

# Middle-Aged Users' Experience of Short Message Service

Christine Soriano      Gitesh K. Raikundalia      Jakub Szajman

School of Computer Science and Mathematics  
Victoria University of Technology  
PO Box 14428, Melbourne City MC, 8001, Victoria, Australia

[christine.soriano@students.vu.edu.au](mailto:christine.soriano@students.vu.edu.au) [Gitesh.Raikundalia@vu.edu.au](mailto:Gitesh.Raikundalia@vu.edu.au) [Jakub.Szajman@vu.edu.au](mailto:Jakub.Szajman@vu.edu.au)

## Abstract

Short Message Service (SMS) is a popular form of non-verbal mobile communication. To date, most research has focused upon the use of SMS by teenagers and young adults. Our work examines the use of SMS by middle-aged users. We conducted a usability study evaluating the ease of use or difficulties experienced by middle-aged individuals whilst engaging in text message objectives and SMS tasks, in each of two pre-determined scenarios. Participants used two different mobile phone handsets to perform their tasks while the usability of each handset was assessed with respect to SMS tasks. The experiment gave insights into the usability issues experienced by middle-aged users such as the clarity of on-screen menus, and the ability to follow the navigational input provided by the hardware design of the mobile phone handsets.

*Keywords:* Short message service, SMS, text messaging, mobile phone, middle-aged users, usability.

## 1 Introduction

Short Message Service is a convenient form of communication allowing users to express themselves textually. The popularity of SMS currently plays a vital role in global mobile communications as it is a cheap, quick and direct way of communicating between individuals who are locally or geographically dispersed. For example, in December 2004, the Mobile Data Association recorded 2.5 billion SMS messages sent over the UK GSM network in one month, which was the highest recorded monthly total at that time ([www.mda-mobiledata.org](http://www.mda-mobiledata.org)). SMS is a flexible tool as it plays a role in different aspects of daily life, e.g., spontaneous communications and marketing activities. The drive of the current market in mobile phone technologies and SMS is pre-dominantly focused upon the younger consumers market, however, many middle-aged users are also willing to learn how to communicate textually by adapting to SMS technologies. Many middle-aged users now utilise SMS for business and personal communications both locally and globally. Thus, it is vital that their needs are considered so that they may actively communicate with ease and confidence.

The aim of this study is to examine the interaction between middle-aged users (aged between 35-60 years) and SMS technologies. The factors that enhance or hinder the use of SMS technologies by middle-aged users, as well as the effectiveness and efficiency of carrying out set objectives and SMS tasks is investigated with the aid of pre-defined scenarios. The mobile phone handset technology is evaluated by addressing the hardware and software related features of SMS activities and how such features affect the means of interaction of middle-aged users.

## 2 Related Work

Since SMS is a recently-emerging area, little work has been done on SMS and its use by middle-aged individuals. A recent study addressing middle-aged individuals and SMS was published in the paper "Envisioning a Mobile Phone for 'All' Ages" by Jarinee Chattatchart and Jacqueline Brodie (2003). To the authors' knowledge, this is the only work directly related to our research. The researchers investigated how age influences the preferences and needs of mobile phone owners in view that the designs of current mobile phone technologies do not support the needs of all generations of users. Results were acquired by surveys completed by 326 mobile phone users of various ages.

It was found that the younger generation of users valued new technologies, aesthetic characteristics, and the extensiveness of functionalities provided. Many of these features were not nearly as important to the older generation of users. Respondents were required to indicate their preferences for various mobile phone handset functionalities. It was discovered that the functions of alarm, text messaging, and check records were enjoyed by younger users, however alienated users over 40 years old. This suggests the opinions of the respondents may have been affected by the poor usability of specific mobile phone handsets. This was indicated by a respondent stating that such activities were complicated. Thus, it was proposed that mobile phone handset designs should be developed to support the needs of the older generation of users in a non-discriminating fashion. Additionally, studies on the impact of SMS have looked at the social and psychological effects of SMS, the use and behavior displayed as result of interaction with SMS by teenagers, as well as the growing role of SMS in mobile commerce and marketing exercises.

