Texting satisfaction: does age and gender make a difference?

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Abstract

This study investigated the effect of age and gender on mobile phone users' texting satisfaction, focusing on text entry factors. Structured questionnaire interviews were used to interview 18 subjects of both genders, aged between 17–37 years. Analysis of variance was computed. Gender effect was found on the speed of text entry method ($p = 0.027$), with the females being more satisfied than males. Age has a significant effect on navigation ($p = 0.026$) and learnability ($p < 0.001$), with the younger groups being more satisfied than the older groups. A significant interaction was found between age and gender for learnability ($p = 0.039$), with a clear difference between genders in the twenties and thirties. Results suggest that age and gender affect users' texting satisfaction, with varying text entry factors. Results obtained can be used to improve text entry methods by (i) catering to local dialects (ii) reducing key overloading or introducing a better method for text entry. It is concluded that texting satisfaction awaits improvements to the text entry methods.

Keywords: Age; Gender; Texting satisfaction; Text entry factors; Structured questionnaire interview

1 INTRODUCTION

Texting on mobile phones refers to the activity of composing short character based messages and exchanging it between mobile phone subscribers. Text messages or popularly known as SMS (Short Message Service) is an offshoot of the mobile phone which has evolved to service a number of unanticipated different uses (Lewis 2005). Teenagers originally started the textual use of the mobile as a form of cheap and accessible social communication. Today texting is a world wide phenomenon that has now well and truly spread beyond teenagers. Mobile Data Association (MDA) reported that over 3 billion text messages were sent in the UK during January 2006. This represents a 25% increase over the same period in 2005, where over 100 million SMS are now being sent per day (Upside Wireless Text Messaging 2006).

One of the major benefits of texting on a mobile phone is that it is cheaper than a mobile call, which appeals to people with limited incomes and to those who do not have access to the Internet for electronic communication. Text messages are being sent for various reasons all over the world. Some interesting ones are: a Malaysian man who divorced his wife by text (Kent 2003), a

Singaporean man being fired by text (Soh 2001) and an African shepherd alerting another shepherd regarding other high quality grazing areas (Gwin 2005).
Due to its overwhelming popularity, SMS and mobile phones have always been a subject of study among many researchers. One area that has been focus of many studies is the text entry method. Mobile phones were initially designed for the sole purpose of making and receiving calls. Today, it is overloaded with many utilities such as, games, browsing and chatting. Text input and the mobile phones are not a very good pairing. The standard keypad on mobile phones consists between 12–15 keys that can be used for text entry (capitalization, symbols, numbers and punctuations) with two to four keys for navigation purpose (arrow keys). This design obviously creates problem when a text needs to be entered in English, a language that involves 26 letters, punctuations and an intricate grammatical structure.

Typically text is entered on a mobile phone in one of two ways: *multitap* or predictive text entry. As the name implies, in a *multitap* system the user needs to make multiple key presses to make a letter selection. For example, the key '2' is loaded with the letters 'A', 'B' and 'C', thus if a user wants to enter a 'C', then he or she has to press the key three times (2–2–2) as 'C' is the third letter placed on the key. Things become more complicated when the intended letters are placed on the same key. For example, to text '*cab'* the key presses will be 222–2–22. Segmentation takes place to determine the correct letter. Most of the mobile phones employ a time-out process, in which the user is required to wait for a specified time (typically one – two seconds) before attempting to enter the next letter; hence *multitap* is often criticized for being slow.

