for all participants in both methods – focus groups and interview (with and without personas) was analysed using content analysis (refer Section 2.9) based on problems reported for each method.

At the early stage of the analysis, the researcher listed all problems identified and suggested design features for both methods. In order to analyse the data on the problems reported, it was necessary to group them together. That is to say that problems reported in different terms might in practice be referring to the same underlying problem. Originally it was considered that categories might be generated by relational analysis. However, it was recognized that there was a danger of individual bias in doing this and it was therefore decided instead to use more of a crowd-sourcing approach, based on card sorting, as reported in Chapter 4. Therefore at this stage the data was simply classified into problems and suggested design features. All problems and suggested design features identified by both methods - interviews and focus groups (with and without personas) were used for the purpose of data analysis.

8) Comparisons across methods:

The questionnaire consisted of questions to elicit a number of different types of information, as summarized in Table 3.10, in comparison with the interview and focus groups. The question types were:

- Background on mobile phone usage: Section A, Question 1-3; Section B, Question 1-4
- Reasons for using a mobile phone Section A, Question 4
- Problems related to usability of the mobile phone: Section B, Question 5

- Suggested features for mobile phones: Section B, Question 9 and 10
- Complaints about mobile phones: Section B, Question 11

Table 3.10- Details of questions across methods

Interview and Focus Groups	Questionnaire
Can you tell me about your mobile phone use?	- Section A ,Question 1, 2, 4 - Section B, Question 2, 3
How frequently do you use your phone?	- Section A, Question 3
Do you carry your phone every time and everywhere you go?	- Section A , Question 4, First category
What feature of your phone do you use frequently?	- Section B, Question 4
What do you like about your phone?	- Section A , Question 4, First category
What do you not like about your phone?	- Section B, Question 5 - Section B, Question 11
Did you find your phone easy or difficult? Can you tell me why?	- Section B, Question 5
How did you learn about your phone?	- Section A, Question 4, Second category
How did you learn how to use your phone after you bought it?	- Section A, Question 4, Second category,
Do you use the user manual that came with the phone?	- Section A, Question 4, Second category, Statement 1
What made it easy or difficult to use?	- Section B, Question 5, Statement 11,
What kind of phone would you like to have?	- Section B, Question 10
Can you simply explain what it would be like?	- Section B, Question 9

The data analysis for comparisons across methods has been divided into 3 different parts:

1) Reasons for having mobile phones

- The analysis was based on ten YES and NO questions obtained from the first category in Question 4, Section A (Appendix I) of the questionnaire relating to reasons for having mobile phones. These were compared with data identified from the interviews and focus groups. The analysis counted all the 'yes' responses for Question 4. Table 3.11 shows an example of a question relating to reasons for having mobile phones in the questionnaire compared to similar findings identified from the other two methods for this analysis.

Table 3.11 - Similar finding across methods (Reasons for having mobile phones)

Method	Reasons for having mobile phones
Questionnaire	I do use mobile phone for personal communication.
Interview	I use mobile phone to communicate with my family and friends.
Focus Groups	I use mobile phone to contact my wife.

2) Usability of the phone

- The analysis was based on five–point Likert items statements obtained from the usability of the phone category in Question 5, Section B (Appendix I) compared with similar findings identified from interviews and focus groups. For the purposes of this analysis, responses rated at either Disagree or Strongly Disagree were classified as indications of a problem for comparison with problems identified by the interviews and focus groups. Table 3.12 shows an example of a statement relating to usability of the phone in the questionnaire compared to similar finding identified from the other two methods for this analysis.

Table 3.12 - Similar finding across methods (Usability of the phone)

Method	Problems related to phone usability
Questionnaire	Supplemental reference materials (such as user manual) provided with phone is not easy to understand.
Interview	Does not find easy to use manual; quite confusing.
Focus Groups	Manual is difficult- massive information.

3) Features that participants suggested for the mobile phone in the future

- The analysis was based on a list of features that the participants wished to have on their mobile phone in the future (Question 9 and 10, Section B, Appendix I) and also similar findings identified from interviews and focus groups. Table 3.13 shows an example of few features relating to features that participants wished to have for the mobile phone in the future as stated in the questionnaire compared to similar finding identified from the other two methods for this analysis.

Table 3.13 - Similar finding across methods

Method	Desired features
Questionnaire	E-mail, Audio Display, Voice memo
Interview	Printed instructions on the back
Focus Groups	Solar power mobile phone

3.4 Results

3.4.1 Effects of country, methods (focus groups and interview) and use of personas on the number of the total problems

This analysis was performed to investigate whether there were differences between the expectations of Malaysian and UK older people with regard to mobile phones and whether the two methods (interview and focus groups) have different levels of effectiveness in the two countries. It was also used to explore the use of personas as a tool in user requirement methods. The analysis was based on the number of problems identified by the participants in relation to mobile phone usage in general.

A three-way independent subject analysis of variance was conducted to investigate the effects of Country (UK versus Malaysia), Method of user requirements elicitation (Focus Groups versus Interview) and the Use of Personas (Personas versus non Personas) on the number of the total problems elicited from participants. There were a total of 167 problems identified in the interviews and focus groups.

The overall results of this analysis are summarized in Table 3.13.

Table 3.14 - Three - way analysis of variance of Country, Method and Use of Personas on number of problems elicited. Significant results are in bold.

Source	Type III Sum of Squares	df	Mean Square	F	p
Country	**48.373**	**1**	**48.373**	**8.136**	**.007**
Method	**256.557**	**1**	**256.557**	**43.152**	**.000**
Persona	.821	1	.821	.138	.713
Country * Method	**36.456**	**1**	**36.456**	**6.132**	**.019**
Country * Persona	**42.489**	**1**	**42.489**	**7.146**	**.012**
Method * Persona	1.923	1	1.923	.323	.573
Country * Method * Persona	.130	1	.130	.022	.883
Error	196.200	33	5.945		

This ANOVA produced the following results:

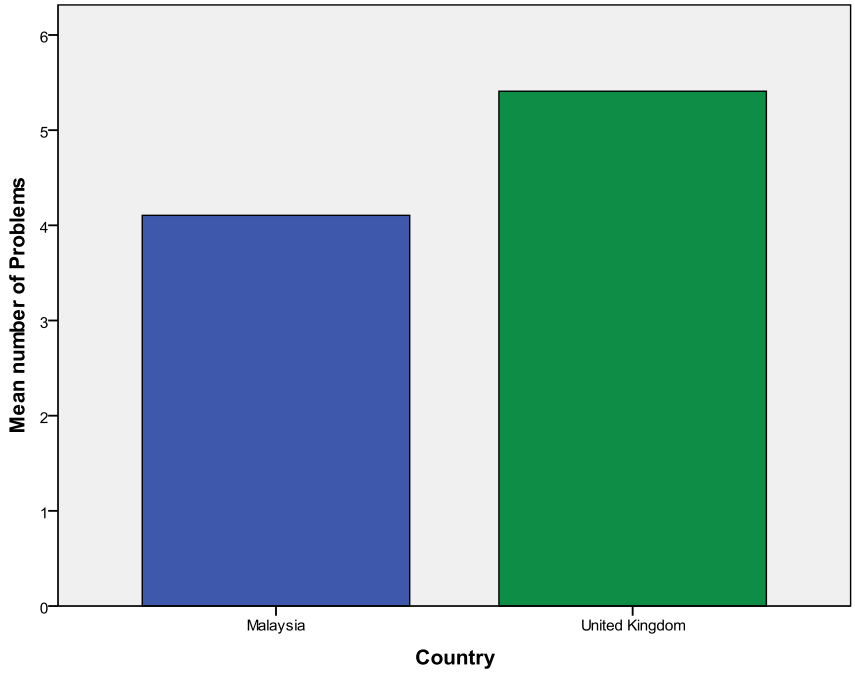


Figure 3.6 – Mean number of problems elicited in each country

The results in Table 3.1 show that there was a significant main effect for Country (F = 8.13, df = 1, 33, p < 0.007) on the number of problems reported. Figure 3.6 shows that more problems were reported in UK than in Malaysia.

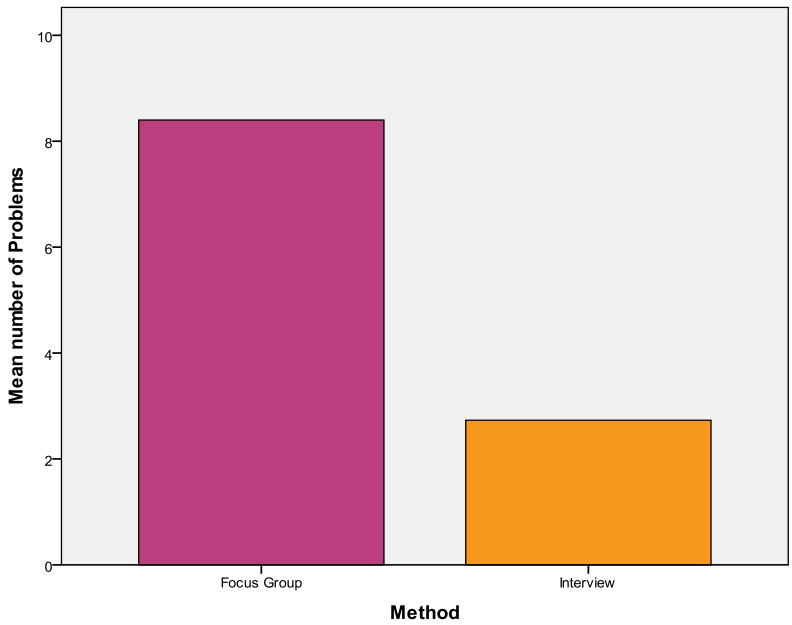


Figure 3.7 – Mean number of problems reported by each method

There was also a main effect for Method (F = 43.15, df = 1, 33, p < 0.000) on the number of problems reported. Figure 3.7 shows that focus groups elicited more problems than interviews.

However, there was no significant main effect for Persona (F = 0.138, df = 1, 33, n.s.) on the number of problems reported.

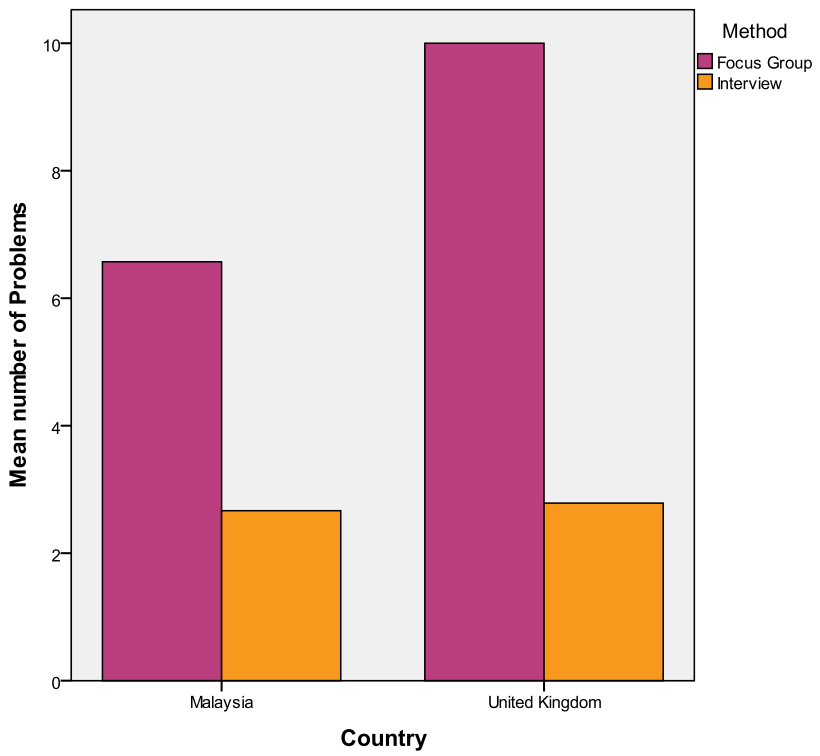


Figure 3.8 – Mean number of problems elicited by Country and Methods

There was a significant interaction between Country and Method ($F = 6.13$, $df = 1, 33$, $p < 0.019$) on the number of problems reported. Figure 3.8 shows that the difference in problems reported between Focus Groups and Interview was greater in the UK than in Malaysia.

Post hoc analyses using Tukey HSD indicated that for both countries, the interviews elicited less problems compared to the focus groups in Malaysia ($p < 0.018$) and the UK ($p < 0.000$). However, the focus groups in Malaysia did not differ significantly from the focus groups in the UK ($p < 0.074$). Similarly, the interviews in Malaysia did not significantly differ from the interviews in the UK ($p < 0.999$).

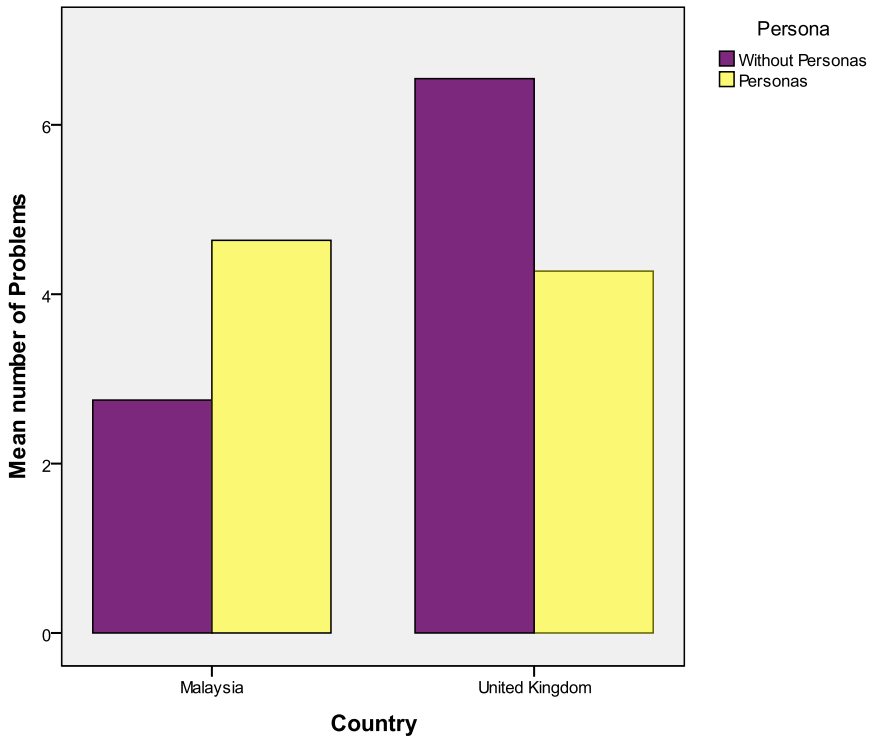


Figure 3.9 – Mean number of problems elicited by Country and Personas

There was a significant interaction between Country and Personas ($F = 7.14$, $df = 1, 33$, $p < 0.012$) on the number of problems reported. Figure 3.9 shows that in Malaysia, more problems were produced with personas than without personas, but in the UK, the effect is in the opposite direction, with more problems elicited without personas than with personas. There was no significant interaction between Method and Personas ($F = 0.32$, $df = 1, 33$, n.s.) on the number of problems reported.

Finally, there was no significant interaction among Country, Method and Personas ($F = 0.02$, $df = 1, 33$, n.s.) on the number of problems reported.

Post hoc analyses using Tukey HSD indicated that there was no significant difference found for mean number of problems elicited by Country and Personas.

3.4.2 Effects of country, methods (focus groups and interview) and use of personas on the number of the total suggested features

This analysis was conducted to achieve the same objectives as in the first analysis based on suggested features suggested by the participants.

A three-way independent subject analysis of variance was conducted to investigate the effects of Country (UK versus Malaysia), Method of user requirements elicitation (Focus Groups versus Interview) and the Use of Personas (Personas versus non Personas) on the number of the total suggested features suggested by participants. The overall results of this analysis are summarized in Table 3.15.

Table 3.15 - Three-way analysis of variance of Country, Method and Use of Personas on number of design improvements/additional features. A significant difference is highlighted in bold.

Source	Type III Sum of Squares	df	Mean Square	F	p
Country	**67.985**	**1**	**67.985**	**13.782**	**.001**
Method	9.136	1	9.136	1.852	.183
Persona	3.870	1	3.870	.784	.382
Country * Method	2.443	1	2.443	.495	.486
Country * Persona	.047	1	.047	.010	.923
Method * Persona	4.387	1	4.387	.889	.353
Country * Method * Persona	8.809	1	8.809	1.786	.191
Error	162.788	33	4.933		

This ANOVA produced the following results:

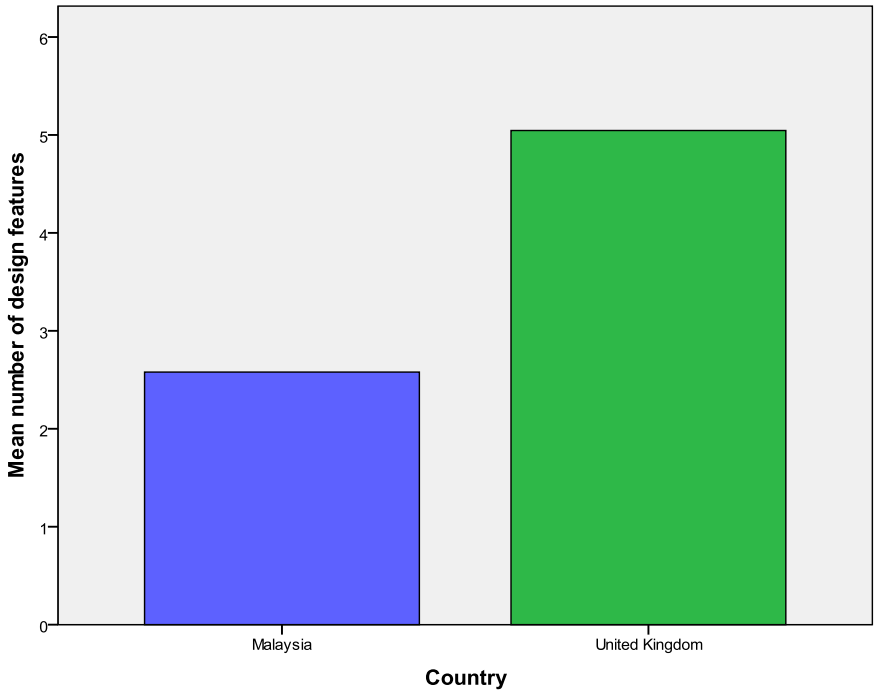


Figure 3.10 – Mean number of suggested features elicited in each country

The results in Table 3.15 shows that there was a significant main effect for Country (F = 13.78, df = 1, 33, p < 0.001) on the number of design improvements/additional features suggested. Figure 3.10 shows that more suggested features were reported in UK than in Malaysia.

There was no significant main effect for Method (F = 1.85, df = 1, 33, n.s.) and Personas (F = 0.78, df = 1, 33, n.s.) on the number of design improvements/additional features suggested.

There was also no significant interaction between Country and Method (F = 0.49, df = 1, 33, n.s.), Country and Personas (F = 0.01, df = 1, 33, n.s.) and Method and Personas (F = 0.88, df = 1, 33, n.s.) on the number of design improvements/additional features suggested.

Finally, there was no significant interaction among Country, Method and Persona (F = 1.78, df = 1, 33, n.s.) on the number of design improvements/additional features suggested.

3.4.3 Effects of country and methods (focus groups, interview and questionnaire) on the number of reasons for having mobile phones

This analysis was performed to compare whether there were more reasons found among the three methods (interview, focus groups and questionnaire) based on the number of reasons identified by the participants in each method in relation to mobile phone usage in general.

A one-way repeated measures Analysis of Variance (ANOVAs) was conducted to investigate the effects of Country (UK versus Malaysia) and Method of user requirements elicitation (Interview versus Focus Groups versus Questionnaire) on the number of reasons (first part in Question 4, Section A, Appendix I) for having mobile phones.

The overall analysis is summarized in Table 3.16.

Table 3.16 - One way repeated measures analysis of variance of Country and Method on the number of reasons for having mobile phones. Significant differences are highlighted in bold.

Source	Type III Sum of Squares	df	Mean Square	F	p
Country	**1.747**	**1**	**1.747**	**7.638**	**.007**
Method	**5.074**	**2**	**2.537**	**11.093**	**.000**
Country * Method	.226	2	.113	.495	.611
Error	23.788	104	.229		

This analysis showed that there was a significant main effect for Country ($F = 7.63$, $df = 1, 104$, $p < 0.007$) on the number of reasons for having a mobile phone.

There was also a significant main effect for Method ($F = 11.09$, $df = 2, 104$, $p < 0.000$) on the number of reasons for having a mobile phone.

Finally, there was no significant interaction between Country and Method (F=0.49, df = 2, 104, n.s) on the number of reasons for having a mobile phone.

Figure 3.11 shows a list of questions related to reasons for having mobile phones in the questionnaire.

Reasons for having mobile phones:

Do you use mobile phone for personal communication (with family or friends)?

Do you use mobile phone for business communication?

Do you mobile phone to seek information (eg: news or driving directions)?

Do you use mobile phone to store phone number?

Do you use mobile phone for other information such as personal notes?

Do you use mobile phone for other information such as a calendar?

Do you use mobile phone for listening to music?

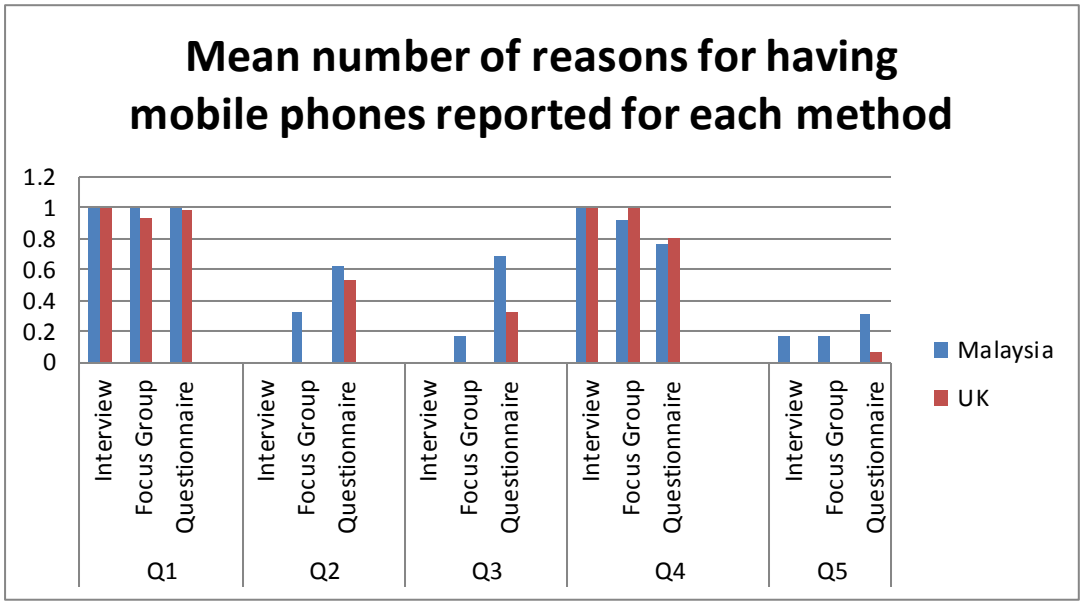
Do you use mobile phone for playing game?

I carry my mobile phone for safety and security.

I use mobile phone for other purposes

(please describe:)

Figure 3.11 – Questions related to reasons for having the mobile phones



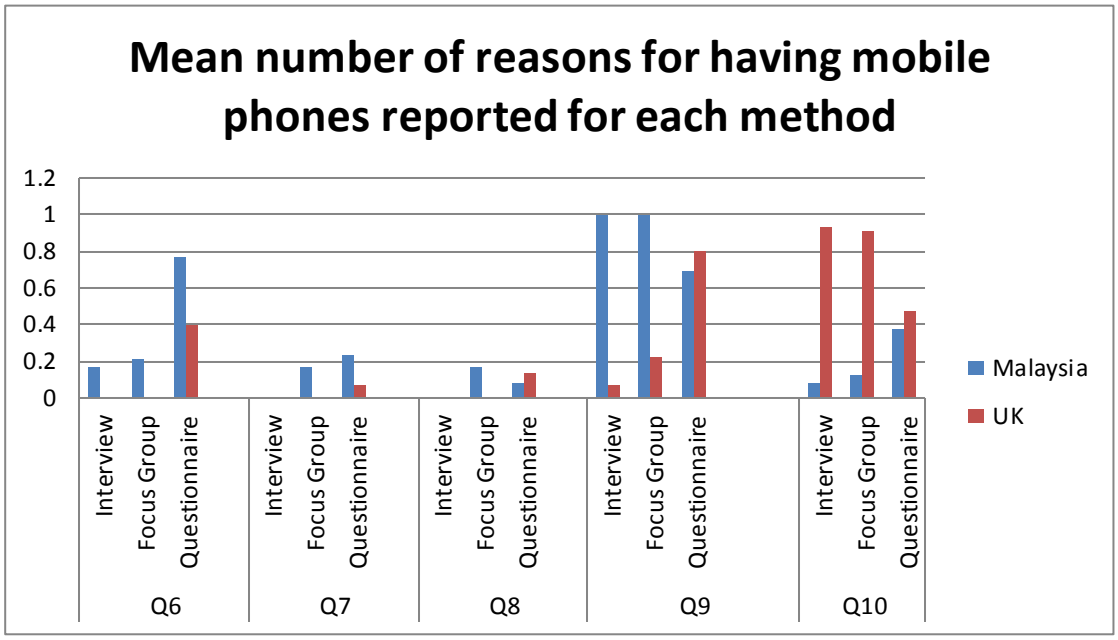


Figure 3.12 – Mean number of reasons for having mobile phone reported by Country and Methods for each method

Post hoc analyses using Tukey HSD indicated that there were 4 questions (questions 3, 6, 9 and 10) in Figure 3.12 which differed significantly. For question 3, more reasons for having mobile phones were reported in the questionnaire compared to the focus groups ($p < 0.000$) in Malaysia. Similarly, more reasons were reported in Malaysia than in UK

through the use of the questionnaire ($p < 0.026$). However, the questionnaire in the UK did not differ significantly from the focus groups in Malaysia ($p < 0.547$). More reasons for having mobile phones were reported in the questionnaire than the focus groups ($p < 0.000$) and the interviews ($p < 0.000$) in Malaysia for question 6. There was also more reasons for having mobile phones reported in the questionnaire ($p < 0.047$) in Malaysia compared to the UK. However, the questionnaire in the UK did not differ significantly from the focus groups ($p < 0.503$) and interviews ($p < 0.464$) in Malaysia.