Studies focused upon the usability of SMS have also been conducted. The usability study on SMS conducted by Groot and Welie (2002), have found high levels of utility provided by mobile phone handsets, that is, the service

Message	Scenario	Objectives	SMS tasks
1	1	<ol style="list-style-type: none"> <li>1. Ask Susie what items you need to purchase for this weeks shopping list</li> <li>2. Add an emoticon to show you are sad because you do not know what items must be purchased → :(</li> </ol>	<ol style="list-style-type: none"> <li>1. Begin at the 'Home' screen and access the menu item to write a new SMS message</li> <li>2. Write your message</li> <li>3. To send the message to Susie, access her mobile phone number using her entry in the phone book</li> <li>4. Send message</li> <li>5. Exit to the 'Home' screen and wait for Susie's reply.</li> </ol>
	2	<ol style="list-style-type: none"> <li>1. Inform John of the movie that you have just watched and ask John if he has watched it (Movie Title: 'Ingenious Mind')</li> <li>2. Add an emoticon to show you are happy because you are excited to talk about the movie → :)</li> </ol>	
2	1	<ol style="list-style-type: none"> <li>1. Tell John how much you would rate the movie out of 10 (i.e. 7.5 out of 10)</li> <li>2. Tell John that he can borrow your copy of the movie</li> </ol>	<ol style="list-style-type: none"> <li>1. Your inbox is now full</li> <li>2. Proceed to remove the first message sent by Susie to clear up some space</li> <li>3. Now go to your inbox and retrieve the message that you have just received from Susie</li> <li>4. Read and reply</li> <li>5. Send the message to Susie using the phonebook feature</li> <li>6. Exit to 'Home' screen and wait for Susie's reply</li> </ol>
	2	<ol style="list-style-type: none"> <li>1. Specify how many litres of ice-cream you will buy</li> <li>2. Ask Susie what's for dinner tonight</li> </ol>	
3	1	<ol style="list-style-type: none"> <li>1. Tell John that you will be running late and that you will just give him a call when you get home <ul style="list-style-type: none"> <li>- This time using the available templates/quick notes</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Open the received message and read</li> <li>2. Access the messages menu</li> <li>3. Navigate your way to locate the templates/quick notes options</li> <li>4. Select the 'Will be home later' template</li> <li>5. Enter Susie's mobile phone number manually. Do not use the phonebook feature at this step.</li> <li>6. Send message</li> <li>7. Return to 'Home' screen and wait for Susie's reply</li> </ol>
	2	<ol style="list-style-type: none"> <li>1. Tell Susie that you will be home later at 6:30pm <ul style="list-style-type: none"> <li>- This time using the available templates/quick notes</li> </ul> </li> </ol>	

**Table 1: Scenario Tasks and Objectives**

and value they offer its users. Users of SMS technologies are “willing to invest time in a poor user interface” (Groot & Welie, 2002) as they tolerate poor usability interface and hardware designs. Hence, there is a competition between the utility and usability of SMS technologies. Groot and Welie suggest offering services with high enough utility to overcome usability constraints, while minimising usability issues. However, simply increasing the level of utility does not eliminate the existence of usability issues. Axup, Viller and Bidwell (2005) have also conducted a usability study on SMS by observing participants engaging in SMS in outdoor environments. It was found that “many handsets have small screens and slow text-entry mechanisms” (Axup et al. 2005), which may contribute to the lack of SMS adoption as a means for communication by middle-aged users. Other usability issues identified include screen glare making it difficult to read text, small key sizes and keypad layouts, and multiple key presses required to access and input characters. Furthermore, a field study conducted by Susanna Hedbring compares the usability of SMS and mobile chat. As stated, the “cumbersome interaction design” of SMS “goes against fundamental usability guidelines.” Despite this, results of the study find that the participants respond that SMS is easy to handle (Hedbring, 2002).

### 3 Experimental Design of Usability Study

This study investigates the usability of SMS regarding the SMS features and handset characteristics. User interaction is evaluated against the usability goals of efficiency, errors, learnability, memorability, and user satisfaction. In this study, we evaluate how well each of these usability goals are satisfied from the perspective of

middle-aged users as they engage in SMS activities on two different mobile phone handsets. The mobile phone handsets used in this study were the NOKIA 5510 and the Samsung T400.

Ultimately, twenty middle-aged individuals will participate in the study. Each participant is required to carry out two pre-defined scenarios, one scenario for each mobile phone handset. The scenarios “Generating a Shopping List” and “Discussing a Movie”, consist of a set of *Objectives* indicating the information that must be communicated, and the subsequent *SMS task*, highlighting the procedures to be followed in satisfying the objectives, such as deleting an SMS in the Inbox (Table 1). Participants’ responses are captured and evaluated on the basis of their interaction with the mobile phone handsets and in accordance with the above usability goals