On the other hand, the predictive text entry method uses linguistic knowledge to predict the intended words of the user. Most mobile phones have licensed the T9 input method which uses a dictionary as the basis for disambiguation. Each key is pressed only once. For example, the user enters 8–4–3–0 to key in '*the*' whereby the 0-key delimits words and terminates disambiguation of the preceding keys (Silfverberg *et al.* 2000). However, this process of disambiguation must sometimes automatically choose between more than one words produced by the same set of key presses, or present the user with a series of word choices. For example, the combination of 3–6–4 ('def'–'mno'–'ghi') might mean dog or fog. If the algorithm suggests a wrong word, the user has to manually cycle through the possible options by pressing a *next* key. Predictive text entry was found to expedite messaging, only when one really knows how to use it. An experiment using a mobile phone (James and Reischel 2001) found that experts and novices reached about 8 words per minute (wpm) with *multitap*. In comparison, predictive text entry was used by novices at 9.1 wpm and experts at 20.4 wpm. However, all these results were based on English-based text only.

User input is a crucial issue concerning mobile devices, thus a lot of studies have been conducted on the efficiency of text entry methods and ways to improve them. Some researchers have done comparison studies based on the text entry methods (Silfverberg *et al*. 2000, Buchanan *et al*. 2001, James and Reischel 2001, Cockburn and Siresena 2003, Wigdor and Balakrishnan 2004) whereas others have tried to introduce new techniques to enter text via mobile phone's limited interface (Mackenzie 2002, Wigdor and Balakrishnan 2003, Gong and Tarasewich 2005). Mackenzie *et al*. (1999) explored the text entry rates for several variations of soft keyboards. Studies have also been conducted to enhance the existing predictive text entry methods (Maragoudakis *et al.* 2002). Though numerous studies have been conducted related to text entry methods, but to the best of our knowledge, none focused on users' texting satisfaction based on age and gender.

People of different age communicate differently as they grew up with different genres of technologies. A number of studies of technology usage and age have found that usage diminishes with age, and sometimes this is linked with attitudes towards specific technologies like the Internet (Pew-Internet 2001, US Department of Commerce 2002). The Department of Commerce study found that computer and Internet use is highest among children and teenagers, while people over 50 years old are less likely to use computers. The e-Living project (Ling *et al.* 2002) investigated technology uptake across age and found that Internet usage, mobile ownership and household Internet connections rapidly decreased for users over 50 years old,

whilst being high for younger adults. A study examining the text entry on handheld computers by older workers found that younger people were faster but less accurate than older people at using a touch-screen keyboard (Wright *et al.* 2000). Age factor was studied in many other studies as well, e.g. Bunce and Sisa (2002) investigated age differences in the perceived workload associated with the performance of a demanding, high event rate, vigilance task. Lightner (2003) studied the impact of age, income and education in e-commerce designs and found that sensory impact of e-commerce sites became less important as respondents increase in age.

Gender has also been used as an important moderating variable in many studies. These include the influence of gender on grip strength and endurance (Nicolay and Walker 2005), the effects of chronic low back pain, age and gender on vertical spinal creep (Kanlayanaphotporn *et al.* 2003), psychology of SMS messaging between male and female users (Reid and Reid 2004), maturation and gender identity of the adoption of mobile phones by teenagers in Norway (Ling 2001) and the moderating effect of gender in explaining the intention to use mobile chat services (Nysveen *et al.* 2005). From a marketing perspective, findings suggest that females and males process advertisements differently and respond differently to marketing communication efforts (Wolin 2003). Gender differences were also noted in studies of technology use. For example, Gefen and Straub (1997) reveal that women and men differ in their perception of e-mail, while Venkatesh and Morris (2000) find gender differences in the motives for using a new software system at a workplace.

Identifying age and gender effect is important to improve technology product designs, so as to increase users' subjective satisfaction. Thus, the aim of this study is to investigate if gender and age influence mobile phone users' texting satisfaction with respect to the text entry factors.

2 RESEARCH FRAMEWORK

In this study, texting satisfaction was identified as the dependent variable and text entry factors such as speed, learnability, simplicity and navigation are the independent variables. All these factors were identified from literature reviews (Silfverberg *et al.* 2000, Buchanan *et al.* 2001, James and Reischel 2001, Wigdor and Balakrishnan, 2004, Soriano *et al.* 2005). Age and gender are the moderating variables. Table 1 shows the description for each of the text entry factors and Figure 1 shows the research framework used in this study.