The post hoc analyses for question 9 indicated that in the UK, the questionnaire yielded more reasons for having mobile phones than the focus groups ($p < 0.000$) and interviews ($p < 0.000$). While in Malaysia, more reasons for having mobile phones were reported in the focus groups ($p < 0.000$) and the interviews ($p < 0.000$). However, in Malaysia, the questionnaire did not differ significantly from the focus groups ($p < 0.088$) and the interviews ($p < 0.202$). The questionnaire in Malaysia also did not differ significantly from the questionnaire ($p < 0.957$) in the UK. Focus groups in Malaysia also did not differ significantly from the interviews ($p < 1.000$) in Malaysia.

For question 10, more reasons for having mobile phones were found in the focus groups ($p < 0.003$) and the interviews ($p < 0.000$) compared to the questionnaire in the UK. Focus groups ($p < 0.000$) and the interviews ($p < 0.000$) reported more reasons for having mobile phones in the UK than in Malaysia. However, in the UK, focus groups did not differ significantly from the interviews ($p < 1.000$). While in Malaysia, the questionnaire did not differ significantly from the focus groups ($p < 0.319$) and the interviews ($p < 0.321$). The questionnaire in Malaysia also did not differ significantly from the questionnaire ($p < 0.991$) in the UK.

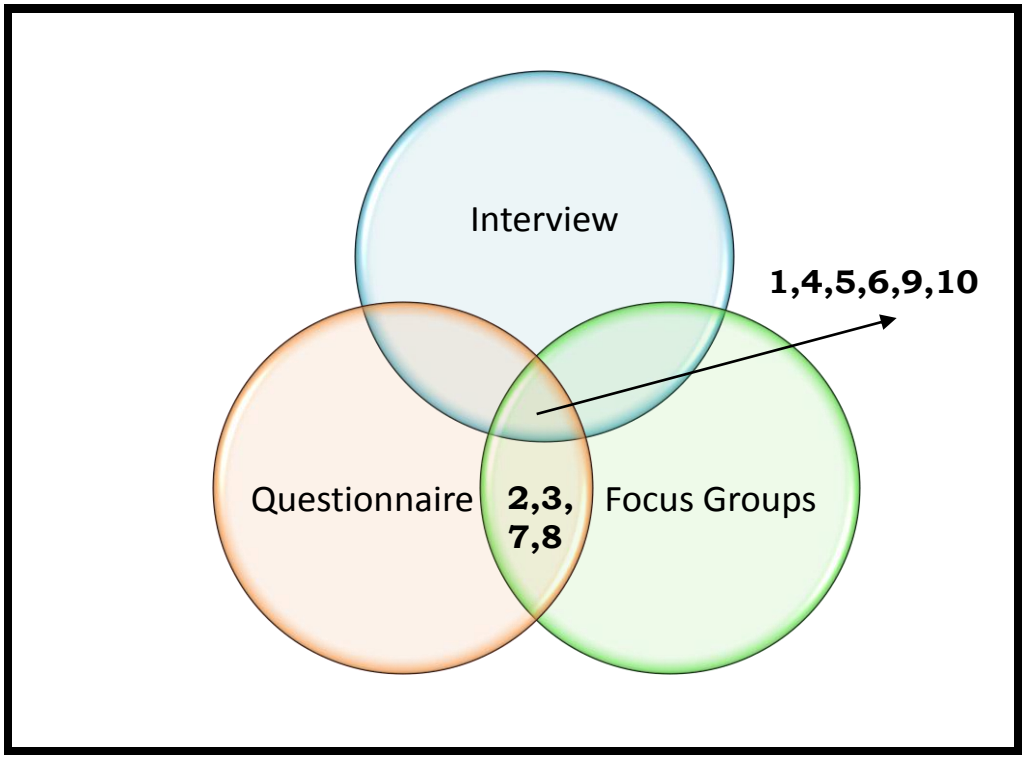


Figure 3.13 – Venn Diagram representation for the number of uses of having mobile phones

Figure 3.13 illustrates ten findings that were related to various reasons for having mobile phone reported by each method. This representation showed that the use of interview, focus groups and questionnaire in the studies were able to identify similar reasons. This is discussed further in Section 3.5.

3.4.4 Effects of country and methods (focus groups, interview and questionnaire) on the number of problems related to usability of the phone

This analysis was performed to compare whether there were more problems found among the three methods (interview, focus groups and questionnaire) based on the number of problems identified by the participants in each method in relation to mobile phone usage in general.

A one-way repeated measures Analysis of Variance (ANOVAs) was conducted to find out the effects of Country (UK versus Malaysia) and Method of user requirements elicitation (Interview versus Focus Groups versus Questionnaire) on the number of problems elicited from the participants based on usability of the phone (first part in Question 5, Section B, Appendix I). The overall analysis is summarized in Table 3.17.

Table 3.17- One way repeated measures analysis of variance of Country and Method on the number of problems elicited based on usability of the phone. Significant differences are highlighted in bold.

Source	Type III Sum of Squares	df	Mean Square	F	p
Country	**6.434**	**1**	**6.434**	**25.838**	**.000**
Method	**6.874**	**2**	**3.437**	**13.803**	**.000**
Country * Method	**3.037**	**2**	**1.519**	**6.099**	**.003**
Error	25.897	104	.249		

This analysis showed that there was a significant main effect for Country ($F = 25.83$, $df = 1, 104$, $p < 0.000$) on the number of problems related to usability of the phone.

There was a significant main effect for Method ($F = 13.80$, $df = 2, 104$, $p < 0.000$) on the number of problems related to usability of the phone.

Finally, there was a significant interaction between Country and Method ($F=6.09$, $df = 2, 104$, $p < 0.003$) on the number of problems related to usability of the phone. Figure 3.14 shows a list of statements related to usability of the mobile phone in the questionnaire.

Usability of the mobile phone:

Overall, I am satisfied with how easy it is to use my mobile phone

It is simple to use my mobile phone

It was easy to learn to use my mobile phone

It is easy to read texts on the screen

It is easy to navigate the menu of the phone

My mobile phone gives error messages that clearly tell me how to fix problems

Whenever I make a mistake using the mobile phone, I recover easily and quickly

It is easy to read labels on buttons

It is easy to press buttons

It is easy to input text

Supplemental references materials (such as user manual) provided with the phone is easy to understand

It is easy to replace the battery

It is easy to charge the battery

Figure 3.14 – Statements related to usability of the mobile phone

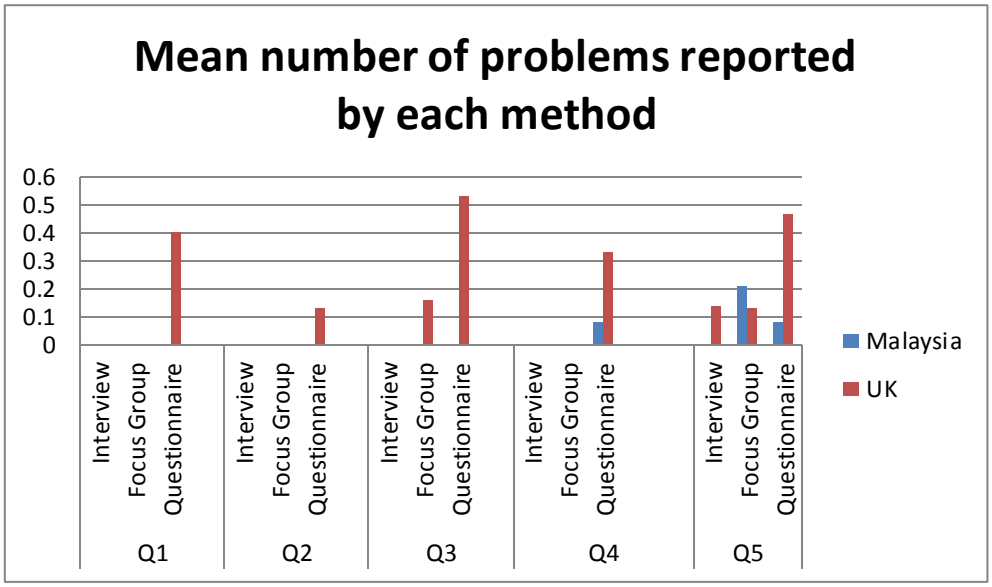


Figure 3.15(a) – Mean number of problems elicited based on usability of the phone by Country and Methods

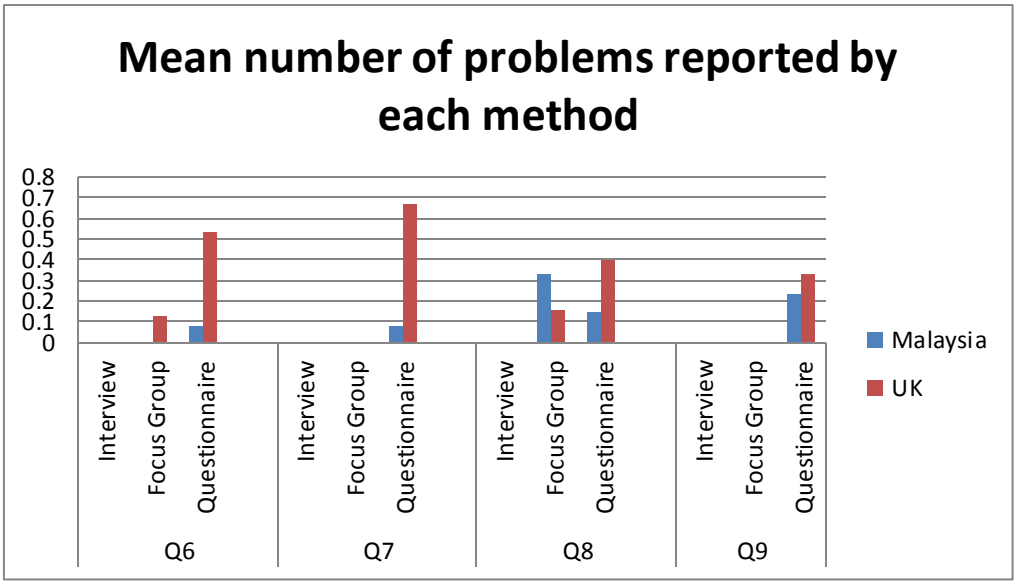


Figure 3.15(b) – Mean number of problems elicited based on usability of the phone by Country and Methods

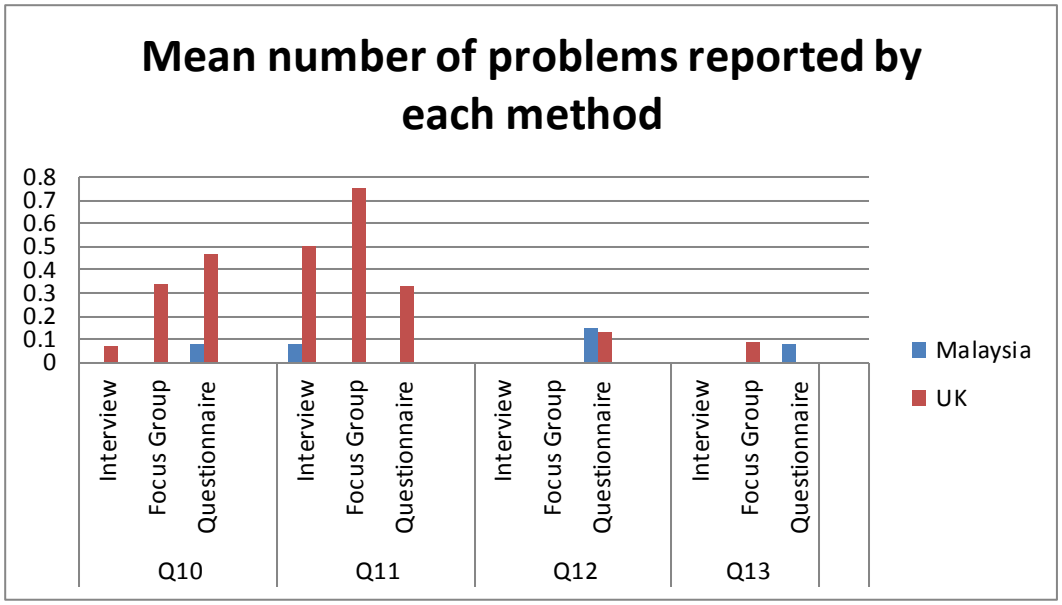


Figure 3.15(c) – Mean number of problems elicited based on usability of the phone by Country and Methods

Post hoc analyses using Tukey HSD indicated that there were 6 questions: - question 1, 2, 3 and 4 (refer Figure 3.15a); and question 6 and 7 (refer Figure 3.15b), which differed significantly.

For question 1 and 2, problems related to usability of the mobile phones were only reported in the questionnaire by UK participants. More problems related to usability of the phone were reported in the questionnaire compared to the focus groups ($p < 0.000$) in the UK for question 3. More problems were reported in the UK than in Malaysia through the use of questionnaire for question 4 ($p < 0.014$) and question 7 ($p < 0.000$).

The post hoc analyses for question 6 indicated that in the UK, the questionnaire yielded more problems related to usability of the mobile phones than the focus groups ($p < 0.000$). More problems related to usability of the mobile phones were also found in the UK compared to Malaysia through the use of questionnaire ($p < 0.001$). However, the

questionnaire in Malaysia did not differ significantly from the focus groups ($p < 0.995$) in the UK.

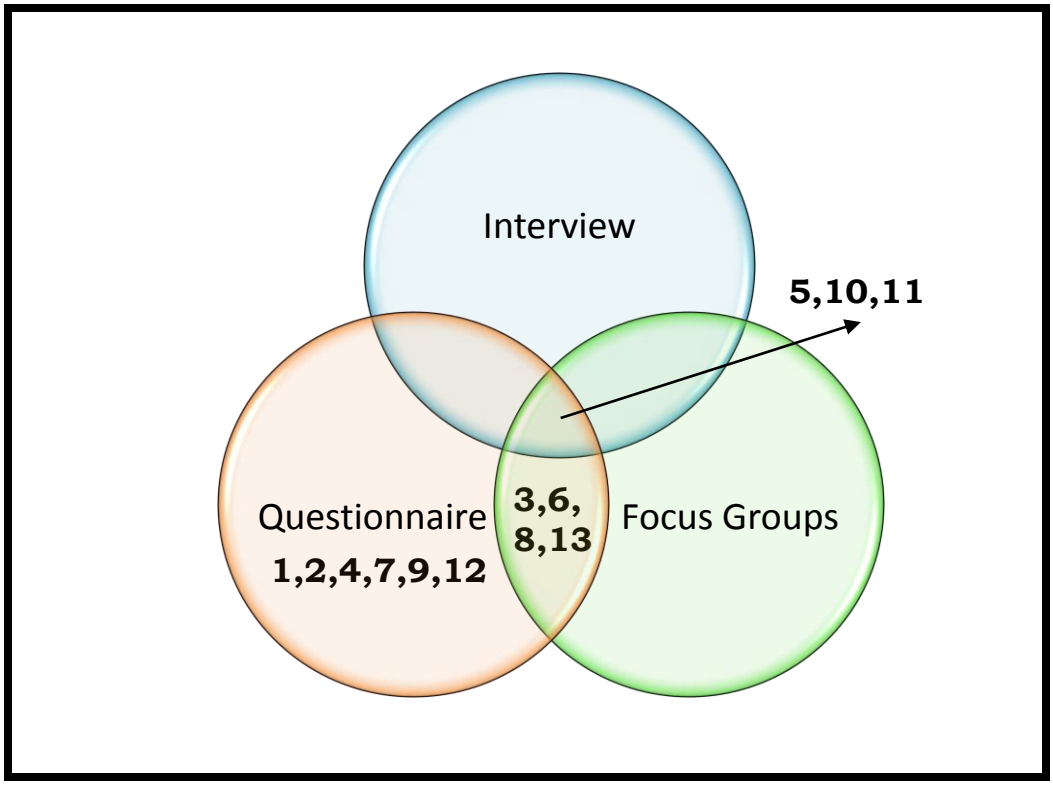


Figure 3.16 – Venn Diagram representation for the number of problems based on usability of the phone

Figure 3.16 illustrates thirteen statements for usability of the phone reported by each method. Three findings reported by all methods. This representation showed that more problems related to usability of the phone were reported in the questionnaire. This is discussed further in Section 3.5.

3.4.5 Effects of country and methods (focus groups, interview and questionnaire) on the number of suggested features for the mobile phone

This analysis was performed to compare whether there were more suggested features found among the three methods (interview, focus groups and questionnaire) based on the number of suggested features identified by the participants in each method in relation to mobile phone usage in general.

A two-way independent subjects Analysis of Variance (ANOVAs) was conducted to investigate the effects of Country (UK versus Malaysia) and Method of user requirements elicitation (Interview versus Focus Groups versus Questionnaire) on the number of future features suggested by the participants (Section B, Question 9). The overall analysis is summarized in Table 3.18.

Table 3.18- Two - way analysis of variance of Country and Method on future features. Significant differences are highlighted in bold.

Source	Type III Sum of Squares	df	Mean Square	F	p
Country	.863	1	.863	.360	.590
	7.261	3.031	2.396		
Method	**2272.301**	**2**	**1136.150**	**559.093**	**.002**
	4.064	2	2.032		
Country * Method	4.064	2	2.032	.193	.825
	1093.236	104	10.512		

This analysis showed that there was no significant main effect for Country (F = 0.36, df = 1, 104, n.s) on the number of future features suggested by the participants.

There was a significant main effect for Method ($F = 559.09, df = 2, 104, p < 0.002$) on the number of future features suggested by the participants.

Finally, there was no significant interaction between Country and Method ($F=0.19$, $df = 2, 104$, n.s) on the number of future features suggested by the participants.

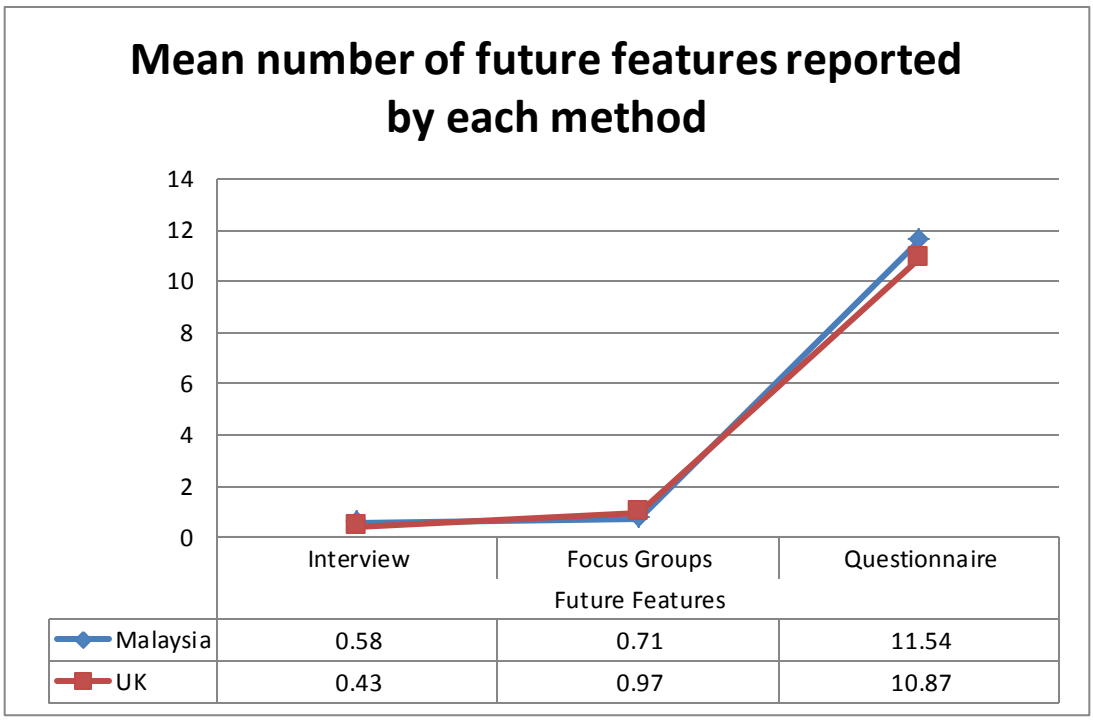


Figure 3.17 – Mean number of future features reported by Country and Methods

Figure 3.17 shows that more suggested features were reported in the questionnaire.

3.4.6 Cost benefit analysis for the three user requirements elicitation methods

This analysis was conducted to compare the costs and effectiveness of the three methods (interview, focus groups and questionnaire). This was measured by hours.

Table 3.19- Estimated time spent by the researcher for each method in both countries (hours)

Researcher	Focus Groups		Interview		Questionnaire	
	M	**UK**	**M**	**UK**	**M**	**UK**
Preparing questions	1	1	1	1	4	4
Recruiting participants	52	104	52	104	52	104
Chairing session	7	8	12	14	0.08	0.08
Data Analysis	168	152	72	66	60	56
Travel time	14	31	24	33	26	30
Total hours	**242**	**296**	**161**	**218**	**142.08**	**194.08**

Table 3.19 shows all the tasks involved with the estimated total hours spent for each task by the researcher. Few hours were required to prepare the questions for all the methods since they were based on questions that were used in other mobile phone studies with some adjustments made by the researcher. In terms of recruitment, the hours spent doubled in the UK since more participants were required for all the studies. One hour was allocated to chair each session. The hours spent for data analysis include transcription, where more hours were allocated for data analysis in Malaysia. More hours were spent in the UK in terms of travel time since some of the sessions took place in London.

Table 3.20 shows the total numbers of participants for each method in Malaysia and the UK.

Table 3.20 – Total numbers of participants

	Malaysia	UK
Interview	12	14
Focus Groups	24	32
Questionnaire	13	15

Estimated total hours for all participants for the three methods were equivalent to the sum of total number of participants for each method multiplied by the sum of participation time for each method (an average of 1 hour) and estimated travel time (1 hour). Table 3.21 shows the estimated total hours spent by all the participants involved in each method for both countries. The total hours include the participation time for each participant who was involved in any of the three methods plus the travel time to get to the venue and return home.

Table 3.21 - Estimated time spent by the participants for each method in both countries (hours)

	Malaysia	UK
Interview	24	28
Focus Groups	48	64
Questionnaire	26	30

Table 3.22 shows the total number of problems reported by each method for Malaysia and the UK.

Table 3.22 – Total numbers of problems reported

	Malaysia	UK
Interview	32	39
Focus Groups	46	80
Questionnaire	223	165

Table 3.23 shows the total number of minutes spent for each method in Malaysia and the UK.

Table 3.23– Total number of minutes spent for each method in both countries

Time (min)	Focus Groups		Interview		Questionnaire	
	M	UK	M	UK	M	UK
Researcher	14520	17760	9660	13080	8524.8	11644.8
Participants	2880	3840	1440	1680	1560	1800
Total (min)	17400	21600	11100	14760	10084.8	13444.8

Table 3.24 – Mean time required per problem reported by each method in Malaysia and the UK

Time	Focus Groups		Interview		Questionnaire	
	M	UK	M	UK	M	UK
min/problem	378.2	270	346.9	378.5	45.2	81.5
hour/problem	6.3	4.5	5.8	6.3	0.8	1.3

Table 3.24 shows the mean time required to report a problem by each method in both countries. The average for each method in each country indicates that the focus group will require around 5 hours 24 minutes to report a problem, while the interview will require 6 hours 18 minutes and the questionnaire about 1 hour and 6 minutes.

Post hoc analyses using Tukey HSD indicated that questionnaire took the least time to report a problem compared to focus group ($p < 0.000$) and interview ($p < 0.000$) as shown in Figure 3.18. However, the focus groups did not differ significantly than the interviews ($p < 0.572$).

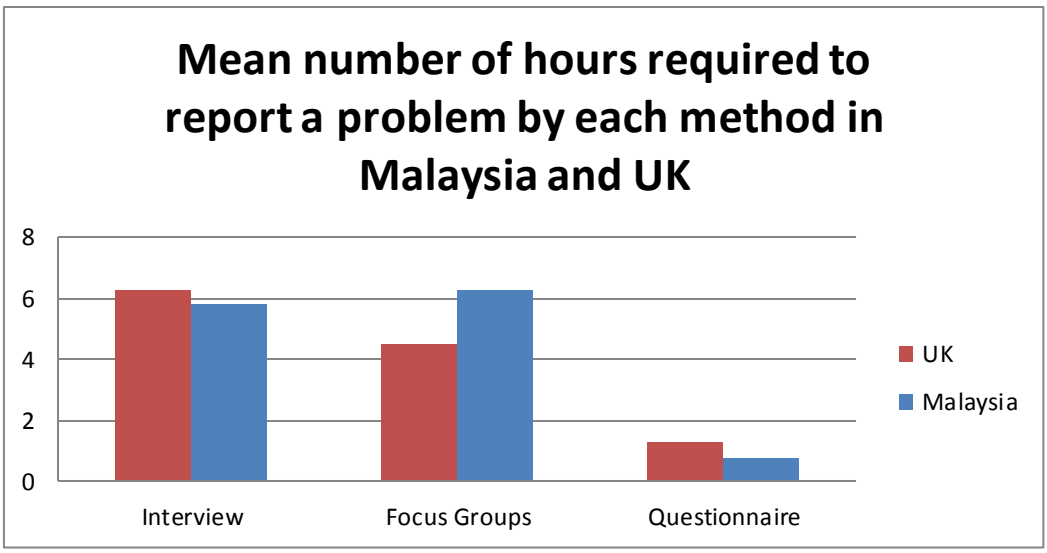


Figure 3.18 – Mean number of problems reported by Country and Methods

3.4.7 Comparisons of rating scale and method preference (questionnaire)

Comparisons were made in terms of rating scale and method preference for the questionnaire (Focus Groups versus Questionnaire or Interview versus Questionnaire). Table 3.25 shows the total number of preferences reported by each participant for all types of rating scale introduced in the questionnaire.

