# Chapter 5.21
# Hand Measurements and Gender Effect on Mobile Phone Messaging Satisfaction:
## A Study Based on Keypad Design Factors

**Vimala Balakrishnan**
*Multimedia University, Malaysia*

**P. H. P. Yeow**
*Multimedia University, Malaysia*

## ABSTRACT

*A total of 110 participants were interviewed to investigate the effect of hand measurements and gender on mobile phone messaging satisfaction. Physical measurements of hand-size and thumbs were recorded. This study focused on mobile phone keypad design factors; namely, key size, shape, texture, space between keys, layout and keypad simplicity. Females were found to be more satisfied with the key size and space between keys, whereas males are more satisfied with key shape. Users with smaller hands and thumbs were found to be more satisfied with key size and space between keys compared to those with larger hands and thumbs. One of the recommended improvements was to have larger keys with more space between them. Results obtained can be used by mobile phone designers to design customized mobile phones, for example, mobile phones that suit users with larger hands and thumbs, especially males.*

## INTRODUCTION

Mobile phone messaging is a popular service that allows users to communicate nonverbally, expressing themselves via combinations of alphanumerical characters with a maximum of 160 characters per single message. These mes-

sages, colloquially called SMS (Short Message Service) have recorded tremendous success in most of countries, including Asian countries like Singapore, Philippines and Malaysia. Ericsson reported that SMS has been the biggest mobile data service thus far in Malaysia (Wong & Pang, 2005). SMS growth is being driven by inexpensive, convenient, interpersonal communication, as well as by applications in business and games. Moreover, it is a fast medium of communication, as a message can be delivered to the recipient within a matter of seconds.

The popularity of SMS has heightened the interest in mobile phone research. A lot of studies have been done on the adoption of mobile phone and SMS in certain countries (Faulkner & Culwin, 2005; Hőflich & Rőssler, 2002; Ling, 2005). Social and psychological effects of SMS messaging were also studied to examine the underlying motivations of using SMS (Reid & Reid, 2004). Some researchers have done usability studies of mobile phones (Balakrishnan, Yeow, & Ngo, 2005; Soriano, Raikundalia, & Szajman, 2005) and some have compared the performance of the text entry methods (Friedman, Mukherji, Roeum, & Ruchir, 2001; James & Reischel, 2001). Although numerous studies have been conducted related to SMS, very few were related to SMS users' subjective satisfaction (Han, Kim, Yun, Hong, & Kim, 2004; Yun, Han, Hong, & Kim, 2003).

## BACKGROUND

### Mobile Phone Keypad Design

Mobile phones still have a keypad designed for dialing numbers, which makes text messaging difficult. The standard ISO mobile phone has only 12 keys ("0"-"9," "#" and "*") to input the entire alphabet, punctuations and numerical characters. Each physical key is therefore overloaded with three or four alphabetical characters: for example, the digit "9" is overloaded with "W," "X," "Y" and "Z." Consequently, this requires the users to make multiple key presses to make any intended selections. The most popular forms of text input on a standard 12-key mobile phone are either multitap or predictive text entry. In the multitap system, one or multiple key presses need to be made to make certain selections. For example, the digit "2" is pressed once for "a," twice for "b" and thrice for "c." As an example, "life" is entered as 555-444-333-33. On the other hand, predictive text entry uses linguistic knowledge and allows the user to choose from possible combinations of characters, shown from the most frequent words to the least frequent words (James & Reischel, 2001).

Studies related to keypad designs are numerous; however, most attempt to tackle keypad design problems by focusing on the text input mechanism (Mackenzie, 2002; Silfverberg, Mackenzie, & Korhonen, 2000; Wigdor & Balakrishnan, 2004). The Fastap keypad was designed by placing 52 independent keys onto an area the same size as the standard ISO keypad. Although it offers an increased performance over an ISO keypad, it remains to be seen how mobile phone users will assess the trade-off between the increased performance of advanced input technologies and their additional cost (Cockburn & Siresena, 2003). Tiny mobile phone key sizes were also identified as one of the problems related to mobile phones by several studies (Kurniawan, Mahmud, & Nugroho, 2006; Maragoudakis, Tseios, Fakotakis, & Avouris, 2002; Soriano et al., 2005). A study conducted with a group of elderly people revealed that keys that are placed too close to one another cause problems while handling a mobile phone (Ornella & Stephanie, 2006).

Thus far, no studies have been conducted to study the effect of varying hand-sizes and thumbs on mobile phone messaging satisfaction; hence, this study aims to investigate and evaluate the influence of hand-size, thumb size and gender of mobile phone users on their SMS messaging satisfaction, focusing only on the keypad design factors.