Table 1- Text entry factors

Text entry factors	Explanation
Speed/Efficiency	The speed in which a text can be keyed in either by using *multitap* or predictive text entry system
Learnability	The ease in which users can learn the text entry mechanism
Simplicity	The simplicity of using the text entry mechanism
Navigation	The ease in which key selections can be made while texting (capitalization, punctuation, blank space etc.)

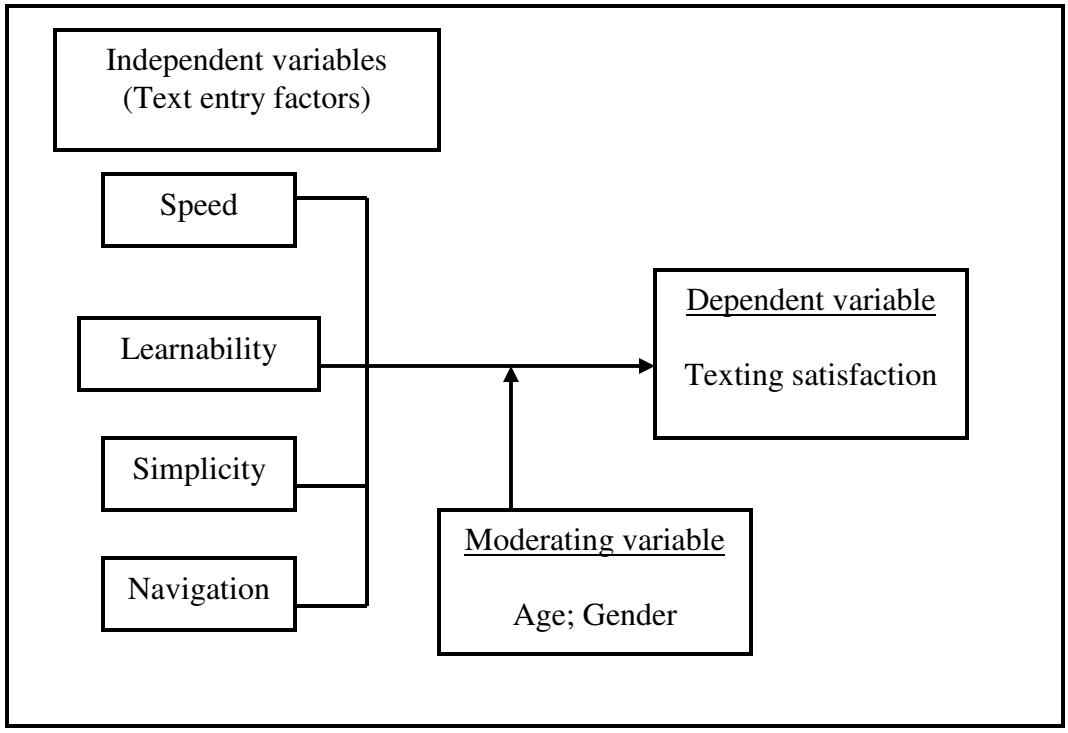

Figure 1-Research framework.

3 METHODS

3.1 Subjects

A total of 18 subjects were interviewed, consisting of nine males and nine females, aged between 17 – 37 years old (mean = 24.3 years, SD = 5.8). All subjects were recruited from Multimedia University (Malaysia), comprising of students and staff. Only a small number of interviews were conducted to obtain in-depth qualitative data. By way of comparison, in a study of teens' text messaging behaviour by Grinter and Eldridge (2001), five males and five females were interviewed. Similarly, in another study of people's monitor usage, only 18 participants were interviewed (Grudin 2001). The subjects were then grouped into three age categories, i.e. teens, twenties and thirties. This resulted in six subjects in each group with three males and three females. All the subjects have used SMS before, with an average of 3.7 years of experience and SD = 1.18. Almost 61.1% (11) of the subjects use *multitap* technique for text entry, 22.2% (4) use predictive text entry and only three teens use predictive text entry and *multitap* technique interchangeably. All 18 subjects use Nokia mobile phones of different models but with a similar keypad layout (Nokia 8250, 3120 and 6610), except for Nokia Communicator 9210™ that was used by one male subject. This particular model displays a smaller version of the QWERTY style keypads that allow for text entry with techniques similar to typing on a regular keyboard.