Table 3.25 – Number of preferences reported by each participant for the questionnaire

Rating	Scale	Malaysia	UK
'Yes' and 'No'	N/A	13	15
Five–point Likert items	0 – Never 4 – Most Frequently	10	13
Six–point Likert items	0 - Don't know, 1 - Not available 2 – Never 3 – Rarely 4 - Occasional 5 - Frequent	6	7
Five–point Likert items	0 – Strongly Disagree 1 - Disagree 2 – Neutral 3 – Agree 4 – Strongly Agree	5	7

All participants for both countries preferred the 'Yes' and 'No' responses in the questionnaire. At the same time, most participants in both countries also preferred the five–point Likert items with scale range from 0 – Never to 4 – Most Frequently as shown in Table 3.25. Remarks were made regarding the terms used in the Likert scale where apparently the participants found the terms quite confusing and preferred less complex

terms. This coincides with the results in the pilot study (refer Table 3.4) in which participants found interpretation of differences such as 'Strongly Disagree' and 'Disagree' too complex.

There were only 28 participants in both countries who agreed to complete a questionnaire. In terms of method preference, the majority of those 28 participants (88%) preferred talking methods (interview and focus groups) compared to non-talking method (questionnaire). The majority of participants preferred talking methods because they were able to communicate and interact with other people. For example, they were able to ask the researcher if they were uncertain about any issues or questions raised during interview or focus groups. On the contrary, it would be impossible for questionnaire due to the nature of the method.

3.4.8 Tasks performed in the interview

Table 3.26 shows the total number of participants for all tasks completed in the interview.

Table 3.26 – Number of participants for all tasks completed in the interview

Rating	Malaysia	UK
1. Saving researcher's phone number	12	14
2. Checking the contact list	12	14
3. Using speed dial	2	1

All participants in Malaysia and the UK were able to perform the first two tasks as indicted in Table 3.26. There were only 2 participants from Malaysia and 1 participant from the UK who knew how to use speed dial. The participants who were able to complete the speed dialling task, were asked for suggestions as to how to make speed dialling easier. The main

problem they identified was that of remembering the mapping from speed dial number to contact name.

3.5 Discussion

This chapter has presented two studies (MALS and UKS) investigating whether there were differences between the expectations of Malaysian and UK older people with regard to the mobile phone. The results for Analysis 3.4.1 showed that there were significant differences between the two countries in terms of the number of problems reported in mobile phone usage in general where more problems were reported in UK than in Malaysia.

The two studies investigated whether the two methods (interview and focus groups) have different levels of effectiveness in the two countries. The results showed that there were significant differences between focus groups and interviews in terms of the number of problems reported in mobile phone usage, where focus groups elicited more problems than interviews. The result is consistent with Kurniawan, (2008) where focus group discussions have been proven to be quite successful in gaining an understanding on how older people use mobile phone. In addition, the results indicated that there were significant differences between both countries and methods in terms of the number of problems reported, where the differences in problems reported between focus groups and interviews was greater in the UK than in Malaysia.

The use of personas as a tool in user requirement methods in the context of interviews and focus groups has also been explored. The results for Analysis 3.4.1 showed that there were significant differences between both countries and personas on the number of problems reported where more problems were produced with personas than without personas in

Malaysia. On the contrary, more problems were elicited without personas than with personas in the UK. It is possible that this is due to cultural differences as reported in various studies involving different cultures (Hall, 1990 and Hofstede, 2005). Malaysian older people were found not to be as open as UK older people in terms of expressing their difficulties with mobile phones. Malaysian older people were only able to share and discuss their problems related to mobile phone usage once the personas were introduced. This implies that they were more open in the interview and focus group sessions once they discovered about other people's difficulties in using mobile phone which were similar or related to them.

A clear apparent cultural difference that was observed (Section 3.4.1) was in the effect of using personas. With personas more problems were elicited in Malaysia, whereas in the UK the opposite effect was observed (Figure 3.9). Clearly it would be good to be able to explain this difference and an apparently obvious approach would be to use Hofstede's Cultural Dimensions (Hofstede, 2005).

Figure 3.19 and Table 3.27 show the scores on each of the five cultural dimensions in Malaysia and the UK. One clear difference is in *Individualism*, which is much lower in Malaysia. Individualism refers to how much members of the culture classify themselves apart from their group memberships. Malaysia's low score implies that it is a *collectivist* society in which individuals act predominantly as members of a life-long and cohesive group or organization. Malaysians operate within large extended families. It could be argued, therefore, that Malaysians identify with their peer group more closely and hence show greater affinity to the personas – which were designed to represent members of that group. The more individualistic UK participants on the other hand may have felt less empathy to the personas, feeling themselves to be more distinct and

individual and therefore more inclined to express their own opinions, rather than attempting to express those of another person.

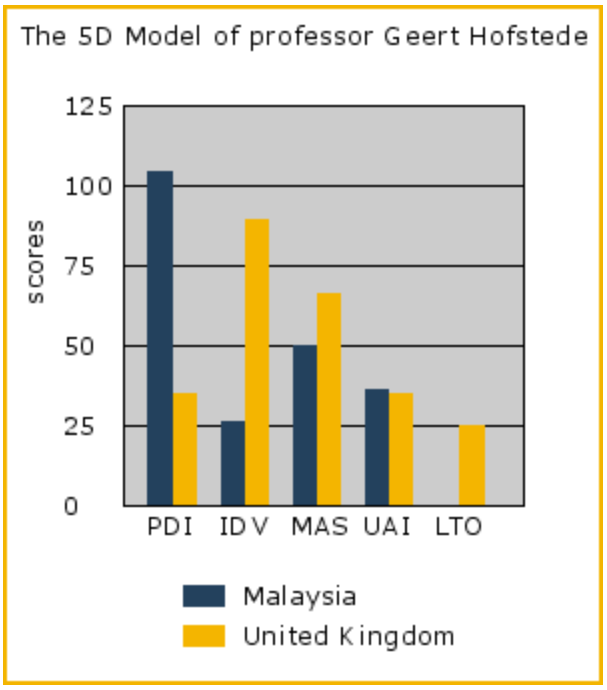


Figure 3.19 – Scores on each of the cultural dimensions for Malaysia and the UK

(Source: www.geerthofstede.com/hofstede_dimensions.php?culture1=57&culture2=94#compare)

Key:

PDI = Power Distance

IDV = Individualism

MAS = Masculinity

UAI = Uncertainty Avoidance

LTO = Long-term Orientation (not collected for Malaysia).

The corresponding figures are given in Table 3.27.

Table 3.27 – Index value on each of the cultural dimensions for Malaysia and the UK

Index	Malaysia	UK
Power Distance	104	35
Individualism	26	89
Masculinity	50	66
Uncertainty Avoidance	36	35
Long-term orientation	-	25

Another clear difference in Hofstede's data between the two countries is in the Power Distance dimension. Power Distance refers to the extent of power inequality among members of an organizational society. Cultures which display low power distance expect and accept power relations that are more consultative or democratic. This could also explain the difference in the use of personas. A member of a low-power-distance culture might feel that they are effectively collaborating with a persona, as if they were a member of the group with whom they ought to consult before making assertions. The opinions they express in the Focus Group or Interview with personas thus become more of a 'consensus' between the real participants and the personas.

There is, though, one major flaw with this argument. Examination of Figure 3.19 and Table 3.27 will immediately show that in fact Malaysia is classed as a *high* Power Distance culture. In other words, the argument in the previous paragraph is turned on its head. If that argument were true, we would expect personas to have been more productive in the UK.

The point here is to highlight one of the fallacies with Hofstede's work: It is very easy (and very tempting) to bend it to one's own purposes. First one has to accept that the scores on the dimensions are representative of a whole culture (remember, they are based on IBM employees), but even if one does that, then it is possible to formulate hypotheses such as those above – and it is practically impossible to independently verify or falsify them. What experiment could be devised that would test either of the explanations of the differences in personas postulated above?

It would take little effort to devise an alternative explanation, based on the true Power Distance difference (i.e. corresponding to Malaysia being a high Power Distance culture and personas being more effective), but this would be just as unverifiable.

There are some aspects of the personas used in this study which may be worthy of deeper investigation. Firstly, the personas used were relatively shallow. This was justified in Section 3.3.2.2, in terms of keeping the personas simple and few in number. It is arguable that a greater number of personas and/or personas with a wider range of functional and communication needs might yield more information. That depth of investigation of persona design was beyond the scope of this thesis, but might be an appropriate topic for study in itself.

Similarly, the influence of the picture of the persona could be investigated further. As explained above, the pictures chosen mainly had the role in this study of establishing the ethnicity of the persona, but it may be that the images had a greater influence on that. For instance, the persona's appearance might evoke empathy, if from a similar culture or class to the participant, or a negative reaction if they are perceived as different. It is notable that Grudin and Pruitt, (2002) say of photographic

models "in our experience, 'amateur' volunteers were better than professional models" but do not explain in what way were they better. This is another topic for potential further research.

Analysis 3.4.2 was conducted to achieve the same objectives as in Analysis 3.4.1, but based on suggested features suggested by the participants. Results showed that there were significant differences between the two countries in terms of the number of design improvements/additional features suggested in mobile phones where more design improvements/additional feature were suggested in UK than in Malaysia.

Analysis 3.4.3 was performed to compare whether there were more reasons for having mobile phones reported among the three methods (interview, focus group and questionnaire) based on the number of reasons identified by the participants in each method in relation to mobile phone usage in general. Results from Analysis 3.4.3 showed that the use of interview, focus groups and questionnaire in the studies were able to identify similar reasons for having mobile phones. The results suggest that the set of questions asked in the questionnaire under this section are complete (refer Figure 3.13). That is to say that the questions, obtained from Lee (2007), covered all of the reasons identified by the participants; there are no reasons that were identified in interviews or focus groups which were not included in the questionnaire. This is probably due to having used the previous results from Lee (ibid.). If designing a questionnaire from scratch it might be advisable to carry out a pilot study to elicit questions and in that case our results confirm that a focus group is better than the interviews in terms of identifying more reasons for having mobile phones. It is possible that by conducting interview alone, some data would have been missed. That is to say that all of the reasons identified are included in

the intersection of questionnaires and focus groups, while 2, 3, 7 and 8 were not captured in interviews.

Analysis 3.4.4 was performed to compare whether there were more problems related to usability of the phone found among the three methods (interview, focus group and questionnaire) based on the number of problems identified by the participants in each method in relation to mobile phone usage in general. Results from Analysis 3.4.4 showed that most problems related to usability of the phone were reported in the questionnaire (refer Figure 3.16). This is not surprising since the list of problems in the questionnaire would have served as a prompt to the participants. The results suggest that the focus group is again better than the interview in terms of identifying more problems related to usability of the phone since there are no problems captured in interviews which were not also raised in the focus groups.

More desirable future features were reported in the questionnaire based from the results in Analysis 3.4.5. Again this is not surprising given that the questionnaire prompted with a list of such features. In order to compare the costs and effectiveness of the three methods (interview, focus group and questionnaire), a cost benefit analysis was conducted (refer Analysis 3.4.6). This calculated the mean time required to report a problem by each method in both countries. Comparing talking methods, the mean time per problem was lower for focus groups than interviews. However, overall the lowest mean time was for questionnaires. This is important if efficiency is the major consideration, but as discussed below, quality and quantity of data will usually have to be considered also. It should be stressed that the results of the cost benefit analysis are based on estimates of time expended, and are also specific to this study. Nevertheless, it is hoped that they may provide a valuable guide for other researchers.

The design of the questionnaire was also compared in terms of rating scale and method preference (refer Analysis 3.4.7). Different types of rating, ranging from 'Yes' and 'No' responses to the Likert scales, were introduced in the questionnaire with the purpose of investigating older people's preferences. The formal feedback indicated that older people found the terms used in the Likert scale to be quite confusing. This is consistent with the findings by O'Neill, 2003 where a number of problems were highlighted regarding the use of 5-point Likert scales with older people. It became apparent that they were having difficulties in understanding the Likert scale and the terms used. A new approach should be taken to simplify the terms for participants with limited experience with scales such as older people. In terms of method preference, the majority of participants (88%) preferred talking methods (interview and focus groups) compared to non-talking method (questionnaire). Eisma et. al (2004) reported that focus groups are perceived as a medium to socialize among participants and researchers as well as providing information. In the context of interview, it was found to be an excellent means of discovering information with a single person. It was obvious in Study 1, participants in both countries enjoyed talking methods as that would be considered as the simplest way of extracting information from them by asking the questions directly. Interestingly, there was one finding particularly related to questionnaires that had not been captured through interviews and focus groups. In both studies, it was obvious that the participants were not in favour of filling in the questionnaires by themselves (which is consistent with Eisma et. al, 2004) and preferred assistance from the researcher to fill the form in for them. In practice, the researcher assisted the participants with general queries only - such as questions related to start and end time, and rating scales. Participants were expected to answer the questions independently since it was meant to be self-administered for the purpose of methods

comparisons. This supported the suggestion that the best way of addressing reluctance of filling in questionnaire in the case of older people will be for the researcher to administer the questionnaire directly. However this may only be practical for smaller scale surveys.

Eisma et. al, (2004) found that assisting participants with questionnaires had the advantage of leading to spontaneous excursions into users' own experiences and provided many useful insights. Clearly, though, this form of questionnaire administration becomes effectively a talking method – more akin to a structured interview.

In summary, in terms of cost (time) alone, the questionnaire is the least costly method. It is also the easiest to apply on a large scale. However, the results of these studies demonstrate that the quality of the information obtained from older people is much higher for talking methods. Focus groups yield the most information while entailing approximately the same cost as interviews.

There were 3 tasks introduced to observe whether the interviewees were able to perform three types of mobile phone functions. All participants in Malaysia and the UK were able to perform the first two tasks (saving researcher's phone number and checking the contact list). There were only 2 participants from Malaysia and 1 participant from the UK that knew how to use speed dial. It seems that most of the participants in both countries do not use the speed dial function.

There were some other limitations in the studies. First, the sample sizes were small. Furthermore, while it might be argued that the participants were not representative of the population at large (being quite educated, middle to upper class and very familiar with mobile phones), it could be said that they were representative of the population of older

mobile phone users. It might be said that this study has concentrated on 'early adopters' in the older population and that, as mobile phone use continues to expand, there will be a need to also accommodate the broader, mainstream user. Furthermore, there was a difference in the age profiles of the participants in the two countries (Malaysia: 55-78, mean 62; UK: 65-90, mean 72). On the one hand this reflects the reality of research: (older) volunteers are hard to recruit and one has to make the most of whomever one can find. At the same time, there is some justification that the age differential roughly reflects the difference in retirement ages.

Also it is possible that the number of problems reported might be influenced by the specific designs of the mobile phones and corresponded to the particular mobile phone models used by the participants. All participants in both countries were retirees, but the difference in retirement age in the two countries meant that those in Malaysia were younger than UK participants. This may have had some influence in terms of mobile phone perception and usage.

Finally, there were limited spaces provided in the open ended questions in the questionnaire that might affect in terms of providing more detailed answers. In addition, not all sections in the questionnaire can be analysed since the data was not available in the other two methods. Both studies (MALS and UKS) were focusing on the interview and focus groups in terms of user requirements elicitation methods. The use of questionnaire was introduced as a baseline and comparisons were made based on the number of uses for having mobile phones, problems related to usability of the phones and suggested features identified across the three methods.

3.6 Summary and Conclusions

This chapter has described two studies which collected the following data in the two countries:

- number of problems using mobile phones
- number of design improvements suggested
- number of reasons for having mobile phones
- number of usability problems
- suggested features for mobile phones

The main objective was to investigate the efficacy of different elicitation methods in the two countries and broadly concluded that the focus group is the best method – in both countries. With regard to the number of problems using mobile phones, the results were based on the raw data, simply the number of problems raised. More problems were reported in UK through focus groups and interviews. It seems that more problems were produced with personas than without personas in Malaysia. On the contrary, more problems were elicited without personas than with personas in the UK.

In terms of design improvements/additional feature, more suggestions were made in UK than in Malaysia. Likert scale was found to be quite confusing and older people preferred talking methods. In terms of cost (time) alone, the questionnaire is the least costly method.

The results related to number of problems using mobile phones appeared to show a difference between the two countries, but it was necessary to carry out a further study to confirm that this is a real result and not a result of what was effectively multiple counting of the same problems. This is the topic of the next chapter.

Chapter 4

Study 2: Online Card Sorting

4.1 Introduction

Study 1 (Chapter 3) uncovered a number of significant differences between the number of problems reported in the different countries and using the different methods. Simply counting the number of problems might be misleading, however, since there might be multiple counting. That is to say that different wording might have been used to describe what is essentially the same problem. For instance, the following are two examples of problems described by participants in interviews: "Manuals are useless, they use words that I can't understand, it is just like learning another language." versus "Manuals come out with specific words that I think I need to have a special dictionary just to use it. It does not make sense at all." As reported in Chapter 3, these would count as two problems, but clearly they might be regarded as evidence of a single problem. Therefore, the study described in this chapter was carried out. The objective was to collect problems into categories which are effectively equivalent. That is to say that the two listed above, for instance, might be included in one category.

Undertaking such a categorization could be dangerous, though, in that it could be subjectively biased. It was decided, therefore, to use a card-sorting exercise with a number of participants to capture their collective opinion and thereby avoid any such bias.

As previously discussed in Section 2.11, traditional card-sorting is just that: each participant is given cards with information on them, and is expected to collect them into piles, such that the participant judges that the cards in a pile are related in some way (Fossum & Haller, 2005). By getting a number of participants to complete the exercise it is possible to analyse their results to obtain a reliable collective grouping. This study used an on-line tool rather than physical cards, which meant a wide sample of participants could be used as well as simplifying the analysis. According to Tullis and Wood (2004), card sorting classifies the elements of an information system in a way that make sense to users. An online card sorting operation was created using WebSort [www.websort.net]. The task for the online card sorting was to generate categories for all problems identified in the interviews and focus groups in both studies (MALS and UKS). As reported in Chapter 3, there were a total of 167 problems identified in the interviews and focus groups.

The objective of this study was to generate categories of equivalent problems from the 167 problems identified in the interviews and focus groups in both studies (MALS and UKS).

4.2 Method

4.2.1 Participants

Sixteen participants took part in the online card sorting study. All of them were experts in the field of HCI, with backgrounds in computer science and psychology. Participants were recruited via email invitations through the British HCI and University of York HCI Research Group mailing lists. There was no personal data obtained from the participants since it was not required in this study.

4.2.2 Design

As mentioned above, an on-line card sort was created using WebSort. This was an open card sort, whereby participants were free to create and name their own categories and WebSort applies a syntactical analysis. (see Section 2.11).

The participants were provided with the raw descriptions of all 167 problems (Appendix M) identified in the original studies. A screenshot of the interface is available in Appendix L.

4.2.3 Procedure

The participants were required to enter their email address at the beginning of the task. Then, they were asked to group all problems into categories and to name each category with a word or words that describe the set of items it contains (Appendix K). They could also benefit from the simple drag-and-drop interface from WebSort to perform the task. Participants were able to complete the online card sorting in their own time.

4.2.4 Data Analysis

Average Linkage Cluster Analysis was used for the groupings in WebSort. Average linkage computes the syntactic distance between subgroups at each step as the average of the distances between the two subgroups.

One of the features available in WebSort is tree graphs. Tree graphs or dendograms can be produced to visually illustrate the groups of items based on participants' perceptions of their relationship (Appendix N). A dendrogram is a branching diagram illustrating the strength of relationships between items and between groups of items. In order to identify potential new groupings of information, dendograms are based on

clusters of items that are both 'distinct' and 'compact'. 'Distinctness' refers to the observation that the longer the distance between items or groups of items, the more distinct they are perceived to be from one another. 'Compactness' refers to the observation that the shorter the distance between two items or groups of items, the more similarity they share. The basis of the dendrogram is that at the leaves are all the original, uncategorized data (167 problems in this case) and at the root of the tree is a single category, encompassing all of the data[2]. The crux of the exercise is to identify the appropriate branching point in the tree, between these two extremes, which identifies real and meaningful categories. In this case there will be somewhere between 1 and 167 categories.

4.3 Results

Eighteen categories were proposed through the online card sorting and labelled according to different themes, as shown in Table 4.1.

[2] In practice, WebSort immediately reduced the number of problems to 151, identifying the distance between some of the problems as being zero

Table 4.1 - Eighteen categories

	CATEGORY
1	Health Concerns
2	Direct Translation and Jargon
3	Difficulties with Manuals
4	Charging Issues
5	Cost and Network
6	Misc 1
7	Short Form for Texting
8	Problems with Predictive Text Function
9	Sense of Familiarity
10	Misc 2
11	Speed Dial Complexity
12	Memory Problems
13	How to Learn using Mobile Phone
14	Functions Complexity
15	Hearing Difficulties
16	Visual Problems
17	Interface Problems
18	Misplace Problems

4.3.1 Effects of country, methods (focus groups and interview) and use of personas on the eighteen categories

The analysis was performed to investigate the effects of country, method of user requirements elicitation and personas on the eighteen categories generated from 167 problems identified by the participants in interviews and focus groups in relation to mobile phone usage in general.

A multivariate ANOVA was conducted to investigate the effects of Country (UK versus Malaysia), Method of user requirements elicitation (Focus Groups versus Interview) and the Use of Personas (Personas versus non Personas) on the eighteen categories generated from 167 problems elicited from participants.

The results of this analysis are summarized in Table 4.2.

Table 4.2- Multivariate analysis of Country, Method and Use of personas on total number of categories

Effect		Value	F	Hypothesis df	Error df	p
Country	Pillai's Trace	.831	15.577	18.000	57.000	.000
	Wilks' Lambda	.169	15.577	18.000	57.000	.000
	Hotelling's Trace	4.919	15.577	18.000	57.000	.000
	Roy's Largest Root	4.919	15.577	18.000	57.000	.000
Method	Pillai's Trace	.788	11.766	18.000	57.000	.000
	Wilks' Lambda	.212	11.766	18.000	57.000	.000
	Hotelling's Trace	3.716	11.766	18.000	57.000	.000
	Roy's Largest Root	3.716	11.766	18.000	57.000	.000
Persona	Pillai's Trace	.638	5.587	18.000	57.000	.000
	Wilks' Lambda	.362	5.587	18.000	57.000	.000
	Hotelling's Trace	1.764	5.587	18.000	57.000	.000
	Roy's Largest Root	1.764	5.587	18.000	57.000	.000
Country * Method	Pillai's Trace	.627	5.320	18.000	57.000	.000
	Wilks' Lambda	.373	5.320	18.000	57.000	.000
	Hotelling's Trace	1.680	5.320	18.000	57.000	.000
	Roy's Largest Root	1.680	5.320	18.000	57.000	.000
Country * Persona	Pillai's Trace	.633	5.471	18.000	57.000	.000
	Wilks' Lambda	.367	5.471	18.000	57.000	.000
	Hotelling's Trace	1.728	5.471	18.000	57.000	.000
	Roy's Largest Root	1.728	5.471	18.000	57.000	.000
Method * Persona	Pillai's Trace	.366	1.829	18.000	57.000	.044
	Wilks' Lambda	.634	1.829	18.000	57.000	.044
	Hotelling's Trace	.577	1.829	18.000	57.000	.044
	Roy's Largest Root	.577	1.829	18.000	57.000	.044
Country * Method * Persona	Pillai's Trace	.553	3.925	18.000	57.000	.000
	Wilks' Lambda	.447	3.925	18.000	57.000	.000
	Hotelling's Trace	1.240	3.925	18.000	57.000	.000
	Roy's Largest Root	1.240	3.925	18.000	57.000	.000

The results in Table 4.2 shows that there was a significant main effect for Country ($F = 15.58$, $p < 0.000$) on total number of categories produced. There was also a main effect for Method ($F = 11.77$, $p < 0.000$) and Persona ($F = 5.59$, $p < 0.000$) on total number of categories produced.

There was a significant interaction between Country and Method ($F = 5.32$, $p < 0.000$), Country and Persona ($F = 5.47$, $p < 0.000$) and Method and Persona ($F = 1.83$, $p < 0.04$) on total number of categories produced.

There was also a significant interaction among Country, Method and Persona ($F = 3.93$, $p < 0.000$) on total number of categories produced.

Results for the effects of Country, Method and Persona on the eighteen categories can be found in Appendix O.

Table 4.3 shows a summary of results for significant main effect for Country, Method and Personas among eighteen categories. The number of categories was reduced to 14 since there were no significant differences found on the other 4 categories (categories 6,9,13 and 18).

Table 4.3 - Results for Country, Method and Personas

(A '/' mark in the table indicates a significant effect)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Country	/	/	/				/	/		/	/	/		/				
Method		/		/	/			/				/		/	/	/	/	
Personas		/						/		/	/							

Table 4.4 indicates a summary of results for 14 categories of problems which show significant differences between the two countries and the country which showed the greater incidence of problems in conjunction with type of methods and personas used.

Table 4.4 - Country, Method and type of Personas

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Country	**M**	**M**	**UK**			**M**	**UK**	**UK**	**M**	**UK**	**UK**			
Method		**FG**		**FG**	**FG**		**FG**			**FG**	**FG**	**FG**	**FG**	**FG**
Personas		**NP**					**P**	**NP**	**P**					

M – Malaysia
UK – United Kingdom
FG – Focus Groups
P – Personas
NP – Non-Personas

Examples of problems which folded into each category based on direct quotes from the participants:

1) Health Concerns
    a. Mobile phone usage might have some effect (eg: brain cancer)
    b. Health issues – effect from using mobile phone (eg: brain cancer)

2) Direct Translation and Jargon
    a. Difficulties in understanding the functions using native language (eg: direct translation)
    b. Problem with jargon and terms, quite misleading

3) Difficulties with Manuals
    a. Problems with manual – could not understand and remember the instructions
    b. Manual – has to go through word by word

4) Charging Issues
    a. Problem with charging – battery indicator
    b. Have to check on daily basis to ensure that the battery is charged

5) Cost and Network
    a. Coverage issues especially in the rural area
    b. Cost is the issue (purchasing phone, service provider)

6) Short Form for texting
    a. Difficulty to understand short form text
    b. Inappropriate style of texting, hard to understand the meaning

7) Problems with Predictive Text Function
    a. Dislike predictive function when it changes everything instead of 1 letter
    b. Predictive function sometimes difficult when do not get the desired words

8) Miscellaneous
    a. Has to fiddle through contact to find own phone number
    b. Lack of usage and aging effect the usage of mobile phone

9) Speed Dial Complexity
    a. Speed dial function needs to be revised in terms of remembering the names assigned to each button

10) Memory Problems
    a. Having problems with remembering the functions
    b. Could not remember own phone number – stick the numbers at the back of mobile phone

11) Functions Complexity
    a. Does not understand some of the functions
    b. Current mobile phone has more functions than required – complicated

12) Hearing Difficulties
    a. Problem with volume and vibration
    b. Could not hear clearly

13) Visual Problems
    a. Unable to read the letters, characters and digits
    b. Numbers on the keypad are too small

14) Interface Problems

a. Difficulties using keypad, multiple characters per button

b. Having difficulties of pressing the character quickly while texting

4.4 Discussion

The aims of Study 2 were to determine whether the results in the previous studies (MALS and UKS) were a real effect that might be due to cultural differences, or whether they may be due to differences in the wording of problem descriptions. The explicit objective was to generate categories from 167 problems elicited from participants.