User feedback is acquired through a set of questionnaires: A pre-experiment questionnaire, post-experiment questionnaire and a scenario questionnaire that is completed at the end of each scenario (Table 2). A short interview seeking more information about open-ended questions was also conducted. For example, users are asked to make further comments on “How easy/difficult did you find it to complete the specified SMS tasks?” User feedback is also captured by encouraging the use of the think-aloud protocol as participants verbalise their thoughts whilst interacting with a handset and satisfying objectives

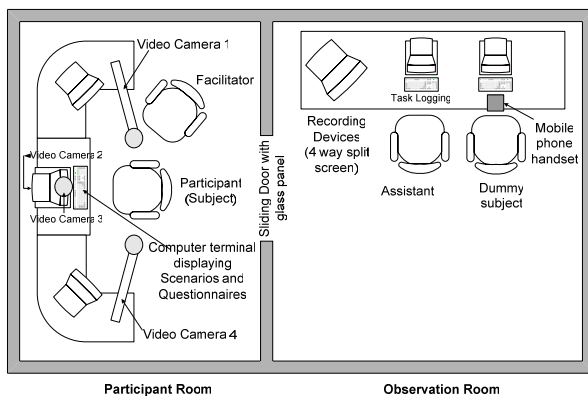
Video camera output is recorded to monitor user actions. The camera captures movement, dialogue and facial expressions. Further refinement and assessment of the

Scenario 1 – Generating A Shopping List		
1	Please indicate how much do you agree to the following statements	
1 - Strongly Disagree 2 – Disagree 3 – Neutral 4 – Agree 5 – Strongly Agree <i>You will later be asked to explain the reason for you responses</i>		Answer
a.	SMS functions are visible (e.g. SMS menu item to 'send' an SMS is clearly visible)	
h.	Menu names used for SMS functions are understandable	
2	Please comment on the mobile phone handset that you have just interacted with	
3	Please comment on the scenario you have just completed	

**Table 2: Scenario Questionnaire**

usability of SMS is made by focusing upon user interaction and performance by evaluating how well users carry out specific SMS tasks and satisfy pre-determined objectives.

A usability research facility (Figure 1) at Victoria University, Australia, was used to carry out the experiments. The facility comprises of two rooms—an observation room and participant room separated by a sliding door with a glass pane. The observation room contains the monitoring equipment and task logging facilities used to record the performance of the participant. The assistant located in this room manages the monitoring equipment and timing of the experiments. A ‘dummy’ subject also located in this room replies to the SMS messages sent by participants following the pre-defined responses for each scenario. The actual study is conducted in the participant room. The video and audio monitoring devices are set up here. Both the facilitator and the participant are situated in the participant room. The facilitator conducts the experiment by explaining the operation of the mobile handsets, observing user interaction, guiding the participant through the scenarios and ensuring that the participant completes all questionnaires. The participant is required to send SMS messages which are received and replied to by the ‘dummy’ subject. A scenario questionnaire is completed by the participant at the end of each scenario reflecting upon their experiences regarding the handset and scenario completed. Finally, the participant completes a post-experiment questionnaire addressing the usability goals in accordance with the scenarios and experiences gained during the study. The results described in the next section are derived from the particular questions in Table 2.



**Figure 1: Usability Research Facility**

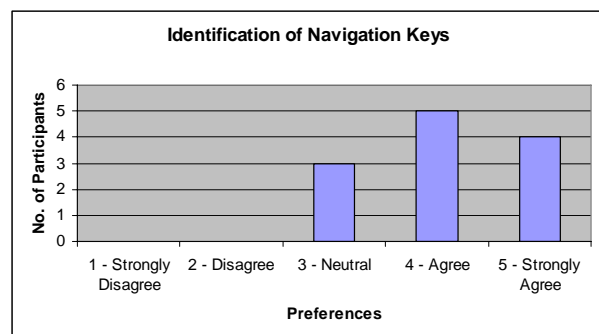
## 4 Results

The usability of SMS and the resulting user experiences were influenced by the NOKIA 5510 and the Samsung T400 handsets used in the study. These handsets adopt different keypad arrangements, navigational elements, naming conventions, menu hierarchies, and the use of colour and black and white screens.

This is an ongoing study and so far twelve out of the intended twenty experiments have been conducted. The experimental results indicate that some of the issues encountered by middle-aged users are related to the complexity of the navigation keys, the clarity of labeling and naming conventions, as well as the layout of the menu hierarchies.