Initially, 18 categories were proposed through the online card sorting. Later, the number of problems identified was reduced to 14 categories (refer Table 4.5) since there were no significant differences found on the other 4 categories in terms of the effect for Country, Method (interview and focus groups) and Personas.

Table 4.5- Fourteen categories

C1	Health Concerns
C2	Direct Translation and Jargon
C3	Difficulties with Manuals
C4	Charging Issues
C5	Cost and Network
C6	Short Form for Texting
C7	Problems with Predictive Text Function
C8	Miscellaneous
C9	Speed Dial Complexity
C10	Memory Problems
C11	Functions Complexity
C12	Hearing Difficulties
C13	Visual Problems
C14	Interface Problems

A number of significant differences were found between the two countries in these categories, as listed below in Table 4.6 (with an indication as to which country had more problems of the type).

Table 4.6 - Category descriptions and indication of which country reported more problems

C1	Health concerns	M
C2	Direct translation and jargon	M
C3	Difficulties with manuals	UK
C6	Short form for texting	M
C7	Problems with predictive text function	UK
C8	Miscellaneous	UK
C9	Speed dial complexity	M
C10	Memory problems	UK
C11	Functions complexity	UK

C8 (Miscellaneous) seems to be an anomalous category generated in the card sorting. There were three problems reported:

a. "Has to fiddle through contact to find own phone number."

b. "Lack of usage and aging effect the usage of mobile phone."

c. "Feel awkward to use mobile phone. I cannot remember how to switch it on."

There is no commonality between the problems listed and therefore this category has been eliminated.

Meanwhile, all of the problems for C2, C3, C6 and C7, appear to be language-related. They are thus important, but do not relate to any cultural differences as such. With regard to C7, predictive texting is not available in the Malay Language, so it is no surprise that the UK users should have more problems with it.

The following categories were clearly not culturally related and so were also eliminated from further analysis:

C4: Charging issues

C5: Cost and network

C12: Hearing difficulties

C13: Visual problems

C14: Interface problems

So, from the original 14 categories which demonstrated differences between countries, four (C1, C9, C10 and C11) remained which might be due to cultural differences. For C1, there were two potential health problems listed by Malaysian participants and none by UK participants. Below are two examples described by the participants:

- "I think if you use a mobile phone for quite a long time, it might have some effect on you such as brain cancer."
- "I heard that it might lead to brain cancer if you use it frequently."

For C9, there were no problems raised by UK participants, but were two raised by Malaysian participants. It appears that the UK participants did not use speed dialling, and hence had no problems. These are two examples reported by some participants:

- "Speed dial function needs to be revised in terms of remembering the names assigned to each button."
- "I do not use speed dial function anymore because I could not remember the names assigned to each button. I prefer to use scroll down contact."

The other two categories (C10 and C11) were about memory problems and function complexity. These two categories looked worthy of further investigation. Below are reported problems associated with memory issues and function complexity.

Problems related to Memory Issues:

- Knows how to use speed dial but sometimes forgets, especially during emergency
- Forgotten how to use speed dial even for simple call due to irregular use
- Having problems with remembering the functions

  – location of the button for assigned functions
- Could not remember own phone number

  – store in address book in mobile phone

  – stick the numbers on the back of mobile phone
- Cannot recall own phone number
- Forgot how to use some functions

  – needs to write instructions on the back as label

Problems related to Function Complexity:

- Don't know about the functions /features available in the mobile phone
- Very rare to use mobile phone due to its complexity
- Heading functions and title quite complicated
- Does not understand some of the functions
- Current mobile phone has more functions than required
- Finds it far too sophisticated

  - unnecessary functions
- Lost in navigating through functions
- Menus are complicated
- Deeply driven menu

4.5 Summary

Card-sorting was employed to obtain a set of categories describing all of the problems, based on a consensus of 16 participants. As a result, 18 categories were identified. Four of them showed no differences so the number of categories was reduced to 14. Of those, 10 categories could be explained by non-culturally-related differences. This leaves just 4 categories that are unexplained (refer Table 4.7). These might be indicative of cultural differences and hence worthy of further investigation to ascertain whether they are truly culturally related. Thus, Study 3 was carried out, which is discussed in Chapter 5.

Table 4.7- Categories of problems which show a difference between the two countries and the country which showed the greater incidence

Category	Country
Health Concerns	Malaysia
Speed Dial Complexity	Malaysia
Memory Problems	UK
Function Complexity	UK

Chapter 5

Study 3: Focus Groups and Questionnaire

5.1 Introduction

Results produced in Study 2 (Chapter 4) seemed to prompt further research aimed at clarifying whether the differences are truly culturally-related. There were four categories of problems which showed a difference between the two countries and the country which showed the greater incidence. Those categories were:

1. Health Concerns
2. Speed Dial Complexity
3. Memory Problems
4. Functions Complexity

Having determined (Chapter 3) that focus group is the most productive method, the ideal would have been to carry out further focus groups in both countries. However, time and money were not available to run focus groups in Malaysia and therefore questionnaires (paper and on-line) were used to probe these areas in Malaysia, while focus groups and questionnaires were used in the UK. The objective was to drill down into the areas covered by the four categories and ascertain the causes of the differences.

Focus group discussions were conducted in the UK only, while a questionnaire was distributed to participants in both countries: the UK and Malaysia. Details of study 3 will be discussed in this chapter.

The main objective of this study was:

- To clarify whether the differences found in Study 2 are truly culturally-related

5.2 Method

5.2.1 Participants

Eleven participants from the UK took part in focus group sessions, 5 females and 6 males. Three focus groups (refer Table 5.1) were formed in the UK with a minimum of 3 persons and a maximum of 4 persons in each group. All participants were retirees and recruited through organizations for older people such as The University of the Third Age (U3A).

In the case of the questionnaire (refer Table 5.1), 47 participants took part in Malaysia, 7 females and 40 males, and all were members of the Government Retiree Club, while in the UK 34 participants were involved, 19 females and 15 males. They were recruited through organizations for older people such as The University of the Third Age (U3A) and Hackney Silver Surfers.

Table 5.1- Number of participants (Ps) for both methods

Country	Focus Group	Questionnaire
Malaysia	0	47 Ps
UK	3 groups 11 Ps	34 Ps

Older people were identified in the two countries according to the respective retirement age, 58 in Malaysia and 65 in the UK. For focus group sessions in the UK, participants' ages ranged from 66 to 91 years of age, giving a mean age of 76 years. Meanwhile in the case of the questionnaire, participants' ages in Malaysia ranged from 58 to 81 years of age, giving a mean age of 66 years, whereas participants' ages in the UK ranged from 66 to 91 years of age, giving a mean age of 75 years. An additional requirement was that the participants owned a mobile phone and had some experience of using it.

All participants for the questionnaire were retirees. Twenty-three participants from UK were married and living independently with their spouse, 5 were either single/divorced, six participants were widowed. Table 5.2 provides the number of participants for highest education attainment for the UK.

Table 5.2 – Number of participants in the UK

Highest education attainment	no
- Secondary School	13
- Degree	5
- Post-graduate/Professional Certificate	8
- Others	8

In Malaysia, thirty-seven participants were married and living independently with their spouse, ten participants were widowed. Table 5.3 provides the number of participants for race, highest education attainment and language preference in Malaysia.

All participants were classified as fit because they still considered themselves able to perform daily routines independently, with significantly different needs and wants due to the stage of their lives they had reached.

Table 5.3 – Number of participants in Malaysia

Race:	no
- Malay	36
- Chinese	2
- Indian	9

Highest education attainment	
- Secondary School (Form 1 - 2)	4
- LCE	10
- GCE	18
- Certificate/Diploma	5
- Degree	5
- Post-graduate/Professional Certificate	5

Language Preference in everyday life:	
- Malay	24
- English	1
- Malay and English	14
- Malay and Tamil/Urdu	2
- English and Tamil/Urdu	1
- Malay, English and Mandarin	1
- Malay, English and Tamil/Urdu	4

5.2.2 Design

Focus Group

Focus group sessions were held in the UK to discuss the four categories before probing into these categories by means of questionnaires. Although it was clear that focus groups are the best method with this group, the researcher decided to proceed with the questionnaire. As explained, this was purely pragmatic due to problems in terms of time and money constraints.

A focus group discussion outline (Appendix P) was prepared to cater for the four categories mentioned earlier in the chapter. The focus group schedule consisted of 5 categories, which were grouped under the following sections:

(i) Health Concerns

(ii) Speed Dial

(iii) Memory

(iv) Function Complexity

All questions had been examined and verified in a pilot study. No adjustments were made to the questions.

Questionnaire

A set of questions (Appendix Q) was prepared for the participants in an attempt to achieve the same objectives and also to reach other audiences, especially those in Malaysia. It consisted of a total of 23 questions. The questions were divided into two types, namely close-ended questions and

open-ended questions. These questions were classified under the following sections:

(i) Demographic information

(ii) Health Concerns

(iii) Speed Dial

(iv) Memory

(v) Function Complexity

The demographic information section consisted of questions relating to age, gender, employment status, marital status and highest education attainment. Questions related to race and language preference were also included in the questionnaire (Appendix R) for Malaysian participants.

Section 1 included inquiries on health concerns. The questions in this section were designed in two different formats. There were some questions demanding a 'yes' or 'no' answer, and others were open-ended questions. Section 2 consisted of inquiries related to speed dial complexity.

All questions demanding a 'yes' or 'no' answer. Section 3 was about memory problems and the participants were asked whether they were able to remember their own mobile phone number and how they managed. They were also asked whether they had encountered any problems remembering how to use their mobile phone and whether they used any memory aids on their mobile phone. The questions in this section were designed in two different formats. There were some questions demanding a 'yes' or 'no' answer, and others were open-ended questions. Finally, Section 4 consisted of inquiries related to function complexity. In this section, the questions were a combination of open-ended questions and also questions

with a 'yes' or 'no' answer. The questionnaire was available in the English and Malay languages. It was also available in two versions: paper and online (http://mp-oldpeople.questionpro.com/).

5.2.3 Procedure

Focus Group

Two of the UK focus groups sessions took place in a room at the Computer Science Department, University of York and one session was held at a café.

Before the focus group sessions began, participants were briefed about the nature of the study. Next, participants were asked if they had any questions, and then to read and fill out the consent form and were informed that they could withdraw from the study at any time (Appendix D). All participants were requested to bring their own mobile phone and other supporting aids that they would like to share, such as instruction manuals and note book or diary for storing names and numbers. During the focus groups sessions, questions were asked in sequence. In total the sessions lasted between 45 and 70 minutes each, including the time to read the briefing and debriefing. Participants were reassured that the focus groups would be completely confidential. The researcher audio-recorded all sessions for transcription and data analysis purposes.

Questionnaire

The questionnaire was distributed to all participants in Malaysia during the retiree club Annual General Meeting that took place in April 2010. Meanwhile in the UK, the questionnaires were mailed to all participants that had been involved in the previous study and invitations were also sent out via email to participate in the online version.

5.2.4 Data Analysis

For the first part of the analysis, the researcher reviewed all transcriptions. The data for all participants from the focus group sessions was analysed using content analysis (refer Section 2.9) and were classified according to four major categories as discussed earlier. For the second part of the analysis, a Chi-square test was conducted to compare preferences for each individual in the questionnaire for all 'yes' and 'no' questions at $p < .05$.

5.3 Results

5.3.1 Detailed descriptions of qualitative results from the focus groups

Examples of problems which folded into each category based on direct quotes from the participants:

1) Health concerns

- Most participants were not worried about the effect on their health of using a mobile phone, but were more concerned about younger generations. These are some examples:

- "I suspect that a horrific amount of use, particularly with younger people, can be a problem. The amount that I use a mobile phone is such that I am not concerned. Does not worry me. If I am using it everyday, but many many times, I think I will be concerned"

- "Well, I mean, I am not particularly bothered as far as I am concerned. And I suppose looking at it at the moment, the bottom of majority, let's say people over 60, do not tend to use the mobile phone to anything like the same degree as the teenagers do. And, I

think it is the extra use - probably a far greater worry than the amount we use it".

2) Speed Dial Complexity

- Difficulties with speed dial. These are some examples:

- "I have to look up the book just to know how to set up a new number"
- "When I ring it, nothing happened. I just found out that I had to press the button longer"

3) Memory Problems

- The need for memory aids. These are some examples:

- "I normally carry a diary and in the diary, all the family's mobile numbers and fixed line numbers"
- "My numbers do show in the mobile phone anyway but it is old and it took a long time to get into it. I will use my diary in my pocket to look up the number"

4) Function Complexity

- Some participants preferred not to use the mobile phone but to use a computer or other electronic device (eg: digital camera) for other features even though they were available in the mobile phone. This was because of the complexity of the operation on the mobile phone. These are some examples:

- "Mine is a very simple phone this time. Last one was a little bit more complicated. It has a lot of features on it which I won't use. Just a simple phone. However, one of my friends down in Norfolk got - it is like a computer and it is very very complicated - and

finding your way on the map. I don't find that totally easy, I have tried using it but I prefer to use a computer for this little thing."

- "I tend to use email because it expands out as much as you want"
- "I prefer to take my own digital photos, and use other sources for music; I intend to use the organizer function when I find time to work out how it works (in the complete absence of any instructions)"

5.3.2 Chi-square analysis

5.3.2.1 Health concerns

These are the questions asked in the questionnaire under first section.

Question 1.1 – Are you worried that using a mobile phone might affect your health?

Only 20.6% of UK participants were worried about mobile phone effect, whereas 43.5% of Malaysian participants were worried that using mobile phone might affect their health. This difference was statistically significant (Chi- Square = 4.58, $p < 0.032$).

Question 1.2 – What effects do you think mobile phones might have on health?

Below is the compilation of answers obtained for open-ended question 1.2:

Malaysia
Brain cancer
Brain disease
Might affect hearing
Might be deaf if use too often
Ear pain when using it for too long
Mental illness in long run
Radiation
Electrocuted
UK
Brain damage
Headaches if used inappropriately
Ear problems
Stress
Possibility that prolonged use of mobile phone might cause brain tumors

Question 1.3 – Have you seen any articles or news about health and mobile phones?

No significant differences were found between the two countries (Chi- Square = 2.13, n.s.) for this question.

5.3.2.2 Speed dial complexity

These are the questions asked in the questionnaire under second section.

Question 2.1 – Do you know what speed dial is?

Only 19.6% of Malaysian participants knew about speed dial compared to 55.9% of UK participants. This difference was statistically significant (Chi- Square = 11.3, $p < 0.001$).

Question 2.2 – Do you know how to use the speed dial function?

Only 13% of Malaysian participants knew how to use speed dial compared to 44.1% of UK participants. This difference was statistically significant (Chi- Square = 9.75, $p < 0.002$).

Question 2.3 – Do you use speed dial?

Only 10.9% of Malaysian participants used speed dial compared to 30.3% of UK participants. This difference was statistically significant (Chi-Square = 4.72, $p < 0.030$).

Question 2.4 – Do you find speed dial convenient to use?

Only 13% of Malaysian participants found speed dial was convenient to use compared to 32.4% of UK participants. This difference was statistically significant (Chi- Square = 4.36, $p < 0.037$).

5.3.2.3 Memory problems

These are the questions asked in the questionnaire under Section 3.

Question 3.1 – Can you remember your own mobile phone number?

Only 29.4% of UK participants could remember their own mobile phone number compared to 77.8% of Malaysian participants. This difference was statistically significant (Chi- Square = 18.5, $p < 0.000$).

Question 3.2 – If no to Question 3.1, how do you manage?

Below is the compilation of answers obtained for open-ended question 3.2:

Malaysia
Write in small note book
Note in diary
Notes in wallet
Ask people
Seek help from children
Wait for people to call
UK
Write in a small note book/ address book
Check in the phonebook on the mobile phone
Note on diary
Notes or a card in wallet
Write and stick number onto reverse of mobile phone

Question 3.3 – Do you ever have problems remembering how to use your mobile phone?

No significant differences were found between the two countries (Chi- Square = 0.238, n.s.).

5.3.2.4 Function complexity

These are the questions asked in the questionnaire under last section.

Question 4.1 – Do you both make and receive calls on your phone?

No significant differences were found between the two countries (Chi- Square = 3.14, n.s.).

Question 4.4 – Do you use a mobile phone for anything else other than making and/or receiving calls? Please make a list.

Below is the compilation of answers obtained for open-ended question 4.4:

Malaysia
Taking notes
Connecting to the internet
Radio
Taking photos
Text (sms and mms)
Storing reminder
Recording
Radio
UK
Connecting to the internet, google and wikipanion
Voicemail, call log
GPS travel
Taking photos
Email, Text
Storing reminder, date and personal details
Calendar, calculator, to do list
Torch, Games
Currency exchange
Checking bank accounts
Music and video
Audio books
Record of phone numbers and addresses
Speaking clock, stopwatch
Browsing web to check for sport, news and finding shops
Loudspeaker function
Memory jogger – useful for dates and times

Question 4.5 – Can you think of any other things that your mobile phone can do?

Below is the compilation of answers obtained for open-ended question 4.5:

Malaysia
Health information
Prayer times for Muslims
Wake up call
Taking photos
Storing information
Calculator
UK
Taking photos
Storing information
Calculator
Flash light clock
Email
Browsing Internet
Text
Torch
Radio
Games
Stopwatch
Call divert
Alarm

Question 4.6 – Do you do any of those things that you have mentioned in Question 4.5? If not, why not?

Below is the compilation of answers obtained for open-ended question 4.6:

Malaysia
Does not use mobile phone often
Prefers to use fixed line phone
Prefers to use computer
Is not aware of the functions provided in the mobile phone
UK
Does not use mobile phone often
Prefers to use fixed line phone (large buttons and hand-free)
Prefers to use computer or laptop for other applications
Prefers to use digital camera for taking photos
Lack of time
Due to ageing, laziness and ignorance
Had not yet explored since just had the mobile phone for a short time

5.4 Discussion of the results

This chapter has presented a study investigating whether the differences found in Study 2 are truly culturally-related. Four categories have been proposed for further investigation based on the results from the previous study (Study 2).

In the Health Concerns category, in Study 2 two potential health problems were listed by Malaysian participants and none by UK participants. The results from this study showed that there was a significant difference between the two countries. More Malaysian participants were worried that using a mobile phone might affect their health compared to

the UK. It was reported in the study conducted by Eisma et. al, (2003) that older people view and attitude towards technology are often based on a limited number of experiences such as personal stories from friends and families, and information gathered through mass media. It seems that this is not the case since no significant differences were found between the two countries in terms of the effects of the mass media in providing information on health and mobile phones. Study 2 suggested that Malaysians had more concerns about the possible effects of mobile phone use on health. This study supports that result, it seems there is a genuinely greater concern about health. One hypothesis as to why this might be is that health effects might have featured more in the Malaysian media, but it would see not to be the case from question 1.3. That leaves the possibility open that this difference has some deeper, cultural cause.

In the second category, Speed Dial Complexity, no problems were raised by UK participants, but there were two raised by Malaysian participants in the second study. The results from Study 3 indicated that there was a significant difference between the two countries. Though most of the Malaysian participants did not know about speed dial, there were still a small number of participants who did know about speed dial usage and reported on its complexity. Study 2 suggested that Malaysians knew about speed dial usage and its complexity compared to the UK. On the contrary, the results of this study indicate that there were more responses in the UK that the participants knew about speed dial function than Malaysia. There is a possibility in the case of UK participants, they might have heard about speed dial during the interview or focus group session conducted in Study 1, since some of them were involved in the questionnaire for Study 3. In terms of speed dial function, usage and convenience, the results were similar in both countries. In the third category, Memory Problems, more

problems were raised by UK participants compared to Malaysian in Study 2. This study supports those results. A significant difference was found between the two countries for Memory Problems, where more Malaysian participants could remember their own mobile phone number compared to UK participants. In the Functions Complexity category, in Study 2 more problems were raised by UK participants compared to Malaysian. Study 2 suggested that both Malaysian and the UK participants had some problems related to functions complexity. Nevertheless, no significant result was found from this study for Functions Complexity.

All these results indicate that there are small but significant differences between the two countries in the three categories: Health Concerns, Speed Dial Complexity and Memory Problems where there were cultural differences.

It seems that this work has merely scratched the surface on some of the questions raised about culture. Some of those differences are evidently due to language problems, but the remainder must be indicative of cultural differences.

5.5 Discussion of culture

At the outset of the research there seemed to be a clear picture as to the nature of culture, in relation to this research, as reflected in Chapter 2. However, in the light of these results, it is apparent that this model was inadequate, which prompts the question: What is a culture? There has been considerable theoretical debate by anthropologists about definitions for culture. Bodley, 1994 used the term 'culture' to refer collectively to a society and its way of life or to human culture entirely. Table 5.4 showed diverse definitions of culture simplified by Bodley, 1994. It is apparent from this list that 'culture' can be many different things in different contexts. Yet, it is

apparent that none of the definitions in this table could be adopted in order to (easily) explain the differences listed above that have been uncovered in this research.

For Hall (1990), culture as a whole is a form of communication that is so deep that is often beyond the conscious awareness. In fact, culture is considered as a pattern of basic assumptions – invented, discovered, or developed by a given group (Schein, 1992). In other words, it may have been naive to have thought that culture could be adequately accommodated in research such as this. As will be discussed in Chapter 7, there is much scope for more research on culture in the hope of making it more amenable in studies such as this.

Table 5.4– Diverse definitions of culture

Topical	Culture consists of everything on a list of topics, or categories, such as social organization, religion, or economy
Historical	Culture is social heritage, or tradition, that is passed on to future generations
Behavioural	Culture is shared, learned human behavior, a way of life
Normative	Culture is ideals, values or rules for living
Functional	Culture is the way human solve problems of adapting to the environment or living together
Mental	Culture is a complex of ideas or learned habits, that inhibit impulses and distinguish people from animals
Structural	Culture consists of patterned and interrelated ideas, symbols or behaviors
Symbolic	Culture is based on arbitrarily assigned meanings that are shared by a society

At this point, it seemed that the author has a clear idea of how culture can be more complex that what she imagined. She was able to

demonstrate that culture can be more complex based from the works that she has conducted. Nevertheless, the author has not been able to demonstrate on what aspects of culture in this context.

5.6 Limitations

There were some other limitations in the studies in this Chapter. First, the sample sizes were small. Furthermore, while it might be argued that the participants were not representative of the population at large (being quite educated, middle to upper class and very familiar with mobile phones), it could be said that they were representative of the population of older mobile phone users. It might be said that this study has concentrated on 'early adopters' in the older population and that, as mobile phone use continues to expand, there will be a need to also accommodate the broader, mainstream user.

Also it is possible that the answers obtained might be influenced by the specific designs of the mobile phones and corresponded to the particular mobile phone models used by the participants. All participants in both countries were retirees, but the difference in retirement age in the two countries meant that those in Malaysia were younger than UK participants. This may have had some influence in terms of mobile phone perception and usage.

Finally, there was limited space provided to answer in the open-ended questions in the paper-based type of questionnaire than in the online version, which might deter people from providing more detailed answers.

5.7 Summary and Conclusions

The objective of Study 3 was to clarify whether the differences found in Study 2 are truly culturally-related. There were four categories of problems which showed a difference between the two countries and the country which showed the greater incidence. The categories were Health Concern, Speed Dial Complexity, Memory Problems and Functions Complexity.

In terms of Health Concern, more Malaysian participants were worried that using a mobile phone might affect their health compared to the UK. There were more responses in the UK that the participants knew about speed dial function than Malaysia for Speed Dial Complexity. In the third category, Memory Problems, more problems were raised by UK participants compared to Malaysian. Nevertheless, no significant result was found from this study for Functions Complexity.

It can be established that there are small but significant differences in three categories: Health Concern, Speed Dial Complexity and Memory Problems. In all of these, there were cultural differences.

Chapter 6

Mobile Phone Findings

6.1 Introduction

The focus of this thesis is on research methods, which methods yield the best information from older people. However, in investigating those methods, information has been obtained about this population's use of mobile phones. This chapter reports those findings. The findings have been classified into 7 different categories:

1) Usage patterns

2) Difficulties encountered with the physical interface of the mobile phone

3) Function complexity

4) Cost

5) Language-related,

6) Ideal phone

7) Other issues

6.2 Usage Patterns

The majority of the participants in Malaysia (94.4%) and the UK (95.6%) used a mobile phone for communication (making and receiving phone calls). There was a small number of older people in both countries

who only used a mobile phone to receive calls. Apart from using it for voice communications, some participants also used text or SMS (Short Messaging System). Most of the participants in both countries were using their mobile to contact their family members and friends when they were out, and preferred to use a landline phone while at home. They stated that other reasons for using a mobile phone apart from for social communication were for emergency and safety purposes when they were travelling alone.

6.3 Difficulties Encountered with the Physical Interface of the Mobile Phone

Participants in both countries reported that they were having difficulties using the mobile phone keypad because of the multiple characters per button (eg: 3 characters per button). It also seemed that the characters on the keypad were too small. The small size was also a problem with relation to pressing small buttons. In particular, some male participants stated that it was too hard to press the buttons due to the physical size of male fingers. Participants who suffered from arthritis reported that they were having difficulties pressing the buttons due to their condition.

Participants also reported that the small screen size was a problem. Another issue raised was the difficulties of using a touch screen; some participants in Malaysia were having problems with selection and required the assistance of an input stick.

Apart from saying that the font was small and not clearly visible, participants reported that they were having problems with the screen background colour. For example, a black font on an orange background did not work for some of them. The colours on the keypad sometimes caused

further problems. There were instances in which the keypad and the labels were different shades of the same colour (silver). In addition, some participants were not able to see the characters on mobile phones with a silver keypad in direct sunlight.

6.4 Function Complexity

Some participants in Malaysia reported that they were having difficulties with the speed dial function and recommended that the function should be revised. Some participants in both countries said that text functions were complicated. For instance, "Texting functions are complicated and that discourages me from using it at all" and "Hidden functions that are used for texting are annoying and a waste of time. I need to do 7 presses just to select symbol".

The predictive text function was also considered too problematic for them. This was especially true for Malaysian participants since it was not available in their native language (Malay) but only available in English. Further details about language-related problems will be discussed in Section 6.6.

These are some examples given by the UK participants regarding difficulties related to the predictive text function:

- "I dislike the predictive function when it changes everything instead of 1 letter"
- "The predictive function is sometimes difficult when I do not get the desired words"

6.5 Cost

Cost plays an important role for participants in both countries. Most of the participants in Malaysia and the UK preferred to purchase the cheapest mobile phone with minimal functions. Nevertheless, there were some participants in both countries who would spend more to purchase mobile phones that have additional features like a camera, email and internet. All the UK participants were using Pay as you Go. The cost varied from £5.00 per month to £10.00 for three months. In one case, a participant spent only £10.00 on call charges over two years. In addition, the participants in both countries emphasized the expiry date issue for 'pay as you go', where in a few cases the remaining credits were not available since the time had expired. In contrast, most of the Malaysian participants were on contract and the cost varied among service providers. They complained about the 'ridiculous' charges in their bills due to unannounced increases in charges or hidden charges applied to their account.

Overall, there were 3 important features relating to cost that were highlighted by the participants:

1) cost in terms of purchasing used or new mobile phones

2) choice of payment plan (contract or Pay as you Go)

3) which service provider offers the best deal

6.6 Language-related

Some Malaysian participants had difficulties in understanding the functions using their native language and preferred to use English. This was due to the direct translation from English to Malay, where in many cases the word did not make sense to them and was hard for them to

understand. There were also attempts made to swap languages from Malay to English and vice versa in order to capture the meaning. There was also no predictive text function available in Malay, which prevented the participants from making full use of texting functions.

Most participants in both countries reported similar experiences in two respects: difficulties with manuals and difficulties in understanding abbreviations (short forms) for texting. They considered that manuals were hard to read and thus difficult for them to understand. They claimed that they contained jargon that was hard to figure out and not intuitive to users. Most of the time, they would seek help from family members and friends. Below are some examples given by the participants:

- "Manuals come out with a specific word for which I need a special dictionary". (UK)
- "I find it translated badly and it does not make sense. I have to go through word by word". (UK)
- "I have problems understanding the instructions; just use simple language". (UK)
- "I am having difficulties with the manual. The writer assumes that the users know and does not give step by step instructions". (Malaysia)
- "The manual is hard. There are language difficulties and assumptions made. I seek help from children". (UK)
- "I do not find it easy to use the manual. It is quite confusing". (Malaysia)
- "Manuals are useless. The instructions are not clear, they are hard and use words that I can't understand. It is just like learning another language". (UK)

Participants also expressed their concerns regarding the inappropriate style of texting in terms of abbreviations and short forms, where they found it hard to understand the meaning. Some of the

participants were aware of the current style of texting which was popular among the younger generations. They preferred to use proper words for texting.

6.7 Ideal Phone

Participants in Malaysia and the UK suggested some features in terms of design improvements for their ideal phone. Below are the compilations of features, based on several classifications:

1) Screen

- recommendation to use a magnifier
- bigger screen

2) Size

- Medium size
- Size that ideally fits into a pocket
- Firm and easy to grab

3) Weight

- Light

4) Keypad

- Broader and thinner
- Slim
- Sliding keypad (to avoid accidentally pressing the button)
- Bigger font and characters on the keypad

- Large lettering on a light background
- Easier mechanisms for input. In particular, it was suggested that a special key could be used to switch between letter and digit mode to ease the input of numbers.
- Characters on the keypad should be clearly visible, especially in the dark and at night time

5) Button

- Bigger buttons
- Distance between buttons
- Similar to landline buttons' arrangement
- One character per button

6) Volume and vibration

- Louder volume
- Stronger vibration

7) Low battery indicator

It is significant that for the most part when describing their ideal phone most people did not ask for additional features, but rather most participants in both countries preferred a simple phone with less complicated functions. In fact, some suggested that they should be able to customize their phone to include only the functions that they want. Some participants did suggest additional features. These included suggestions by UK participants of texting by voice and written instructions attached to the phone.

6.8 Other issues

A large number of potential health problems were listed by Malaysian participants and none by UK participants. The Malaysian participants expressed their concern that mobile phone usage might have some effect on them such as brain cancer, exposure to radiation and ear pain after extended use of the mobile phone. It was expected that the UK participants would be raising issues related to Health as reported in a study conducted by Kurniawan, 2006 like brain cancer and other health problem (eg: RSI). Nevertheless, the finding indicated that the UK participants in Study 1 did not raise any issues related to Health.

More problems relating to memory issues and function complexity were reported in the UK. A common memory problem reported by participants in both countries was the inability to remember their own phone number. Most of the participants preferred to store their own number in the address book in their mobile phone. Other alternatives were to stick their numbers on the back of the phone, carry notes or a card in their wallet and write in a small note book or diary (consistent with Lee, 2007).

More problems were reported in the UK relating to the mobile phone menu in terms of function complexity; the majority of participants in both countries found that mobile phone menus were complicated and sometimes they got lost navigating through the functions due to a deeply driven menu. The findings were consistent with a study conducted by Ziefle and Bay, 2004 where the results indicated that the nature of the mobile phone menu needs to be made more transparent.

Some UK participants expressed their frustrations about function names. For instance, the address book might be referred to as an 'address book', or 'contacts'. Some phones even had a 'miscellaneous' heading under which such diverse functions as calendars and calculators were listed. Similar frustrations were also expressed by Malaysian participants who found that the heading functions and title were further complicated due to direct translation and did not make any sense to them. Most participants in both countries were aware that their current mobile phone had more functions than they used, but were not interested in functions other than making/receiving calls and texting. The findings were similar with Kurniawan, (2008) where the participants would rarely use functions beyond making/receiving voice calls and texting.

The majority of the participants in both countries complained about the inappropriate use of mobile phones in public. They were annoyed about the current use of mobile phones, which invaded other people's privacy through loud conversation in the bus, train or tube.

6.9 Discussion

The findings reported in this chapter highlighted several issues that were important for older people. While some of these issues (usage patterns, difficulties encountered with the physical interface of the mobile phone, function complexity, cost and ideal phone) have been highlighted in other studies conducted by other researchers (Kurniawan, 2006; Kurniawan, Mahmud and Nugroho, 2006; and Hassan and Md Nasir, 2008), it was still interesting to discover unexpected issues. For example, in Malaysia, issues such as difficulties with the language (direct translation), speed dial complexities and health concerns were highlighted and discussed.

Another interesting issue was mobile phone etiquette where the majority of the participants in Malaysia and the UK complained about the inappropriate use of mobile phones in public. Participants considered the issue as negative effects of using mobile phone (Kurniawan, 2008). The majority of participants in both countries also expressed their concern regarding the inappropriate style of texting; they found it hard to understand the meaning of text language and short forms. Participants believed that the inappropriate style of texting can ruined people's literacy (Kurniawan, Mahmud and Nugroho, 2006). They were also frustrated with manuals, finding them to be very complicated and filled with jargon and terms that were quite misleading (consistent with Kurniawan, 2006, Kurniawan, Mahmud and Nugroho, 2006 and Eisma et. al, 2003). Further evidence on these issues has been demonstrated and discussed throughout the chapter. The information was gathered through the three studies conducted using three methods: focus groups, interviews and questionnaires. Participants in both countries were able to elaborate and explain their answers in depth. Furthermore, the findings produced new insights into issues such as health concerns and difficulties with language which have not been captured in other studies of mobile phone usage by older people in Malaysia.

There were some other limitations in the studies. First, the sample sizes were small. Furthermore, while it might be argued that the participants were not representative of the population at large (being quite educated, middle to upper class and very familiar with mobile phones), it could be said that they were representative of the population of older mobile phone users. It might be said that this study has concentrated on 'early adopters' in the older population and that, as mobile phone use

continues to expand, there will be a need to also accommodate the broader, mainstream user.

Also it is possible that the number of problems reported might be influenced by the specific designs of the mobile phones and corresponded to the particular mobile phone models used by the participants. All participants in both countries were retirees, but the difference in retirement age in the two countries meant that those in Malaysia were younger than UK participants. This may have had some influence in terms of mobile phone perception and usage.

6.10 Summary and Conclusions

The findings in this chapter have been classified into 7 different categories. The categories were 1) Usage patterns, 2) Difficulties encountered with the physical interface of the mobile phone, 3) Functions complexity, 4) Cost, 5) Language-related, 6) Ideal phone and 7) Other issues.

In terms of usage patterns, apart from social communication, the other reason for using a mobile phone would be for emergency and safety purposes. Participants in both countries reported that they were having difficulties related to keypad, screen size and background colour. Some participants in Malaysia had difficulties with the speed dial function and found that predictive text function to be problematic. There were 3 important features relating to cost were highlighted by the participants: cost in terms of purchasing used or new mobile phones, choice of payment plan and which service provider offers the best deal. Some Malaysian participants had difficulties in understanding the functions using native language. Most of the participants in both countries also had difficulties with manuals and abbreviations for texting. Participants in both countries

suggested some features in terms of design improvements such as recommendation to use a magnifier, medium size mobile phone, light size and large lettering on a light background.

The findings presented in this chapter may have implications for the design of mobile phones in general. It may be concluded that the usability of current mobile phones has to be enhanced in order to cater for the needs of other groups of users, including older people.

Chapter 7

Conclusions

7.1 Introduction

This concluding chapter gives a brief overview of the studies conducted, how this work has made a contribution to knowledge and recommendation for future research are given.

7.2 Overview of the research

This research is related to the use of mobile technology by older people focusing at the appropriate methods for collecting data. Since older people differ from the 'typical' group of users, it is a great challenge to identify methods that are effective in terms of gathering older people's needs. At present, there are many different methods of data collection available in terms of user requirements for mobile technology. However, not all the methods are suitable to use in the context of involving older people as participants. The process of acquiring user requirements data from older people is therefore not a straightforward process. This is due to the fact that older people have an extremely wide range of characteristics and impairments compared to other groups of participants. In fact, there is a need for an evaluation of existing methods with respect to older people, who vary in cultural and other aspects such as aging effects and cognitive complexity.

This thesis has reported on three studies conducted in Malaysia and the UK. For the first study, two similar studies have been carried out, in

Malaysia and the UK. These studies focused on talking methods that were interviews and focus groups. In addition, the use of personas as a tool in elicitation has been explored. A questionnaire was also prepared for the participants in an attempt to achieve the same objectives from different perspectives as discussed earlier in Chapter 3. The results showed focus groups yielded more problems compared to interviews and this difference was far bigger in the UK. In terms of the effect of personas, more problems were produced with personas than without personas in Malaysia, but in the UK, it is in the opposite direction, with more problems elicited without personas than with personas. There were no significant differences for design improvements or additional features. Nevertheless, there were significant differences found for problems reported in three methods: questionnaire, focus group and interview. It was also reported that majority of the participants prefer talking methods compared to a questionnaire. Based on the results, further analysis was carried out in a second study to ascertain whether the results were real effect that might be due to cultural differences. Next, in the second study, card sorting was conducted in order to generate categories from the 167 problems identified in the first study. The results yielded 4 categories that were used in the subsequent investigations. These categories were: Health Concerns, Speed Dial Complexity, Memory Problems and Function Complexity. There were differences in the numbers of problems reported in each of these categories in the two countries and the objective of the final study was to clarify whether the differences are truly culturally-related.

This study was based on focus groups and questionnaires. The focus groups were conducted only in the UK but questionnaires were distributed to participants in both countries. Results indicated that there was a significant difference between the two countries in terms of Health

Concerns. More Malaysian participants were worried that using a mobile phone might affect their health compared to the UK. In the second category, Speed Dial Complexity, results indicated that there was a significant difference between the two countries. Though most of the Malaysian participants did not know about speed dial, there were still a small number of participants who did know about speed dial usage and reported on its complexity. A significant difference was found between the two countries for Memory Problems, where more Malaysian participants could remember their own mobile phone number compared to UK participants.

7.3 Findings and contributions of this research

This research has been focused in two areas, and has made contributions to both of them. They are methods of requirements elicitation with older people and cultural differences in the use of mobile technology by that group.

In Chapter 3, the following objectives were set out:

1) To investigate whether there are differences between the expectations of Malaysian and UK older people with regard to mobile phones.

2) To investigate whether the two talking methods have different levels of effectiveness in the two countries.

3) To compare the talking methods against a non-talking method (specifically the questionnaire) in terms of method preferences.

4) To explore the use of personas as a tool in user requirement elicitation methods (in the context of interviews and focus groups).

5) To compare the costs and effectiveness of the three methods (interviews, focus groups and questionnaire).

To review the level of success, 1 and 4 can be treated separately (cultural comparisons and use of personas, respectively), but 2, 3 and 5 amount to different aspects of talking methods.

7.3.1 Cultural comparisons

The principal objective of this research is to investigate the utility of the different methods. The research has been carried out to investigate whether there are differences between the expectations of Malaysian and UK older people with regard to mobile phones. The findings highlighted several issues that were important for older people. For example, sense of familiarity was important to the majority of participants in both countries in terms of learning how to use mobile phone and also learning from the manuals. Another interesting issue was about mobile phone etiquette where majority of the participants in Malaysia and UK were complaining about the inappropriate use of mobile phones in public. The majority of participants in both countries also expressed their concern regarding inappropriate style of texting where they found it hard to understand the meaning in terms of text language and short form. They were also frustrated with manuals where they found them to be very complicated, filled with jargon and terms that were quite misleading. Meanwhile in Malaysia, issues such as difficulties with language (direct translation), speed dial complexities and health concerns were highlighted and discussed. Furthermore, new insights were produced from the findings such as health concerns and difficulties with language (direct translation) which have not been captured in other mobile phone study by older people in Malaysia. Another main contribution is that the author has uncovered culturally related differences between the use of mobile technologies (concentrating on the mobile phone) by older people in the two countries. Based on the results in Study 3 (Chapter 5), the author has managed to

establish that there were small but significant cultural differences in the effectiveness of these methods in the two countries.

7.3.2 Use of personas

The use of personas in the context of user requirements elicitation has been tested in the first study. Personas are used to personalise and engage the participants into discussion where they are able to be more open in providing feedbacks about mobile phone usage. Results indicated that personas do not have any effect on both methods (interviews and focus groups) in both countries.

7.3.3 Talking methods

The main contribution to knowledge has been the evaluation of three existing methods: focus groups, interviews and questionnaires in the context of mobile phone usage among older people. The research has been carried out to investigate whether the two talking methods have different levels of effectiveness in the two countries and also to compare the talking methods against a non-talking method (specifically the questionnaire) in terms of method preferences.

These methods were initially exploratory, gathering quantitative data through questionnaires and more qualitative data through questionnaires, interviews and focus groups. The evaluation of the methods was conducted in Malaysia and the UK. The results were able to unfold the differences in terms of methods used with older people. For example, it seemed that the majority of the participants preferred the talking methods of interviews and focus groups compared to questionnaires. Focus groups proved to be better than interviews in terms of identifying more problems. This finding was also supported through Cost Benefit Analysis which indicated that focus groups required fewer hours than interviews in terms

of reporting a problem. It is hoped that this finding may provide a valuable guide for other researchers.

Having acknowledged the elusive nature of culture, nevertheless an additional contribution of this research is to demonstrate that rigorous and quantitative methods can be applied in its study.

Another limitation again highlights the lack of clarity as to the definition of culture. This research set out to compare Malaysian culture with British culture. In the event, the participants who took part were reasonably homogeneous within those groups: Malay Malaysians and White British. In one sense this can be treated as a positive outcome, a comparison of two quite well-defined cultural groups.

However, these groups are not representative of the ethnic diversity in either country. This could lead to one of two conclusions: either larger, more diverse participant pools should have been used, reflecting the true diversity and implying that there is an identifiable (and heterogeneous) Malaysian and British culture. Alternatively, there should be a recognition that there are multiple cultures, and (for instance) Chinese Malaysians should have been compared with Malay Malaysians – and White British with Afro-Caribbean British.

There is also a question as to the choice of the age groups. As discussed in Section 2.2.1, it was decided to use retirement age as the selector in this research. This choice was an attempt to account for the fact that age is not a simple chronological measure, but is culturally related. Retirement age is different in different countries which is a reflection of cultural variation. This is reflected in the different age profiles of the participants in the studies.

7.4 Future research directions

The current work can be expanded in terms of looking at the other category of users that are younger people. A comparison can be made within countries by looking at the differences between younger people and older people within similar context. Eisma et al. (2003) stated that there are also language and cultural differences to be considered when dealing with these groups. Again, with a clearer definition of culture, it might be possible to assess the cultural distance between younger and older people within the same country and between people of the same age in different countries. Specifically, it may be (in this age of globalization) that young people in Malaysia are culturally closer to young people in the UK than they are to older people in Malaysia.

Specifically an apparent cultural difference was found with the use of personas, whereby the number of problems reported in Malaysia was greater when personas were used, while in the UK the opposite effect was found (Figure 3.9). As discussed in Section 3.5, current treatments of culture are not sufficient to explain this and it is to be hoped that in the future better techniques will be available to give plausible explanations of such phenomena.

Personas themselves are also worthy of further investigation. As discussed in Section 3.5, the effects of the richness of the persona on information generated, and the influence of the choice of photograph are both worthy topics for study in themselves.

There were several issues related to mobile phone usage by older people have been discussed earlier. Issues associated to language, manuals and texting have been brought up in this work. More user studies need to

be conducted to investigate on these issues or new issues that are related to the use of mobile phone by older people. Mobile phone findings as discussed earlier in Chapter 6 can be the basis or references for future user studies. As has been noted above, while cultural differences were found – they were small ones. This suggests the further conclusion that until there are better ways of defining culture, any effort put into accommodating cultural differences in interaction is inefficient. The same amount of effort put into (say) accommodating language differences may have a much greater pay-off.

7.5 Summary

This chapter has provided an overview of the work presented in this thesis and how this work has made a substantial contribution to knowledge. There is clearly plenty of scope for future research. There is a lot more that future researcher will need to learn about culture and what culture is before it can be applied to this kind of study or technology. For example, the difficulties in conducting culture research such as coordinating methodology as reported by Westlund (2010).

At current state of knowledge, it seems that it is not worth in spending lots of time in investigating culture differences for this kind of research and it is recommended for future researchers to look at other aspects of culture.

SECTION A: DEMOGRAPHIC INFORMATION

Please tick (/) for the answers.

1. Age: ( ) years old

2. Gender: ☐ Female ☐Male

3. Race: ☐Malay ☐ Chinese ☐ Indian ☐Other

4. Employment status: ( )
   If retiree, please state previous employment: ( )

5. Marital status: ( )

6. Highest education attainment:

☐	Primary school (standard 1 – 6)	☐	Certificate/ Diploma
☐	Secondary school (form 1 -2)	☐	Degree
☐	LCE	☐	Post-graduate/ Professional Certificate
☐	GCE	☐	Others: _____

7. Language preference:

☐	Malay	☐	English
☐	Mandarin	☐	Tamil/ Urdu
☐	Others: _____		

8. Have you ever wear any of these items?

☐	Glasses	☐	Contact lenses
☐	Walking stick	☐	Hearing aid

9. If you are wearing glasses, please answer this question. Otherwise, go to question 10.
   Do you wear glasses for:

☐	Reading	☐	All the time

10. Do you have any other disabilities or health problems that may affect your ability to use mobile phone?

_____

_____

SECTION B: INTERVIEW

Introduction Session

Hello. My name is Sofianiza Abd Malik. I am a Phd Student from Department of Computer Science at University of York. Currently, I am conducting a study about the use of mobile phone by older people.

During the interview, you will be asked some questions related to mobile phone purchase, mobile phone usage, how do you learn to use mobile phone and ideal phone.

At the end of the interview, I am going to ask you to do three tasks in order for me to understand how you use your mobile phone better.

For your information, our interview will be recorded for data analysis purposes. I will also like to inform you that you are free to withdraw at any time during this interview.

Please do not hesitate to ask me any inquiries related to the topics or if you want me to repeat the questions.

Can you please fill in the Informed Consent Form. Do you have any questions regarding the form?

Interview Questions

1) How did you get the phone?

- Did you buy it yourself?
- What made you choose this phone particularly?

2) Phone usage and their experience with their phone

- Can you tell me about your mobile phone use?
- How frequently do you use your phone?
- Do you carry your phone every time and everywhere you go?
- What feature of your phone do you use frequently?
- What do you like about your phone?
- What do you not like about your phone?
- Did you find your phone easy or difficult? Can you tell me why?

3) Learning how to use the phone

- How did you learn about your phone?
- How did you learn how to use your phone after you bought it?
- Do you use the user manual that came with the phone?
- What made it easy or difficult to use?

4) Let us talk about an ideal phone for you.

- What kind of phone would you like to have?
- Can you simply explain what it would be like?

SECTION C: TASKS

Task: saving a phone number

Ok, from now on, I am going to ask you to show me how you use your phone. I am going to ask you to save my phone number and my name into your phone, and I am going to ask you some questions about that.

- Do you see any problems with your phone while saving my number?
- Do you have any suggestions on how to improve the problem?

Task: checking the contact list

- Can you retrieve the numbers in your contact list?
- Do you have any suggestions on how to improve the problem?

Task: using the speed dial

- Do you know how to use the speed dial?
- Do you have any suggestions on how to improve the problem?

SECTION A: DEMOGRAPHIC INFORMATION

Please tick (/) for the answers.

1. Age: ( ) years old

2. Gender: ☐ Female ☐Male

3. Race: ☐Malay ☐ Chinese ☐ Indian ☐Other

4. Employment status: ( )
   If retiree, please state previous employment: ( )

5. Marital status: ( )

6. Highest education attainment:

☐ Primary school (standard 1 – 6)	☐ Certificate/ Diploma
☐ Secondary school (form 1 -2)	☐ Degree
☐ LCE	☐ Post-graduate/ Professional Certificate
☐ GCE	☐ Others: _____

7. Language preference:

☐ Malay	☐ English
☐ Mandarin	☐ Tamil/ Urdu
☐ Others: _____	

8. Have you ever wear any of these items?

☐ Glasses	☐ Contact lenses
☐ Walking stick	☐ Hearing aid

9. If you are wearing glasses, please answer this question. Otherwise, go to question 10.
   Do you wear glasses for:

☐ Reading	☐ All the time

10. Do you have any other disabilities or health problems that may affect your ability to use mobile phone?

_____

_____

SECTION B: FOCUS GROUPS

Introduction Session

Hello. My name is Sofianiza Abd Malik. I am a Phd Student from Department of Computer Science at University of York. Currently, I am conducting a study about the use of mobile phone by older people.

In the discussion, you will be asked some questions related to mobile phone purchase, mobile phone usage, how do you learn to use mobile phone and ideal phone.

For your information, our discussion will be recorded for data analysis purposes.
I will also like to inform you that you are free to withdraw at any time during this discussion.

Please do not hesitate to ask me any inquiries related to the topics or if you want me to repeat the questions.

Can you please fill in the Informed Consent Form. Do you have any questions regarding the form?

Can you please fill in your personal information using this form? (Section A: Demographic Information).

Focus Groups Questions

1) How did you get the phone?

- Did you buy it yourself?
- What made you choose this phone particularly?

2) Phone usage and their experience with their phone

- Can you tell me about your mobile phone use?
- How frequently do you use your phone?
- Do you carry your phone every time and everywhere you go?
- What feature of your phone do you use frequently?
- What do you like about your phone?
- What do you not like about your phone?
- Did you find your phone easy or difficult? Can you tell me why?

3) Learning how to use the phone

- How did you learn about your phone?
- How did you learn how to use your phone after you bought it?
- Do you use the user manual that came with the phone?
- What made it easy or difficult to use?

4) Let us talk about an ideal phone for you.

- What kind of phone would you like to have?
- Can you simply explain what it would be like?

SECTION A: MOBILE PHONE USAGE

1. Do you use a mobile phone? ☐ Yes ☐ No

2. How long have you been using a mobile phone? _____ years

3. How often do you use a mobile phone?

☐ Less than once a week ☐ Once a week

☐ Once a day ☐ More than once a day

☐ More than 5 times a day

4. For each of the following statements, please indicate the extent to which you agree.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Reasons for having mobile phones:					
I use mobile phone for personal communication (with family or friends)	☐	☐	☐	☐	☐
I use mobile phone for business communication	☐	☐	☐	☐	☐
I use mobile phone to seek information (eg: news or driving directions)	☐	☐	☐	☐	☐
I use mobile phone to save information (eg: phone numbers)	☐	☐	☐	☐	☐
I use mobile phone to save information (eg: personal notes)	☐	☐	☐	☐	☐
I use mobile phone for entertainment (eg: music, game)	☐	☐	☐	☐	☐
I use mobile phone for safety and security	☐	☐	☐	☐	☐
I use mobile phone for other purposes (please describe:)	☐	☐	☐	☐	☐

I learn how to use a mobile phone by…..