### 4.1 Navigational Input

The first signs of user resistance in utilising SMS functionalities were experienced in the navigational inputs. All 12 participants experienced difficulties in using the 10 keys on the Samsung navigational keypad. They experienced difficulties in the interpretation of key functions, specifically as to the shape, labeling and positioning. The ‘centre key’ was often recognized as the ‘enter key’ due to its position and its size. In addition, navigation key labeling using lines in place of arrows caused participants to believe that a scroll system was not implemented. The NOKIA handset offered increased navigational efficiency having only three navigational keys. The NOKIA handset employs a ‘select’ key labeled with a horizontal line located in the centre of the navigational keys which is easily identified. The other two keys only offer ‘cancel’ and ‘scroll’ options.



**Figure 2: Identification of navigational input on the NOKIA handset**

The labeling of the arrows caused confusion to some users as they were unsure whether they selected left, right, up or down. Results obtained from the scenario questionnaire's question 1a. (Table 2) found that five of the 10 participants interacting with the NOKIA for the second scenario 'agree' to the clear identification of navigation keys, whereby another four participants 'strongly agree' to this same question (Figure 2).

#### 4.2 Clarity of Labeling and Naming

The study showed that the colours adopted by the on-screen menu and keypad did not play a largely significant role in distinguishing features and functionalities. Users relied more upon the clarity of labels and textual representations offered by the handsets. This conclusion was confirmed by acquiring data from a colour-blind participant indicating that text provided the dominant means for distinguishing between navigation and alphanumeric keys and identifying on-screen menu items. Thus, the consistency in layout is vital for good usability. Middle-aged users also expressed a demand for efficiency, achievable by straightforward naming conventions that could be easily and instantly interpreted. In relation to the Samsung handset's from the responses obtained from the scenario questionnaire question 1h. (Table 2), four of the 10 participants 'agreed' to the clarity of menu labels on the Samsung. However, three participants also 'disagreed' and another three remained 'neutral' (Figure 3). Additionally, 11 of the 12 observed participants could not select a miscellaneous character from the Samsung character list. The participants were unaware of the relationship between the numerical figures placed above each character item that provided the means for character selection. This resulted in user frustration. Eight of the middle-aged participants wore glasses. These participants commented upon the small size of the labels, particularly on the NOKIA keypad. The participants with or without eyeglasses found it difficult to distinguish between the characters ':' and ';' which are both located near each other on the same key. Consequently, many subjects preferred the larger size of labels found on the Samsung handset.

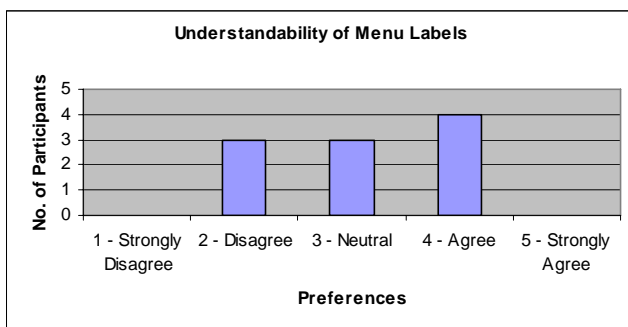


Figure 3: Clarity of Samsung Menu Labels

#### 4.3 Menu Hierarchies

Middle-aged users frequently expressed need to know where they were within the menu hierarchy. Many participants showed tendencies of getting 'lost' or not knowing how deeply they were embedded within a menu.

A participant indicated that they were unsure and fearful about what menu options will appear next, lacking appropriate feedback if they were on the correct path in achieving their desired task. Four participants wanted a help feature to be provided by the phone, in form of a pocket instruction manual or a help button on the handset itself. Participants also recommended that the menu hierarchy should be displayed across the top of the screen or as a toolbar running along side of the screen keeping track of the location of the user at any given moment. As commented by a participant, "This is where people get confused as they may not be able to access the menu items they want to utilise, or may not be able to get back to where they were". Therefore, such a feature would create a sense of confidence, and the feeling of being reassured that they were on the correct path and could find a way back to the beginning after having accessed incorrect menu items.

### 5 Conclusion

Usability study of SMS in middle-aged users revealed that middle-aged users experience difficulties in interacting with SMS technology due to the poor usability of the mobile phone handset and the corresponding SMS on-screen features. There are three factors preventing users in their efficient and effective SMS activities. These factors relate to the navigation input and the characteristics of the navigational keypad. Additional factors include the clarity of labeling and naming conventions of the navigational and alphanumeric keys and the on screen objects, and finally the structure of the menu hierarchies employed. Middle-aged users should be considered when designing mobile phone handsets with extensive functionality. The usability study of SMS on middle-aged users is presently ongoing, and we will continue to investigate the factors that hinder or enhance the use of SMS by users of this age group.

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