Reading manuals	☐	☐	☐	☐	☐
Asking family or friends	☐	☐	☐	☐	☐
Asking customer service	☐	☐	☐	☐	☐
Trying out myself	☐	☐	☐	☐	☐
Others (please describe:)	☐	☐	☐	☐	☐

SECTION B: CURRENT MOBILE PHONE

1. What model of mobile phone do you currently own?

   Manufacturer: _____

   Service Carrier: _____

   Model: _____

2. Do you have a contract or pay as you go?

☐ Contract ☐ Pay as you go

3. How frequently do you use the following functions of your mobile phone?

Functions	Don't know	Not available	Never	Rarely	Occasional	Frequent
Make a call						
Receive a call						
Phonebook (eg: contacts)						
Speed dial						
Call history						
Voice message checking						
Text message service						
Voice memo						
Change ringer tone						
Calculator						
Calendar						
Alarm						
Multimedia Messaging Service						
Camera						
Game						
Internet						
Voice activation						
Clock						
Listening to music						
Speaker phone						
Others:						
Others:						

4. On average, how many times a day do you make use of the following service?

Service	Number of times used daily (approximately)
Send SMS	
Receive SMS	
Make a call	
Receive a call	

5. Please answer to the following questions based on your experience with your current mobile phone.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Usefulness of the phone					
I find my mobile phone useful in my life	☐	☐	☐	☐	☐
My mobile phone has all the functions and capabilities I expect it to have	☐	☐	☐	☐	☐
My mobile phone allows me to use my time efficiently	☐	☐	☐	☐	☐
My mobile phone makes my life easier	☐	☐	☐	☐	☐
Usability of the phone					
Overall, I am satisfied with how easy it is to use my mobile phone	☐	☐	☐	☐	☐
It is simple to use my mobile phone	☐	☐	☐	☐	☐
It was easy to learn to use my mobile phone	☐	☐	☐	☐	☐
It is easy to read texts on the screen	☐	☐	☐	☐	☐
It is easy to navigate the menu of the phone	☐	☐	☐	☐	☐
My cell phone gives error messages that clearly tell me how to fix problems	☐	☐	☐	☐	☐
Whenever I make a mistake using the mobile phone, I recover easily and quickly	☐	☐	☐	☐	☐
It is easy to read labels on buttons	☐	☐	☐	☐	☐
It is easy to press buttons	☐	☐	☐	☐	☐
It is easy to input text	☐	☐	☐	☐	☐
Supplemental references materials (such as user manual) provided with the phone is easy to understand	☐	☐	☐	☐	☐

It is easy to replace the battery	☐	☐	☐	☐	☐
It is easy to charge the battery	☐	☐	☐	☐	☐
Anxiety/Fear					
I am afraid to use mobile phone because I might be exposed to radiation	☐	☐	☐	☐	☐
I do not like to use mobile phone because I am not good in technology	☐	☐	☐	☐	☐
I feel anxious when using a mobile phone	☐	☐	☐	☐	☐
When I use a mobile phone, I am afraid that I will break it	☐	☐	☐	☐	☐
Fashion/Status					
Fashionable people use mobile phone	☐	☐	☐	☐	☐
Using a mobile phone is good for my image	☐	☐	☐	☐	☐
I use a mobile phone because lots of other people use one	☐	☐	☐	☐	☐
Cost					
Mobile phone is value for money	☐	☐	☐	☐	☐

6. What are the most important tasks that you perform with your mobile phone. (Please try to name at least 3 in order of importance).

_____

_____

_____

7. How many saved numbers do you currently have on your phone?

_____

8. Considering mobile phone usage, how would you describe yourself?

☐ Light user

☐ Moderate

☐ Moderate user

☐ Heavy

☐ Very heavy

9. Please mark all the features that you wish to have on your mobile phone in the future.

Features	
Make a call	
Receive a call	
Phonebook (eg: contacts)	
Speed dial: a function to dial a designated number when you press a number key	
Call history	
Voice message checking	
Text messaging service	
Voice memo: a function to save your voice in your phone	
Change ringer tone	
Calculator	
Calendar	
Alarm clock	
MMS (Multimedia Messaging Service)- a function to send video and audio to another person	
Camera	
Game	
Internet	
E-mail	
Voice activation	
Clock	
Listening to music	
Speaker phone	
Emergency call button	
Audio display – a function to read aloud menus and key pressed	

10. Do you have any other functions or services that you wish to have in the future?

_____

_____

_____

11. Do you have any complaints about your mobile phone?

_____

_____

_____

SECTION C: USE OF TECHNOLOGY

1. How frequently do you use the following?

	Never	1-3 times per month	Once per week	2-3 times per week	Once per Day	More than once per day
Computer						
Internet						
Email						

Informed Consent Form

Before you participate in this study, please complete Section A, printing your name in the first space and then sign at the end.

Once the study is over and you have been debriefed, you will be asked to initial the three statements in Section B, to indicate your agreement.

Section A

I,_____, voluntarily give my consent to participate in this study as part of Sofianiza Abd Malik's PhD Project.

I have been informed about, and feel that I understand the basic nature of the project. I realize that I will be asked questions related to mobile phone usage and functionalities.

I give my permission for the study to be audio-taped and photographed. I understand that all the information collected, including the audio-tape and photo, is confidential. Only Sofianiza Abd Malik and her PhD supervisor, Alistair Edwards, will have access to the data collected today in its original format and it will only be made public in an anonymous format.

I understand that I may withdraw from the study at any time without prejudice, simply by saying that I would like to stop now.

Signature of Research Participant Date:

Section B

Please initial each of the following statements when the study has been completed and you have been debriefed.

I have been adequately debriefed	Your initials:
I was not forced to complete the study	Your initials:
All my questions have been answered	Your initials:

SECTION A: DEMOGRAPHIC INFORMATION

Please tick (/) for the answers.

1. Age: ( ) years old

2. Gender: ☐ Female ☐Male

3. Race: ☐Malay ☐ Chinese ☐ Indian ☐Other

4. Employment status: ( )
   If retiree, please state previous employment: ( )

5. Marital status: ( )

6. Highest education attainment:

☐ Primary school (standard 1 – 6)	☐ Certificate/ Diploma
☐ Secondary school (form 1 -2)	☐ Degree
☐ LCE	☐ Post-graduate/ Professional Certificate
☐ GCE	☐ Others: _____

7. Language preference:

☐ Malay	☐ English
☐ Mandarin	☐ Tamil/ Urdu
☐ Others: _____	

8. Have you ever wear any of these items?

☐ Glasses	☐ Contact lenses
☐ Walking stick	☐ Hearing aid

9. If you are wearing glasses, please answer this question. Otherwise, go to question 10.
   Do you wear glasses for:

☐ Reading	☐ All the time

10. Do you have any other disabilities or health problems that may affect your ability to use mobile phone?

_____

_____

SECTION A: DEMOGRAPHIC INFORMATION

1. Age: ( ) years old

2. Gender: ☐ Female ☐ Male

3. Employment status: ( )
   If retiree, please state previous employment: ( )

4. Marital status: ( )

5. Highest education attainment:

☐ Primary school ☐ Certificate/ Diploma

☐ High School ☐ Degree

☐ Post-graduate / Professional Certificate ☐ Others: _____

6. Do you ever use any of these items?

☐ Glasses ☐ Contact lenses

☐ Walking stick ☐ Hearing aid

7. If you are wearing glasses, please answer this question. Otherwise, go to question 8.
   Do you wear glasses for:

☐ Reading ☐ All the time

8. Do you have any other disabilities or health problems that may affect your ability to use mobile phone?

_____

_____

INTERVIEW

Introduction Session

Hello. My name is Sofianiza Abd Malik. I am a Phd Student from Department of Computer Science at University of York. Currently, I am conducting a study about the use of mobile phone by older people.

During the interview, you will be asked some questions related to mobile phone purchase, mobile phone usage, how do you learn to use mobile phone and ideal phone.

At the end of the interview, I am going to ask you to do three tasks in order for me to understand how you use your mobile phone better.

For your information, our interview will be recorded for data analysis purposes. I will also like to inform you that you are free to withdraw at any time during this interview.

Please do not hesitate to ask me any inquiries related to the topics or if you want me to repeat the questions.

Can you please fill in the Informed Consent Form. Do you have any questions regarding the form?

SECTION A: INTERVIEW QUESTIONS

1) How did you get the phone?

- Did you buy it yourself?
- What made you choose this phone particularly?

2) Phone usage and their experience with their phone

- Can you tell me about your mobile phone use?
- How frequently do you use your phone?
- Do you carry your phone every time and everywhere you go?
- What feature of your phone do you use frequently?
- What do you like about your phone?
- What do you not like about your phone?
- Did you find your phone easy or difficult? Can you tell me why?

3) Learning how to use the phone

- How did you learn about your phone?
- How did you learn how to use your phone after you bought it?
- Do you use the user manual that came with the phone?
- What made it easy or difficult to use?

4) Let us talk about an ideal phone for you.

- What kind of phone would you like to have?
- Can you simply explain what it would be like?

SECTION B: TASKS

Task: saving a phone number

Ok, from now on, I am going to ask you to show me how you use your phone. I am going to ask you to save my phone number and my name into your phone, and I am going to ask you some questions about that.

- Do you see any problems with your phone while saving my number?
- Do you have any suggestions on how to improve the problem?

Task: checking the contact list

- Can you retrieve the numbers in your contact list?
- Do you have any suggestions on how to improve the problem?

Task: using the speed dial

- Do you know how to use the speed dial?
- Do you have any suggestions on how to improve the problem?

Introduction Session

Hello. My name is Sofianiza Abd Malik. I am a Phd Student from Department of Computer Science at University of York. Currently, I am conducting a study about the use of mobile phone by older people.

In the discussion, you will be asked some questions related to mobile phone purchase, mobile phone usage, how do you learn to use mobile phone and ideal phone.

For your information, our discussion will be recorded for data analysis purposes.
I will also like to inform you that you are free to withdraw at any time during this discussion.

Please do not hesitate to ask me any inquiries related to the topics or if you want me to repeat the questions.

Can you please fill in the Informed Consent Form. Do you have any questions regarding the form?

FOCUS GROUPS QUESTIONS

1) How did you get the phone?

- Did you buy it yourself?
- What made you choose this phone particularly?

2) Phone usage and their experience with their phone

- Can you tell me about your mobile phone use?
- How frequently do you use your phone?
- Do you carry your phone every time and everywhere you go?
- What feature of your phone do you use frequently?
- What do you like about your phone?
- What do you not like about your phone?
- Did you find your phone easy or difficult? Can you tell me why?

3) Learning how to use the phone

- How did you learn about your phone?
- How did you learn how to use your phone after you bought it?
- Do you use the user manual that came with the phone?
- What made it easy or difficult to use?

4) Let us talk about an ideal phone for you.

- What kind of phone would you like to have?
- Can you simply explain what it would be like?

SECTION A: MOBILE PHONE USAGE

Start Time: _____

1. Do you use a mobile phone? ☐ Yes ☐ No

2. How long have you been using a mobile phone? _____ years

3. How often do you use a mobile phone?

☐ Less than once a week ☐ Once a week

☐ Once a day ☐ More than once a day

☐ More than 5 times a day

4. For each of the following statements, please indicate the extent to which you agree.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Reasons for having mobile phones:					
I use mobile phone for personal communication (with family or friends)	☐	☐	☐	☐	☐
I use mobile phone for business communication	☐	☐	☐	☐	☐
I use mobile phone to seek information (eg: news or driving directions)	☐	☐	☐	☐	☐
I use mobile phone to save information (eg: phone numbers)	☐	☐	☐	☐	☐
I use mobile phone to save information (eg: personal notes)	☐	☐	☐	☐	☐
I use mobile phone for entertainment (eg: music, game)	☐	☐	☐	☐	☐
I use mobile phone for safety and security	☐	☐	☐	☐	☐
I use mobile phone for other purposes (please describe:)	☐	☐	☐	☐	☐

Please circle for the answers.

I learn how to use a mobile phone by…..

	Never				most frequently
Reading manuals	0	1	2	3	4
Asking family or friends	0	1	2	3	4
Asking customer service	0	1	2	3	4
Trying out myself	0	1	2	3	4
Others (please describe:)	0	1	2	3	4

SECTION B: CURRENT MOBILE PHONE

1. What model of mobile phone do you currently own?

Manufacturer: _____

Service Carrier: _____

Model: _____

2. Do you have a contract or pay as you go?

☐ Contract ☐ Pay as you go / Prepaid

3. On average, how many times a day do you make use of the following service?

Service	Number of times used weekly (approximately)
Send SMS / Text	
Receive SMS/ Text	
Make a call	
Receive a call	

4. How frequently do you use the following functions of your mobile phone?

Functions	Don't know	Not available	Never	Rarely	Occasional	Frequent
Make a call						
Receive a call						
Phonebook (eg: contacts)						
Speed dial						
Call history						
Voice message checking						
Text message service/ SMS						
Voice memo						
Change ringer tone						
Calculator						
Calendar						
Alarm						
Multimedia Messaging Service						
Camera						
Game						
Internet						
Voice dial						
Clock						
Listening to music						
Speaker phone						
Others:						
Others:						

5. Please answer to the following questions based on your experience with your current mobile phone.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Usability of the phone					
Overall, I am satisfied with how easy it is to use my mobile phone	☐	☐	☐	☐	☐
It is simple to use my mobile phone	☐	☐	☐	☐	☐
It was easy to learn to use my mobile phone	☐	☐	☐	☐	☐
It is easy to read texts on the screen	☐	☐	☐	☐	☐
It is easy to navigate the menu of the phone	☐	☐	☐	☐	☐
My mobile phone gives error messages that clearly tell me how to fix problems	☐	☐	☐	☐	☐
Whenever I make a mistake using the mobile phone, I recover easily and quickly	☐	☐	☐	☐	☐
It is easy to read labels on buttons	☐	☐	☐	☐	☐
It is easy to press buttons	☐	☐	☐	☐	☐
It is easy to input text	☐	☐	☐	☐	☐
Supplemental references materials (such as user manual) provided with the phone is easy to understand	☐	☐	☐	☐	☐
It is easy to replace the battery	☐	☐	☐	☐	☐
It is easy to charge the battery	☐	☐	☐	☐	☐
Cost					
Mobile phone is value for money	☐	☐	☐	☐	☐

6. What are the most important tasks that you perform with your mobile phone? (Please try to name at least 3 in order of importance).

_____

_____

7. How many saved numbers do you currently have on your phone?

_____

8. Considering mobile phone usage, how would you describe yourself?

☐ Light user

☐ Moderate

☐ Heavy

☐ Very heavy

9. Please mark all the features that you wish to have on your mobile phone in the future.

Features	
Make a call	
Receive a call	
Phonebook (eg: contacts)	
Speed dial: a function to dial a designated number when you press a number key	
Call history	
Voice message checking	
Text messaging service / SMS	
Predicting texting function	
Voice memo: a function to save your voice in your phone	
Change ringer tone	
Calculator	
Calendar	
Alarm clock	
MMS (Multimedia Messaging Service)- a function to send video, photo and audio to another person	
Camera	
Game	
Internet	
E-mail	
Voice activation	
Clock	
Listening to music	
Speaker phone	
Emergency call button	
Audio display – a function to read aloud menus and key pressed	

10. Do you have any other functions or services that you wish to have in the future?

_____

_____

_____

11. Do you have any complaints about your mobile phone?

_____

_____

_____

SECTION C: USE OF TECHNOLOGY

1. How frequently do you use the following?

	Never	1-3 times per month	Once per week	2-3 times per week	Once per Day	More than once per day
Computer						
Internet						
Email						

End Time: _____

SECTION A. GENERAL QUESTIONS ABOUT CELL PHONE USE

1) Do you own a cell phone?

☐ Yes ☐ No

2) How many years have you owned a cell phone? _____ years

3) Indicate the extent to which you agree with each statement.

The reason I have a cell phone is…	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Personal communication (with family or friends)	☐	☐	☐	☐	☐
Business communication (with business partner or co-workers)	☐	☐	☐	☐	☐
To seek information (e.g., news or driving directions)	☐	☐	☐	☐	☐
To save information (e.g., phone numbers or personal notes)	☐	☐	☐	☐	☐
Entertainment (e.g., music, game)	☐	☐	☐	☐	☐
Safety and security	☐	☐	☐	☐	☐
Others (please describe:)	☐	☐	☐	☐	☐

4) Indicate the extent to which you agree with each statement.

I learn how to use a cell phone by…	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Reading manuals	☐	☐	☐	☐	☐
Asking family or friends	☐	☐	☐	☐	☐
Asking customer service	☐	☐	☐	☐	☐
Trying out myself	☐	☐	☐	☐	☐
Others (please describe:)	☐	☐	☐	☐	☐

SECTION B. QUESTIONS ABOUT YOUR CURRENT CELL PHONE

1) What model of cell phone do you own currently?

- Manufacturer: _____ (e.g., Motorola, Nokia, Samsung, etc.)
- Model name (check the inner side of battery case): _____ (e.g., SPH-A960, etc.)
- Service carrier: _____ (e.g., Verizon, Sprint, etc.)

2) How frequently do you use the following functions of your cell phone?

Functions	I don't know what this is	Not available on my phone	Never	Rarely	Somewhat frequently	Frequently
Make a call	☐	☐	☐	☐	☐	☐
Receive a call	☐	☐	☐	☐	☐	☐
Phonebook (e.g., contacts)	☐	☐	☐	☐	☐	☐
Speed dial	☐	☐	☐	☐	☐	☐
Call history	☐	☐	☐	☐	☐	☐
Voice message checking	☐	☐	☐	☐	☐	☐
Text messaging Service	☐	☐	☐	☐	☐	☐
Voice memo	☐	☐	☐	☐	☐	☐
Change ringer tone	☐	☐	☐	☐	☐	☐
Calculator	☐	☐	☐	☐	☐	☐
Calendar	☐	☐	☐	☐	☐	☐
Alarm	☐	☐	☐	☐	☐	☐
Multimedia Messaging Service	☐	☐	☐	☐	☐	☐
Camera	☐	☐	☐	☐	☐	☐
Game	☐	☐	☐	☐	☐	☐
Internet	☐	☐	☐	☐	☐	☐
Voice activation	☐	☐	☐	☐	☐	☐
Clock	☐	☐	☐	☐	☐	☐
Listening to music	☐	☐	☐	☐	☐	☐
Speaker phone	☐	☐	☐	☐	☐	☐
Others: _____		☐	☐	☐	☐	☐
Others: _____		☐	☐	☐	☐	☐

3) Please answer to the following questions based on your experience with your current cell phone.

Usefulness of the phone	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I find my cell phone useful in my life.	☐	☐	☐	☐	☐
My cell phone has all the functions and capabilities I expect it to have.	☐	☐	☐	☐	☐
My cell phone allows me to use my time efficiently.	☐	☐	☐	☐	☐
My cell phone makes my life easier.	☐	☐	☐	☐	☐

Usability of the phone	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Overall, I am satisfied with how easy it is to use my cell phone.	☐	☐	☐	☐	☐
It is simple to use my cell phone.	☐	☐	☐	☐	☐
It was easy to learn to use my cell phone.	☐	☐	☐	☐	☐
It is easy to read texts on the screen.	☐	☐	☐	☐	☐
It is easy to navigate the menu of the phone.	☐	☐	☐	☐	☐
My cell phone gives error messages that clearly tell me how to fix problems.	☐	☐	☐	☐	☐
Whenever I make a mistake using the cell phone, I recover easily and quickly.	☐	☐	☐	☐	☐
It is easy to read labels on buttons.	☐	☐	☐	☐	☐
It is easy to press buttons.	☐	☐	☐	☐	☐
It is easy to input text.	☐	☐	☐	☐	☐
Supplemental reference materials (such as user manual) provided with the phone is easy to understand.	☐	☐	☐	☐	☐
It is easy to replace the battery.	☐	☐	☐	☐	☐
It is easy to charge the battery.	☐	☐	☐	☐	☐

Pleasurability of the phone	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Overall, my phone design is attractive.	☐	☐	☐	☐	☐
The screen design of my phone is pleasant.	☐	☐	☐	☐	☐
I find my cell phone entertaining.	☐	☐	☐	☐	☐
My phone makes appealing sound.	☐	☐	☐	☐	☐

Satisfaction	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Overall, I am satisfied with my cell phone.	☐	☐	☐	☐	☐

4) Do you have any complaints about your cell phone? Please write down here.

_____

_____

5) Please mark all features that you wish to have on your cell phone in the future.

Features	Yes, I wish to have this function
Make a call	☐
Receive a call	☐
Phonebook (e.g., contacts)	☐
Speed dial: a function to dial a designated number when you press a number key	☐
Call history	☐
Voice message checking	☐
Text messaging Service	☐
Voice memo: a function to save your voice in your phone	☐
Change ringer tone	☐
Calculator	☐
Calendar	☐
Alarm	☐
MMS (Multimedia Messaging Service): a function to send video and audio to another person.	☐
Camera	☐
Game	☐
Internet	☐
E-mail	☐
Voice activation	☐
Clock	☐
Listening to music	☐
Speaker phone	☐
Emergency call button (e.g., 911)	☐
Audio display: a function to read aloud menus and key pressed.	☐

6) Do you have any other functions or services that you wish to have in the future? Regardless of whether it is possible with current technology, please describe here. (For example, I wish to receive health-related information on my phone.)

_____

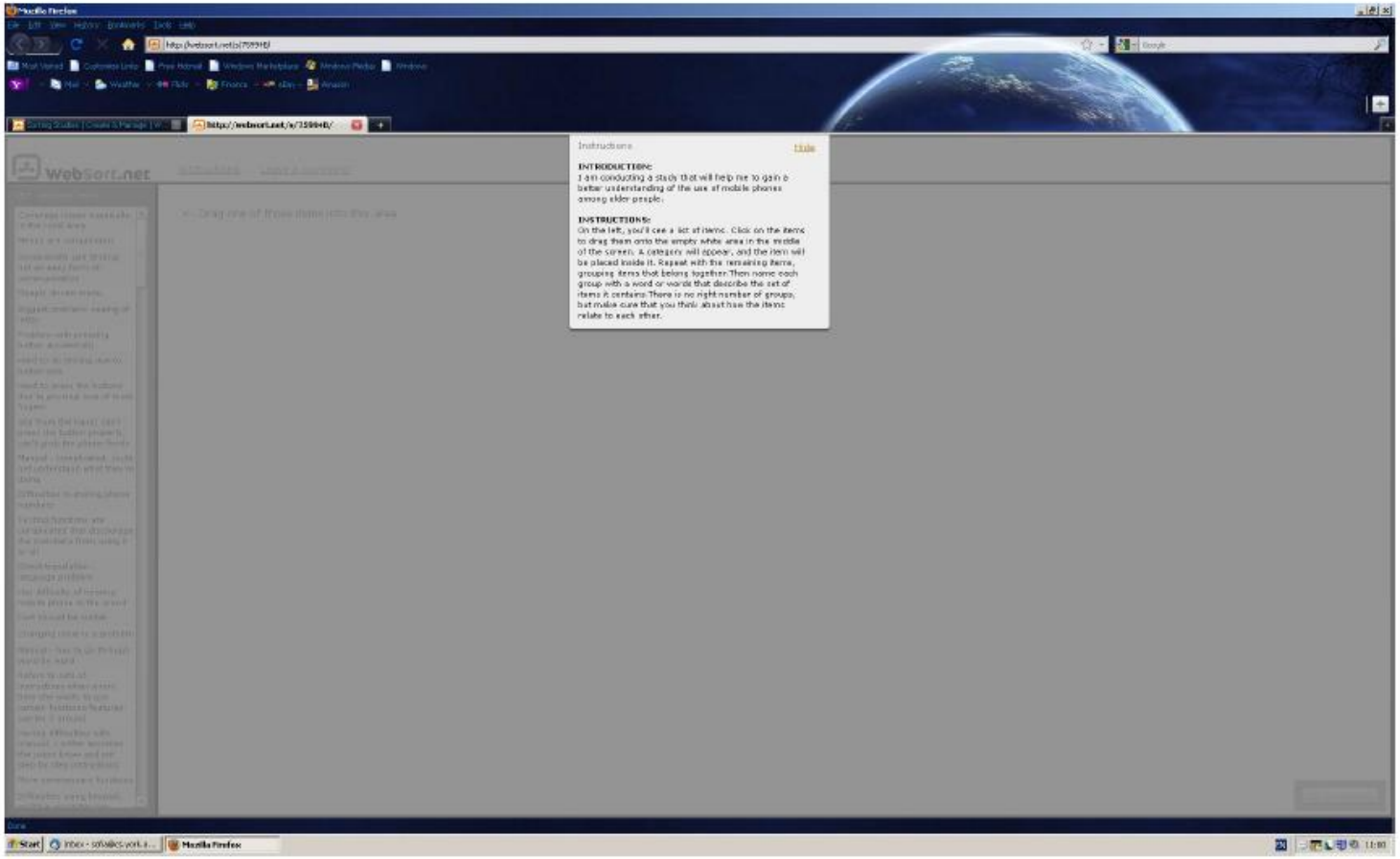
_____

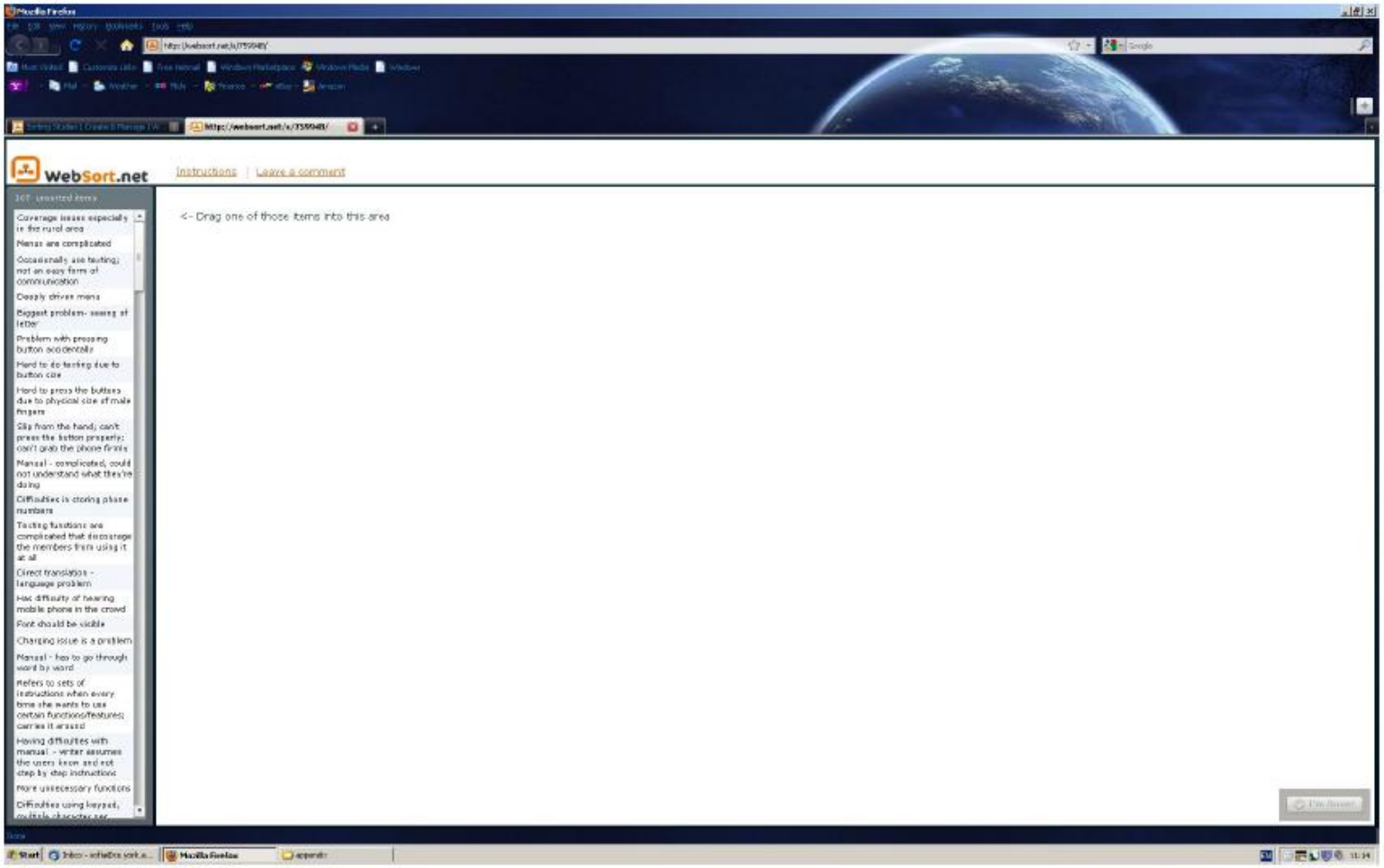
_____

SECTION C. USE OF TECHNOLOGY

1) How frequently do you use the following?

	Never	1-3 times per month	Once per week	2-3 times per week	Once per day	More than once per day
Computer	☐	☐	☐	☐	☐	☐
Internet	☐	☐	☐	☐	☐	☐
Email	☐	☐	☐	☐	☐	☐


WebSort.net
Instructions
Hide
INTRODUCTION:
I am conducting a study that will help me to gain a better understanding of the use of mobile phones among older people.
INSTRUCTIONS:
On the left, you'll see a list of items. Click on the items to drag them onto the empty white area in the middle of the screen. A category will appear, and the item will be placed inside it. Repeat with the remaining items, grouping items that belong together. Then name each group with a word or words that describe the set of items it contains. There is no right number of groups, but make sure that you think about how the items relate to each other.


WebSort.net
Instructions
Leave a comment
<- Drag one of those items into this area

LIST OF PROBLEMS

1. Express their concern that mobile phone usage might have some effect on them (eg: brain cancer)
2. Health issues - effect from using mobile phone (eg: brain cancer)
3. Difficulties in understanding the functions using native language - eg; direct translation
4. Direct translation - language problem
5. Difficulties in understanding the functions using native language - eg; direct translation
6. Difficulties in understanding the functions using native language - hard to understand and direct translation
7. Difficulties in understanding the functions using native language
8. Problem of understanding the instruction; just use simple language
9. Problem with jargon and terms, quite misleading
10. Jargon, not intuitive term to users; hard to figure out
11. Refers to sets of instructions when every time she wants to use certain functions/features; carries it around
12. Manual - find it being translated badly
13. Consider manual as very heavy reading, prefers to fiddle around, self-explorer
14. Dislike manual; translating info quite problematic; just try an error or seek help from others
15. Problems with manual - could not understand and remember the instructions
16. Manual - does not make sense
17. Manual - does not make sense
18. Manuals - does not understand, having problems to learn how to use mobile phone, strange logic to understand
19. Having difficulties with manual - writer assumes the users know and not step by step instructions
20. Find manuals not clear; forget the basic of explanation
21. Does not find easy to use manual; quite confusing
22. Manual - complicated, could not understand what they're doing
23. Manuals come out with specific word - need special dictionary

24. Manual- problems with jargon
25. Finds manual a little bit difficult; time consuming for reading the manual and doing it- too much effort
26. Manual - has to go through word by word
27. Finds manual sometimes easy and sometimes hard
28. Manual is hard; language and assumption made
29. Manuals are useless; instructions are not clear, hard, use word that can't understand (Like learning another language)
30. Does not refer to manuals; seeks helps from husband, not self-explorer
31. Clueless with no help in terms of learning
32. Have to check on daily basis to ensure that the battery is charged
33. Have to check everyday to make sure that the battery is charged
34. Does not bother to check on the battery at all; only charge when it is noticeable
35. Has additional back-up battery to be brought with (to overcome the charging issue)
36. Problem with charging - battery indicator
37. Charging problem
38. Charging issue is a problem
39. Having charging problem
40. Expiry date issue for pay as you go
41. Contract issues (ridiculous charges)
42. Cost is the issue (purchasing phone, service provider)
43. Problems with reception, interference with background noise
44. Coverage issues especially in the rural area
45. Coverage issues
46. Problem with coverage and network
47. Problem with different sim card and network when travelling abroad
48. Bad interface for texting with different types of mobile phone
49. Hidden functions that are used for texting are annoying and waste of time eg: 7 presses just to select 1 symbol
50. Inappropriate style of current texting; not acceptable
51. Express their concern regarding inappropriate style of texting in terms of meaning

52. Express their concern regarding inappropriate style of texting, hard to understand the meaning
53. Difficulty to understand short form text
54. Doesn't use text so much - problems with text language and short form
55. Dislike predictive function when it changes everything instead of 1 letter
56. Predictive function for text is problematic
57. Problem with predictive function
58. Predictive function sometimes difficult when do not get the desired words
59. Problem with texting - pressing wrong button
60. Occasionally use texting; not an easy form of communication
61. Doesn't know how to text
62. Texting functions are complicated that discourage the members from using it at all
63. Problem with texting – lost
64. Steps of performing text - requires number of steps; can be reduced
65. Find it ridiculous to start with message, rather than contact
66. Forgotten how to use text message ; which button to use
67. Needs to remember the steps before texting due to irregular usage
68. Assign certain location to place the mobile phone to avoid misplace
69. Misplace mobile phone
70. Problem with switching phone- sense of familiarity
71. Problems when switching mobile phone-different features
72. Having difficulties when switching one mobile phone to another - due to different order and button
73. Lack of usage and aging effect the usage of mobile phone
74. Has to fiddle through contact to find her own phone number
75. Feels awkward to use; can't remember to switch it on
76. Speed dial function needs to be revised in terms of remembering the names assigned to each button
77. Speed dial function needs to be revised - difficulties of remembering the names assigned to each button
    - reason why does not use it; prefers scroll down
78. Memory issue (Has to register numbers to overcome the problem - for contract)

79. Knows how to use speed dial but sometimes forget especially during emergency
80. Forgotten how to use it even for simple call due to irregular use
81. Having problems with remembering the functions; Location of the button for assigned functions
82. Could not remember own phone number -store in address book in mobile phone; stick the numbers at the back of mobile phone
83. Cannot recall own phone number
84. Forgot how to use some functions - need to write instructions at the back as label
85. Cognitive problem of forgetting on how to use some functions
86. No efforts are made in learning how to use a mobile phone due to aging, always seek help from others
87. Lack of training
88. Low self-esteem to join classes that taught how to use mobile phone for older people, prefer individual tutoring
89. Learn to use mobile phone from store assistant, not a self-explorer
90. Could not figure out how to use mobile phone even after 10 years
91. Complexity of the buttons - eg: green button
92. Difficulties in storing phone numbers
93. Don't know about the functions /features available in the mobile phone
94. Aware about other functions but never try to use it due to the fact that he does not know how
95. Problem with emporia life model- complicated
96. Very rare to use mobile phone due to its complexity
97. Heading functions and title quite complicated
98. Does not understand some of the functions
99. Problem with emporia life model- unnecessary functions
100. Introducing unnecessary functions
101. Current mobile phone has more functions than required – complicated
102. More unnecessary functions
103. Finds it far too sophisticated; unnecessary functions
104. Complicated functions
105. Difficulties in navigating through functions
106. Lost in navigating through functions

107. Menus are complicated
108. Deeply driven menu
109. One of the members is not able to use hands-free due to physical hearing impairments in one of the ears
110. Problem with hearing
111. Problem with hearing even though with largest vibration being set - could not feel it in the pocket
112. Poor audio
113. Could not hear clearly
114. Has difficulty of hearing mobile phone in the crowd
115. Problem with volume and vibration
116. Screen problem
117. Unable to read the letters, chars and digits
118. Biggest problem- seeing of letter
119. Small screens
120. Cannot see better
121. Due to short sighted, needs to remove glasses to see the screen
122. Backlight phone will disappear fast
123. Silver keypad, can't see in sunlight, cannot see letters
124. Could not use mobile phone in the dark since back screen is very important
125. Colour contrast
126. Difficulties looking at numbers; small
127. Small fonts
128. Font should be visible
129. Font should be bigger
130. Small letters
131. Poor interface; hard to see
132. Message display was too quick - not able to read
133. Having problem with background colour/colour contrast; needs to unlock the keypad just to get good b/ground colour
134. Problem with emporia life model- black on orange b/ground does not work
135. Background colour for keypad, button and letter are the same
136. Not easy to see the button in sunlight

137. Numbers on the keypad are too small
138. Numbers are small
139. Problem with emporia life model- tendency to accidentally pressing the buttons
140. Difficulties using keypad, multiple character per button
141. Having difficulties of pressing the character quickly while texting
142. Hard to press the buttons due to physical size of male fingers
143. Buttons are too small for arthritis patients
144. Problems with dialling due to arthritis
145. Slip from the hand; can't press the button properly; can't grab the phone firmly
146. Talk about hands-free usage to overcome the problem of not able to grip the phone firmly
147. Problem with handling the mobile phone physically
148. Use nail to press the buttons due to the size of mobile phone and arthritis
149. Have to use nail for pressing buttons
150. Having difficulties of pressing the buttons with finger nails especially for women
151. Problem with pressing button accidentally
152. Difficulties pressing buttons - need special input device
153. Difficulties with touch screens in terms of selection
154. Small buttons
155. Smaller keypad
156. Buttons on the keypad are small
157. Keypad problem
158. Problem with mobile phone; quite difficult and miniature
159. Fail to use text function due to memory impairment
160. Arrangements of characters on the keypad (3 chars per button)
161. Difficulties in using scroll function to find certain names by just selecting the buttons - eg: Ana, Ani
162. Agreed on the fact that vision, hearing and cognitive impairments are the main problems to them while using mobile phone
163. Numbering
164. Language problem in the sim card when use abroad

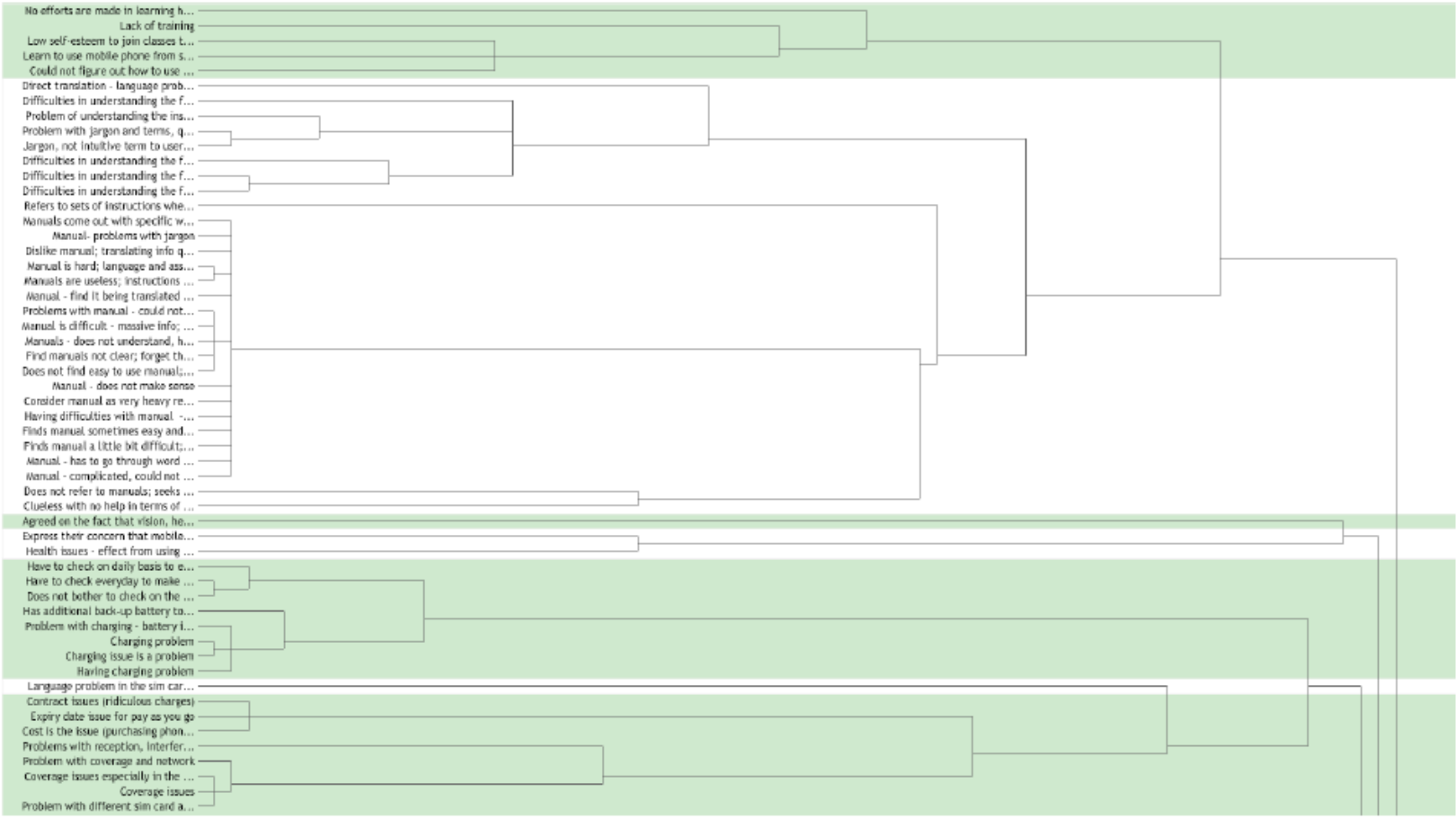
165. Use substitute letter 'l' for 1; problems of pressing the button again and again

166. Hard to do texting due to button size

167. Does not know how to store, write numbers down due to not knowing how to store and save

SNAPSHOT OF DENDOGRAM

APPENDIX N



RESULTS FOR THE EFFECTS OF COUNTRY, METHOD AND PERSONA

APPENDIX O

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	p
Country	Health Concerns	.766	1	.766	11.642	.001
	Direct Translation and Jargon	1.374	1	1.374	7.110	.009
	Difficulties with Manuals	10.527	1	10.527	19.872	.000
	Charging Issues	.050	1	.050	.195	.660
	Cost and Network	1.235	1	1.235	3.470	.066
	Misc 1	.088	1	.088	1.901	.172
	Short Form for Texting	1.305	1	1.305	13.827	.000
	Problems with Predictive Text Function	7.901	1	7.901	15.371	.000
	Sense of Familiarity	.030	1	.030	.526	.471
	Misc 2	.343	1	.343	5.030	.028
	Speed Dial Complexity	.446	1	.446	7.106	.009
	Memory Problems	6.338	1	6.338	34.090	.000
	How to Learn using Mobile Phone	.018	1	.018	.090	.766
	Functions Complexity	7.855	1	7.855	7.647	.007
	Hearing Difficulties	.149	1	.149	.973	.327
	Visual Problems	1.188	1	1.188	1.107	.296
	Interface Problems	.645	1	.645	.942	.335
	Misplace Problems	.046	1	.046	.398	.530

RESULTS FOR THE EFFECTS OF COUNTRY, METHOD AND PERSONA

APPENDIX O

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	p
Method	Health Concerns	.185	1	.185	2.813	.098
	Direct Translation and Jargon	2.713	1	2.713	14.037	.000
	Difficulties with Manuals	.077	1	.077	.145	.705
	Charging Issues	1.238	1	1.238	4.878	.030
	Cost and Network	6.148	1	6.148	17.279	.000
	Misc 1	.088	1	.088	1.901	.172
	Short Form for Texting	.018	1	.018	.189	.665
	Problems with Predictive Text Function	5.597	1	5.597	10.888	.001
	Sense of Familiarity	.015	1	.015	.268	.606
	Misc 2	6.795E-5	1	6.795E-5	.001	.975
	Speed Dial Complexity	.006	1	.006	.088	.768
	Memory Problems	1.541	1	1.541	8.290	.005
	How to Learn using Mobile Phone	.573	1	.573	2.877	.094
	Functions Complexity	4.247	1	4.247	4.134	.046
	Hearing Difficulties	5.221	1	5.221	34.149	.000
	Visual Problems	9.033	1	9.033	8.420	.005
	Interface Problems	17.028	1	17.028	24.888	.000
	Misplace Problems	.046	1	.046	.398	.530

RESULTS FOR THE EFFECTS OF COUNTRY, METHOD AND PERSONA

APPENDIX O

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	p
Persona	Health Concerns	.212	1	.212	3.214	.077
	Direct Translation and Jargon	.766	1	.766	3.966	.050
	Difficulties with Manuals	.006	1	.006	.012	.914
	Charging Issues	.446	1	.446	1.756	.189
	Cost and Network	.871	1	.871	2.447	.122
	Misc 1	.088	1	.088	1.901	.172
	Short Form for Texting	.011	1	.011	.114	.736
	Problems with Predictive Text Function	2.691	1	2.691	5.235	.025
	Sense of Familiarity	.015	1	.015	.268	.606
	Misc 2	.343	1	.343	5.030	.028
	Speed Dial Complexity	.446	1	.446	7.106	.009
	Memory Problems	.250	1	.250	1.342	.250
	How to Learn using Mobile Phone	.079	1	.079	.399	.529
	Functions Complexity	.333	1	.333	.324	.571
	Hearing Difficulties	.043	1	.043	.282	.597
	Visual Problems	.655	1	.655	.611	.437
	Interface Problems	.320	1	.320	.467	.496
	Misplace Problems	.278	1	.278	2.412	.125

RESULTS FOR THE EFFECTS OF COUNTRY, METHOD AND PERSONA

APPENDIX O

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	p
Country * Method	Health Concerns	.185	1	.185	2.813	.098
	Direct Translation and Jargon	.027	1	.027	.138	.711
	Difficulties with Manuals	1.227	1	1.227	2.317	.132
	Charging Issues	.666	1	.666	2.623	.110
	Cost and Network	1.235	1	1.235	3.470	.066
	Misc 1	.088	1	.088	1.901	.172
	Short Form for Texting	.018	1	.018	.189	.665
	Problems with Predictive Text Function	3.689	1	3.689	7.176	.009
	Sense of Familiarity	.030	1	.030	.526	.471
	Misc 2	6.795E-5	1	6.795E-5	.001	.975
	Speed Dial Complexity	.006	1	.006	.088	.768
	Memory Problems	1.770	1	1.770	9.521	.003
	How to Learn using Mobile Phone	.079	1	.079	.399	.529
	Functions Complexity	2.610	1	2.610	2.541	.115
	Hearing Difficulties	.149	1	.149	.973	.327
	Visual Problems	2.138	1	2.138	1.993	.162
	Interface Problems	.956	1	.956	1.397	.241
	Misplace Problems	1.220	1	1.220	10.573	.002

RESULTS FOR THE EFFECTS OF COUNTRY, METHOD AND PERSONA

APPENDIX O

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	p
Country * Persona	Health Concerns	.212	1	.212	3.214	.077
	Direct Translation and Jargon	.079	1	.079	.411	.523
	Difficulties with Manuals	.828	1	.828	1.563	.215
	Charging Issues	.666	1	.666	2.623	.110
	Cost and Network	1.992	1	1.992	5.597	.021
	Misc 1	.088	1	.088	1.901	.172
	Short Form for Texting	.011	1	.011	.114	.736
	Problems with Predictive Text Function	1.429	1	1.429	2.779	.100
	Sense of Familiarity	.030	1	.030	.526	.471
	Misc 2	.343	1	.343	5.030	.028
	Speed Dial Complexity	.446	1	.446	7.106	.009
	Memory Problems	.346	1	.346	1.863	.176
	How to Learn using Mobile Phone	.573	1	.573	2.877	.094
	Functions Complexity	2.610	1	2.610	2.541	.115
	Hearing Difficulties	.642	1	.642	4.199	.044
	Visual Problems	.477	1	.477	.445	.507
	Interface Problems	1.209	1	1.209	1.767	.188
	Misplace Problems	.132	1	.132	1.140	.289

RESULTS FOR THE EFFECTS OF COUNTRY, METHOD AND PERSONA

APPENDIX O

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	p
Method * Persona	Health Concerns	.000	1	.000	.003	.954
	Direct Translation and Jargon	1.110	1	1.110	5.743	.019
	Difficulties with Manuals	2.261	1	2.261	4.268	.042
	Charging Issues	.006	1	.006	.022	.883
	Cost and Network	.871	1	.871	2.447	.122
	Misc 1	.088	1	.088	1.901	.172
	Short Form for Texting	.079	1	.079	.842	.362
	Problems with Predictive Text Function	.563	1	.563	1.095	.299
	Sense of Familiarity	.221	1	.221	3.877	.053
	Misc 2	6.795E-5	1	6.795E-5	.001	.975
	Speed Dial Complexity	.006	1	.006	.088	.768
	Memory Problems	.250	1	.250	1.342	.250
	How to Learn using Mobile Phone	.018	1	.018	.090	.766
	Functions Complexity	.000	1	.000	.000	.987
	Hearing Difficulties	.043	1	.043	.282	.597
	Visual Problems	1.500	1	1.500	1.399	.241
	Interface Problems	.001	1	.001	.001	.973
	Misplace Problems	.132	1	.132	1.140	.289

RESULTS FOR THE EFFECTS OF COUNTRY, METHOD AND PERSONA

APPENDIX O

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	p
Country * Method * Persona	Health Concerns	.000	1	.000	.003	.954
	Direct Translation and Jargon	.212	1	.212	1.095	.299
	Difficulties with Manuals	.452	1	.452	.854	.358
	Charging Issues	.050	1	.050	.195	.660
	Cost and Network	1.992	1	1.992	5.597	.021
	Misc 1	.088	1	.088	1.901	.172
	Short Form for Texting	.079	1	.079	.842	.362
	Problems with Predictive Text Function	.093	1	.093	.181	.672
	Sense of Familiarity	.030	1	.030	.526	.471
	Misc 2	6.795E-5	1	6.795E-5	.001	.975
	Speed Dial Complexity	.006	1	.006	.088	.768
	Memory Problems	2.446E-5	1	2.446E-5	.000	.991
	How to Learn using Mobile Phone	1.374	1	1.374	6.903	.010
	Functions Complexity	.184	1	.184	.179	.674
	Hearing Difficulties	.642	1	.642	4.199	.044
	Visual Problems	.076	1	.076	.071	.791
	Interface Problems	.256	1	.256	.374	.542
	Misplace Problems	.278	1	.278	2.412	.125

FOCUS GROUP QUESTIONS

1 Health Concerns

1.1 Are you at all worried that using a mobile phone might affect your health? (If *yes* then ask them about their concerns. If *no* then they will presumably say why, but the answer to the next question will also clarify whether they are unaware of potential problems)

1.2 (Whether they answered *yes* or *no* to 1.1, ask them) Have you seen any articles or news reported in the newspaper about mobile phone effects?

2 Speed Dial Complexity

2.1 Do you know what speed dial is?

2.2 (If *yes* to 2.1) Do you know how to use the speed dial function?

2.3 (If *yes* to 2.2) Do you use speed dial? (i.e. it's one thing to know how to use it; it's another to actually use it)

2.4 (If *yes* to 2.3) Do you find speed dial convenient to use?

3 Memory Problems

3.1 Can you remember your own mobile phone number?

3.2 (If *no* to 3.1) How do you manage?

3.3 Do you ever have problems remembering how to use your mobile phone?

3.4 (Particularly if *yes* to 3.3) Do you have any memory aid that you use with mobile phone (such as a notebook)?

4 Function Complexity

4.1 Do you make and receive calls on your phone, or only receive them from other people?

4.2 (If *receive-only*). Why do you not make calls? (I'd imagine either because it's perceived as too hard – or too expensive)

4.3 (Regardless of answers to 4.1 & 4.2) Do you use your mobile phone for anything else other than making and/or receiving calls?

4.4 (Regardless of answer to 4.3) Can you think of any other things that your phone can do? (Make a list)

4.5 Do you do any of those things? If not, why not?

DEMOGRAPHIC INFORMATION

Please tick (/) for the answers.

1. Age: ( ) years old

2. Gender: ☐ Female ☐ Male

3. Employment status: ( )

4. Marital status: ( )

5. Highest education attainment:

☐ Primary school ☐ Secondary school

☐ Degree ☐ Post-graduate / Professional Certificate

☐ Others: _____

SECTION 1: HEALTH CONCERNS

Please tick (/) for the answers.

1.1 Are you worried that using a mobile phone might affect your health?

☐ Yes ☐ No

1.2 What effects do you think mobile phones might have on health?

_____

_____

_____

_____

1.3 Have you seen any articles or news about health and mobile phones?

☐ Yes ☐ No

1.4 If yes, approximately when was the last time you saw or heard articles or news about health and mobile phones?

_____

_____

_____

SECTION 2: SPEED DIAL

2.1 Do you know what speed dial is?

☐ Yes ☐ No

Comments:

_____

_____

_____

2.2 If *yes to* Question 2.1, do you know how to use the speed dial function?

☐ Yes ☐ No

Comments:

_____

_____

_____

2.3 If *yes* to Question 2.2, do you use speed dial?

☐ Yes ☐ No

Comments:

_____

_____

_____

2.4 If *yes* to Question 2.3, do you find speed dial convenient to use?

☐ Yes ☐ No

Comments:

_____

_____

_____

SECTION 3: MEMORY

3.1 Can you remember your own mobile phone number?

☐ Yes ☐ No

3.2 If *no* to Question 3.1, how do you manage?

_____

_____

_____

_____

3.3 Do you ever have problems remembering how to use your mobile phone?

☐ Yes ☐ No

3.4 If *yes* to Question 3.3, do you have any memory aid that you use with mobile phone? (eg: notebook or crib sheet)

_____

_____

_____

SECTION 4: FUNCTION COMPLEXITY

4.1 Do you both make and receive calls on your phone? If yes, please proceed to Question 4.4.

☐ Yes ☐ No

4.2 Do you only receive calls from other people? If yes, please proceed to Question 4.3.

☐ Yes ☐ No

4.3 Why do you not make calls?

_____

_____

_____

_____

4.4 Do you use your mobile phone for anything else other than making and/or receiving calls? Please make a list.

_____

_____

_____

_____

4.5 Can you think of any other things that your phone can do?

_____

_____

_____

_____

4.6 Do you do any of those things that you have mentioned in Question 4.5? If not, why not?

_____

_____

_____

_____

_____

THANK YOU

DEMOGRAPHIC INFORMATION

Please tick (/) for the answers.

1. Age: ( ) years old

2. Gender: ☐ Female ☐Male

3. Race: ☐Malay ☐ Chinese ☐ Indian ☐Other

4. Employment status: ( )
   If retiree, please state previous employment: ( )

5. Marital status: ( )

6. Highest education attainment:

☐	Primary school (standard 1 – 6)	☐	Certificate/ Diploma
☐	Secondary school (form 1 -2)	☐	Degree
☐	LCE	☐	Post-graduate/ Professional Certificate
☐	GCE	☐	Others: _____

7. Language preference:

☐	Malay	☐	English
☐	Mandarin	☐	Tamil/ Urdu
☐	Others: _____		

SECTION 1: HEALTH CONCERNS

Please tick (/) for the answers.

1.1 Are you worried that using a mobile phone might affect your health?

☐ Yes ☐ No

1.2 What effects do you think mobile phones might have on health?

_____

_____

_____

_____

1.3 Have you seen any articles or news about health and mobile phones?

☐ Yes ☐ No

1.4 If yes, approximately when was the last time you saw or heard articles or news about health and mobile phones?

_____

_____

_____

SECTION 2: SPEED DIAL

2.1 Do you know what speed dial is?

☐ Yes ☐ No

Comments:

_____

_____

_____

2.2 If *yes to* Question 2.1, do you know how to use the speed dial function?

☐ Yes ☐ No

Comments:

_____

_____

_____

2.3 If *yes* to Question 2.2, do you use speed dial?

☐ Yes ☐ No

Comments:

_____

_____

_____

2.4 If *yes* to Question 2.3, do you find speed dial convenient to use?

☐ Yes ☐ No

Comments:

_____

_____

_____

SECTION 3: MEMORY

3.1 Can you remember your own mobile phone number?

☐ Yes ☐ No

3.2 If *no* to Question 3.1, how do you manage?

_____

_____

_____

_____

3.3 Do you ever have problems remembering how to use your mobile phone?

☐ Yes ☐ No

3.4 If *yes* to Question 3.3, do you have any memory aid that you use with mobile phone? (eg: notebook or crib sheet)

_____

_____

SECTION 4: FUNCTION COMPLEXITY

4.1 Do you both make and receive calls on your phone? If yes, please proceed to Question 4.4.

☐ Yes ☐ No

4.2 Do you only receive calls from other people? If yes, please proceed to Question 4.3.

☐ Yes ☐ No

4.3 Why do you not make calls?

_____

_____

_____

_____

4.4 Do you use your mobile phone for anything else other than making and/or receiving calls? Please make a list.

_____

_____

_____

_____

4.5 Can you think of any other things that your phone can do?

_____

_____

_____

_____

4.6 Do you do any of those things that you have mentioned in Question 4.5? If not, why not?

_____

_____

_____

_____

_____

THANK YOU

References

Abdou, K. (2004). The strategic alliances between the American and german companies. *Journal of European Business Review*. 16(1), pp. 8-27.

Adler, P. J. (2005). Dealing with interviews when creating personas: a practical approach. *Proceedings of Student Interaction Design Research Conference SIDER05*, 27-28 January 2005, pp. 84-88.

Baron, N. S. and Segerstad, Y. H. A. (2010). Cross-cultural patterns in mobile-phone use: public space and reachability in sweden, the usa and japan. *New Media & Society*, 12(1), pp. 13-34.

Biljon, J. V. and Kotze, P. (2008). Cultural factors in mobile phone adoption and usage model. *Journal of Universal Computer Science*, 14(16), pp. 2650-2679.

Blom, J., Chipcasw, J. and Lehikoinen, J. (2005). Contextual and cultural challenges for user mobility research. *Communications of the ACM*, July, 48(7), pp. 37-41.

Blomquist, A. and Mattias, A. (2002). Personas in action: ethnography in an interaction design team. *Proceedings of the second Nordic conference on Human-computer interaction* (NordiCHI '02), pp. 197-200. DOI=10.1145/572020.572044

Blythe, M. and Wright, P. (2006). Pastiche scenarios: fiction as a resource for experience centred design. *Interacting with Computers*, 18(5), September, pp. 1139-1164.

Bodley, J. H. (2000). *Cultural anthropology: tribes, states and the global system*. 3rd Edition, Mayfield Publishing Co., Mountain View, CA.

Busha, C. H. and Harter, S.P. (1980). *Research methods in librarianship: techniques and interpretation*. New York: Academic Press.

Business Communications Review. (2005). *A billion mobile phones a year by 2009, report say*. Business Communication Reviews, Sept. 8.

Cardon, P. W. (2008). A critique of hall's contexting model: a meta-analysis of literature on intercultural business and technical communication. *Journal of Business and Technical Communication*, 22 (399), pp. 399-428. DOI:10.1177/1050651908320361

Carroll, J. (1995). *Scenario-based design*. Wiley.

Chapman, C. N. and Milham R.P. (2006). The persona's new clothes: methodological andpractical arguments against a popular method. *Proceedings of the Human Factors and Ergonomics Society 50th Annual Meeting*, pp. 634-636.

Choi, B., Lee, I. and Kim, J. (2006). Culturability in mobile data services: a qualitative study of the relationship between cultural characteristics and user-experience attributes. *International Journal of Human-Computer Interaction*, 20(3), pp. 171-203.

Cooper, A. (2004). *The inmates are running the asylum: why high tech products drive us crazy and how to restore the sanity*. 2nd Edition. Pearson Higher Education.

Creswell, J. W. (2003). *Research design : qualitative, quantitative, and mixed method approaches*. Thousand Oaks, Calif : Sage Publications, London.

Dai, H. and Palvia, P. C. (2009). Mobile commerce adoption in china and the united states: a cross-cultural study. *SIGMIS Database* 40(4), pp. 43-61. DOI= 10.1145/1644953.1644958

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), pp. 319-340.

Department of Statistics. (2009). *Population by Age Group, 1963-2008*. Kuala Lumpur: Government of Malaysia.
Retrieved May 11, 2010, from
http://www.statistics.gov.my/portal/images/stories/files/LatestReleases/population/msia_broadage_1963-2008.pdf

Department of Statistics. (2001). *Population and housing census of Malaysia*. Kuala Lumpur: Government of Malaysia.

Dickinson, A., Arnott, J. and Prior, S. (2007). Methods for human-computer interaction research with older people. *Behaviour & Information Technology*, 26(4), pp. 343-352.
DOI=10.1080/01449290601176948

Dickinson, A., Eisma, R., Syme, A. and Gregor, P. (2002). UTOPIA: Usable technology for older people: inclusive and appropriate. *Brewster, S., Zajicek, M. (eds.) A New Research Agenda for Older Adults, Proc. BCS HCI*, London, pp. 38–39.

Eisma, R., Dickinson, A. Goodman, J., Syme, A., Tiwari, L. and Newell, A.F. (2004). Early user involvement in the development of Information Technology related products for older people. *Universal Access in the Information Society*, 3(2), pp. 131-140.

Eisma R., Dickinson A., Goodman J., Mival O., Syme A. and Tiwari L. (2003). Mutual inspiration in the development of new technology for older people. *Include*, London, March, pp.7:252-7:259.

Fincher, S. and Tenenberg, J. (2005). Making sense of card sorting data. *Expert Systems*, 22(3), pp. 89-93.

Fossum, T. and Haller, S. (2005). Measuring card sort and orthogonality. *Expert Systems*, 22(3), pp. 139-146.

Fugger, E., Prazak B., Hanke, S. and Wassertheurer S. (2007). Requirements and ethical issues for sensor-augmented environments in elderly care. *Universal Access in HCI*, Part 1, HCII 2007, LNCS 4554, pp. 887-893.

Gregor, P., Newell, A. F. and Zajicek, M. (2002). Designing for dynamic diversity – interfaces for older people. *Conference proceedings of Assets 2002*, pp. 151-156.

Grudin, J. and Pruitt, J. (2002). Personas, participatory design, and product development: An infrastructure for engagement. *Proc. PDC 2002*, pp. 144-151.

Hall, E.T. (1990). *The silent language*. New York: Anchor Books.

Hall, E.T. (1976). *Beyond culture*. New York: Doubleday.

Hagen, P., Robertson, T. and Kan, M. (2005). *Methods for understanding use of mobile technologies*. Technical Report October.
Retrieved January 15, 2008, from
http://research.it.uts.edu.au/idwop/downloads/MOBILEMETHODS_05v2.pdf

Hand Phone Users Survey. (2006).
Retrieved Nov. 2, 2007, from
http://www.mcmc.gov.my/facts_figures/stats/pdf/HPSurvey2006.pdf

Harris, P., Rettie, R. and Kwan, C.C. (2005). Adoption and usage of m-commerce: a cross-cultural comparison of hong kong and united kingdom. *Journal of Electronic Commerce Research*, 6(3), pp. 210-224.

Harris, R. W., Yogeesvaran, K. and Lee, L.W.Y. (2005). *Telecentres for national e-Inclusion in malaysia*.
Retrieved Nov. 2, 2007, from
http://i4online.net/ATF/2007/fullpapers/Roger_ATF07ABS113.pdf

Hassan, H. and Md Nasir, M. H. N. (2008). The use of mobile phones by older adults: a malaysian study. *SIGACCESS Access. Comput.* 92 (September 2008), pp. 11-16.DOI=10.1145/1452562.1452564

Hawthorn, D. (2000). Possible implications of ageing for interface designers. *Interacting with Computers*, vol. 12, pp. 507–528.

Hertzog, C. and Bleckley, M.K. (2001). Age differences in the structure of intelligence - Influences of information processing speed. *Intelligence*, 29(3), pp.191–217.

Hisham, S. (2009). Experimenting with the use of persona in a focus group discussion with older adults in Malaysia. *Proceedings of the 21st Annual Conference of the Australian Computer-Human Interaction Special Interest Group: Design: Open 24/7* (OZCHI '09), pp. 333-336. DOI=1738826.1738889

Hisham, S. and Edwards, A. D. N. (2007). Ageing and its implication for elderly web experiences. *S. H. Kurniawan & P. Zaphiris (Eds)*, Advances in universal web design and evaluation: research, trends and opportunities. Hershey: Idea Group Inc., pp. 97-113.

Hofstede, G. (2001). *Culture's Consequences: comparing values, behaviors, institutions, and organizations across nations* (2nd ed.). Thousand Oaks, CA: SAGE Publications.

Hofstede, G. and Hofstede, G. J. (2005). *Cultures and organizations: software of the mind* (Revised and expanded 2nd ed.). New York: McGraw-Hill.

Holzinger, A., Searle, G. and Nischelwitzer, A. (2007). On some aspects of improving mobile applications for the elderly. *Universal Access in HCI*, Part 1, HCII 2007, LNCS 4554, pp. 923-932.

Inglis, E., Szymkowiak, A., Gregor, P., Newell, A.F., Hine, N., Shah, P., Wilson, B.A. and Evans, J. (2002). Issues surrounding the user centred development of a new interactive memory aid. *Universal Access in the Information Society*, Special Issue on "Countering Design Exclusion", 2(3), pp. 1-19.

International Telecommunication Union. (2010). *Press Release - ITU sees 5 billion mobile subscribers globally in 2010*.
Retrieved May 12, 2010 , from
http://www.itu.int/net/pressoffice/press_releases/2010/06.aspx

International Telecommunication Union. (2009). *The world in 2009: ict facts and figures*.
Retrieved May 12, 2010, from
http://www.itu.int/ITU-D/ict/material/Telecom09_flyer.pdf

International Telecommunication Union. (2006).
Retrieved Nov. 15, 2007, from
http://www.itu.int/ITU-D/ict/statistics/ict/index.html

Jeffries, R., Miller, J. R., Wharton, C. and Uyeda, K. M. (1990). User interface evaluation in the real world: a comparison of four techniques. *Proceedings of CHI' 91 (ACM Computer Human Interaction)*, New Orleans, April 28 – May 3, pp 1-11.

Kaba, B., N'Da, K. and Mbarika, V. (2008). Understanding the factors influencing the attitude toward and the use of mobile technology in developing countries: a model of cellular phone use in guinea. *Proceedings of the 41st Hawaii international Conference on System Sciences (HICSS 2008)*, Hawaii, pp. 127-140.
DOI=10.1109/HICSS.2008.479

Kantola, V., Tiitta, S., Mehto, K. and Kankainen, T. (2007). Creativity and cognition using dramaturgical methods to gain more dynamic user understanding in user-centered design. *Creativity and Cognition*, pp.173 - 182.

Katz J. E. and Sugiyama, S. (2006). Mobile phones as fashion statements: evidence from student surveys in the us and japan. *New Media Society*, vol. 8, pp. 321-337.

Ketola, P. and Roykkee, M. (2001). Three facets of usability in mobile handsets. *Proceedings of CHI 2001*. Seattle, Washington.

Kim, H., Heo, J., Shim, J., Kim, M., Park, S. and Park S. (2007). Contextual research on elderly user's needs for developing universal design mobile phone. *Universal Access in HCI*, Part 1, HCII 2007, LNCS 4554, pp. 950-959.

Kim, J. H. and Lee, K. P. (2007). Culturally adapted mobile phone interface design: correlation between categorization style and menu structure. *Proceedings of the 9th international Conference on Human Computer interaction with Mobile Devices and Services*, Singapore, 09 – 12 September, vol. 309, pp. 379-382.

Kim, J. H. and Lee, K. P. (2005). Cultural difference and mobile phone interface design: icon recognition according to level of abstraction. *Proceedings of the 7th international Conference on Human Computer interaction with Mobile Devices & Services*. Salzburg, Austria, 19 – 22 September, vol. 111, pp. 307-310.

Kitzinger, J. (1995). Introducing focus groups. *British Medical Journal*, 311(7000), pp. 299-302.

Krippendorff, K. (1980). *Content analysis: an introduction to its methodology*. Beverly Hills: Sage Publications, USA.

Kuchinke, K, P. (1999). Leadership and culture : work related values and leadership styles among one company's u.s. and german telecommunication employess. *Human Resource Development Quarterly*, 10 (2), pp. 135-154.

Kurniawan, S.H. (2008). Older people and mobile phones: A multi-method investigation. *International Journal of Human-Computer Studies 66*, pp. 889-901.

Kurniawan, S.H. (2006). An exploratory study of how older women use mobile phones. *Proceedings of UbiComp'06*, Orange County, CA, USA, 17-21 September, pp. 105-122.

Kurniawan, S.H., Mahmud, M. and Nugroho, Y. (2006). A study of the use of mobile phones by older persons. *Extended Abstracts of CHI'06*, Montreal, QC, Canada, 22-27 April, pp. 989-994.

Laslett, P. (1991). *A fresh map of life: the emergence of the third age*. Harvard University Press, pp. 213.

Lee, Y.S. (2007). *Older adults' user experiences with mobile phones: identification of user clusters and user requirements*. PhD Dissertation, Virginia Polytechnic Institute and State University, USA.

Lewis, J. R. (1995). IBM computer usability satisfaction questionnaire: psychometric evaluation and instructions for use. *International Journal of Human-Computer Interaction*, 7(1), pp. 57-78.

Lin, D.Y. (2001). Age differences in the performance of hypertext perusal. *Proceedings of the Human Factors And Ergonomic Society 45th Annual Meeting*, 8 – 12 October, Minneapolis, MN. (Santa Monica, CA: Human Factors and Ergonomics Society), pp. 211 – 215.

Lines, L. and Hone, K. (2002). Research methods for older adults. Presented at the workshop *'a new research agenda for older adults' at HCI 2002*.

Loke, L., Robertson, T. and Mansfield, T. (2005). Moving bodies, social selves: movement-oriented personas and scenarios. *Proceedings of the 17th Australia conference on Computer-Human Interaction: Citizens Online: Considerations for Today and the Future* (OZCHI '05). Computer-Human Interaction Special Interest Group (CHISIG) of Australia, Narrabundah, Australia, 23-25 November, pp. 1-10.

Malaysian Communications and Multimedia Commission. (2010). *Statistics and records: penetration rates at a glance*.
Retrieved May 12, 2010, from
http://register.skmm.gov.my/facts_figures/stats/ViewStatistic.asp?cc=36702694&srid=50919742

Malaysian Communications and Multimedia Commission. (2008). *Communications and multimedia: selected facts and figures, Q4 2008*.
Retrieved May 12, 2010, from
http://www.skmm.gov.my/link_file/facts_figures/stats/pdf/SKMM_Q4.pdf

Mann, W. C., Helal, S., Davenport, R. D., Justiss, M. D., Tomita, M. R. and Kemp, B. J. (2004). Use of cell phones by elders with impairments: Overall appraisal, satisfaction, and suggestions. *Technology and disability, 16*, pp. 49-57.

Markensten, E. and Artman, H. (2002). Procuring a usable system using unemployed personas. *Proc. 3rd NORDICHI 2004*, ACM Press, 2002, pp. 13-22.

Marshall, C. and Gretchen B. R. (2006). *Designing qualitative research*. Thousands Oaks, Calif: Sage Publications, London.

Massimi, M. and Baecker, R.M. (2007). *An empirical study of seniors" perceptions of mobile phones as memory aids*.
Retrieved Nov. 7, 2007, from
http://www.dgp.toronto.edu/papers/mmassimi_TECHAGING2007.pdf

Massimi, M., Baecker, R.M. and Wu, M. (2007). Using participatory activities with seniors to critique, build, and evaluate mobile phones. *Proceedings of the 9th international ACM SIGACCESS conference on Computers and accessibility*. Tempe, Arizona, USA, October 15 - 17, pp. 155-162.

Mayhew, D. J. (1992). *Principles and guidelines in software user interface design*. Prentice - Hall.

McCreadie, C. (2005). Older pedestrians, mobile phones and new way-finding technology: first stage of new research. *Gerontechnology*, 4(1), pp. 5-14.

McSweeney, B. (2002). Hofstede's model of national cultural differences and their consequences: A triumph of faith – a failure of analysis. *Human Relations*. 55(1), pp. 89-118.

Melenhorst, A.S., Rogers, W.A. and Bouwhuis, D.G. (2006). Older adults' motivated choice for technological innovation: Evidence for benefit-driven selectivity. *Psychology and Aging*, 21(1), pp. 190-195.

Midford, R. and Kirsner, K. (2005). Implicit and explicit learning in aged and young adults. *Aging Neuropsychology And Cognition*, 12(4), pp. 359–387.

Mikkonen, M., Vayrynen, S., Ikonen, V. and Heikkila, M. O. (2002). User and concept studies as tools in developing mobile communication services for the elderly. *Personal Ubiquitous Computing*. 6(2), pp. 113-124.

Mynatt, E.D., Melenhorst, A.S., Fisk, A.D. and Rogers, W.A. (2004). Aware technologies for aging in place: understanding user needs and attitudes. *Ieee Pervasive Computing*, 3(2), pp. 36-41.

Newell, A. F., Arnott, J., Carmichael, A. and Morgan M. (2007). Methodologies for involving older adults in the design process. *Proceedings HCII 2007*, 5 (2007), Beijing, 22-27 July, pp.982-989.

Newell, A. F. and Dickinson, A. (2001). Designing a portal for older users: A case study of an industrial/ academic collaboration. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 13(3), pp. 347-375.

Nielsen, J. (1993). *Usability Engineering*. Boston, MA: Academic Press.

Norman K. D. and Yvonna S. L. (2008). *Collecting and interpreting qualitative materials*. Sage Publications, London.

Ofcom. (2006). *Media Literacy Audit: Report on media literacy amongst older people*. Ofcom's Media Literacy Publications and Research, March 2006. Retrieved Oct. 23, 2007, from http://www.ofcom.org.uk/advice/media_literacy/medlitpub/medlitpubrss/older/older.pdf

O'Neill, A-M. (2003). *Evaluating technology for elders: towards a measure of attitudes*. PhD Thesis, University of Hertfordshire, UK.

Ong, F. S and Phillips, D.R. (2007). Older consumers in Malaysia. *International Journal of Ageing and Later Life*, 2(1), pp. 85-117.

Oshlyansky, L., Cairns P. and Thimbleby, H. (2006). A cautionary tale: Hofstedeís VSM revisited. *Proceedings of British Human Computer Interaction Conference 2006*. London, September 11 – 15, pp. 1-4.

Pak, R. (2001). A further examination of the influence of spatial abilities on computer task performance in younger and older adults. *Proceedings of the Human Factors and Ergonomic Society 45th Annual Meeting*, 8 – 12 October, Minneapolis, MN. (Santa Monica, CA: Human Factors and Ergonomics Society), pp. 1551–1555.

Palen, L., Salzman, M. and Youngs, E. (2000). Going wireless: behavior & practice of new mobile phone users. *Proceedings of the 2000 ACM Conference on Computer Supported Cooperative Work* (Philadelphia, Pennsylvania, United States). CSCW '00. ACM, Dec. 2 - 6, New York, pp. 201-210.

Pattison, M. and Stedmon, A. (2006). Inclusive design and human factors: designing mobile phones for older users. *Psychology Journal*, 4(3), pp. 267-284.

Patton, M. Q. (2002). *Qualitative research and evaluation methods*. Thousand Oaks, Calif : Sage Publications, London.

Prest, A.R. and Turvey, R. (1965). Cost-benefit analysis: a survey. *The Economic Journal*, 75(300), pp. 683-735.

Pruitt, J. and Grudin, J. (2003). Personas: practice and theory. *Proceedings of the 2003 conference on Designing for user experiences* (DUX '03), pp. 1-15. DOI=10.1145/997078.997089

Population and Housing Census. (2000). *Population distribution and basic demographic characteristics report.*
Retrieved April 14, 2008, from
www.statistics.gov.my/english/frameset_census.php?file=census

Ryu, Y. S. and Smith-Jackson, T. L. (2005). Usability questionnaire items for mobile products and content validity. *Proceedings of HCI International*, Las Vegas.

Satchell, C. and Singh, S. (2005). The mobile phone as the globalizing icon of the early 21st century. *Proceedings HCI International: The 11th International Conference on Human-Computer Interaction*, Las Vegas, pp. 1-10.

Schein, E. H. (1992). *Organizational culture and leadership*. 2nd Edition. San Francisco: Jossey-Bass.

Schieber, F. (2003). *Human factors and aging: identifying and compensating for age-related deficits in sensory and cognitive function*. Charness, N., Cshaie, K.W. (eds.) Impact of technology on successful aging, Springer Publishing Company, U.S.A, pp. 64–65.

Silverman, D. (2001). *Interpreting qualitative data: methods for analysing talk, text, and interaction*. Thousand Oaks, Calif: Sage Publications, London.

Swallow, D., Blythe, M. and Wright, P. (2005). Grounding experience: relating theory and method to evaluate the user experience of smartphones. *Proceedings of EACE 05*, Crete, pp. 91-98.

Thompson, G. J., Locander, W. B. and Pollio, H. R. (1989). Putting consumer experience back into consumer research: The philosophy and method of existential-phenomenology. *Journal of consumer research, 16*(2), pp. 133-146.

Trompenaars, F. and Turner, C.H. (1997). *Riding the waves of culture: understanding cultural diversity in business*. New York: McGraw-Hill.

Tullis, T. and Wood, L. (2004). How many users are enough for a card-sorting study? *Proceedings UPA' 2004*, Minneapolis, MN, June 7-11.

United Nations Department of Economic and Social Affairs – Population Division. (2009). *Report: World: World population ageing report (December 2009)*, pp. 11.
Retrieved May 11, 2010, from
http://www.globalaging.org/agingwatch/desa/population/ageingpopulation.pdf

United Nations Division for Social Policy and Development. (2002). *Report of the second world assembly on ageing*. 8-12 April, Madrid, Spain, pp 1.

United Nations. (2002). *World Population Ageing 1950-2050*.
Retrieved Oct. 11, 2007, from
http://www.un.org/esa/population/publications/worldageing19502050

Wajcman, J., Bittman, M., Jones, P., Johnstone, L. and Brown, J. (2007). *The impact of the mobile phone on work/life balance*.
Retrieved June 14, 2008, from
http://polsc.anu.edu.au/staff/wajcman/pubs/Report_on_Mobiles_and_Work_Life_Balance_June_07.pdf

Weber, R. (1990). *Basis content analysis*. 2nd Edition. Thousand Oaks, CA: Sage Publications.

Westlund, O. (2010). New(s) functions for the mobile: a cross-cultural study. *New Media & Society*, 12(1), pp. 91-108.

Zajicek, M. (2004). Successful and available: interface design exemplars for older users. *Interacting with Computers*, 16(3), pp. 411-430.

Ziefle, M. and Bay, S. (2005). How older adults meet complexity: aging effects on the usability of different mobile phones. *Behaviour & Information Technology*, 24(5), pp. 375-389.

Ziefle, M. and Bay, S. (2004). *Mental models of a cellular phone menu. Comparing older and younger novice users. S. Brewster & M. Dunlop (Eds),* Mobile Human-Computer-Interaction. Springer, Berlin, Germany, pp. 25-37.