Table 2-Summary statistics for the majority number of users for each gender/age categories

Gender/Age	Time (%: N)	Sent (%: N)	Frequency of Abbreviations (%: N)	Frequency of Slang (%e: N)
Male/teens	1–3 (100:3)	3–5 (66.7:2)	Always (100:3)	Always (66.7:2)
Male/20s	3–5 (66.7:2)	3–5 (66.7:2)	Sometimes (66.7:2)	Sometimes (66.7:2)
Male/30s	<1 (100:3)	1–3 (66.7:2)	Sometimes (66.7:2)	Never (66.7:2)
Female/teens	5–7 (66.7:2)	3–5 (66.7:2)	Always (66.7:2)	Always (66.7:2)
Female/20s	3–5 (100:3)	3–5 (100:3)	Always (66.7:2)	Sometimes (66.7:2)
Female/30s	1–3 (66.7:2)	1–3 (66.7:2)	Sometimes (66.7:2)	Never (66.7:2)

Time: time spent to SMS in a day (minutes); Sent: number of SMS sent in a day; N: number of subjects; Total number of subjects for each category is 3

Table 2 shows some of the summary statistics for the average time spent in messaging in a day, average number of SMS sent in a day, frequency of using abbreviations and slang (local dialect such as *'eh'* and *'lah'*) based on gender and age.

Females spend more time texting in a day than males, hence sending more messages in a day. Moreover, texting activities also decline as the participants' age increases. Females use more abbreviations than males. It can also be noted that the younger the subject, the higher the frequency of using abbreviations and slang in messages.

3.2 Materials

An interview questionnaire was designed based on Sinclair's (1995) guidelines. The questionnaire was developed in English and had two major sections: Section A to obtain the demographic profile of the subjects (gender, age and experience in using SMS) whereas Section B is for the subjects to rate their satisfaction/dissatisfaction levels to statements using Likert's five-point scale, whereby 1 means 'Strongly dissatisfied', 2 means 'Dissatisfied', 3 means 'Neutral', 4 means 'Satisfied' and 5 means 'Strongly Satisfied'.

3.3 Interviews

Face-to-face interviews were conducted with each of the subject. Each interview session lasted for about 15–20 minutes. Subjects were encouraged to discuss problems, voice out opinions, suggestions and recommendations. All verbal comments were recorded. All interviews took place in Multimedia University involving undergraduate students and working professionals. Only one interviewer was involved in this exercise and all 18 interviews were completed within two days.

4 RESULTS AND DISCUSSION

The data collected were analysed using Statistical Package for the Social Sciences (SPSS) software. Analysis of variance (ANOVA) and Tukey Post-Hoc analysis were used to analyse the significant differences (if any) between gender and age groups, with respect to text entry factors effect on texting satisfaction. All results are considered significant at $p < 0.05$ level.

Table 3-ANOVA test for text entry factors satisfaction, based on gender

Text entry factors	F	*p*
Speed or Efficiency	5.95	0.027*
Learnability	0.05	0.821
Simplicity	0.05	0.819
Navigation	0.06	0.810

F: F statistic; *p*: *p*-value; *: significant at $p < 0.05$

Table 3 shows that there is a significant effect of gender with respect to users' satisfaction towards speed or efficiency of text entry mechanism. The females were found to be more satisfied (mean = 4.2) than males (mean = 3.3). About 44.4% (4/9) of the males reported that texting using the current text entry methods can be tedious and time consuming, especially when they are on the move or when they couldn't pay full attention to the screen and keypads while texting (crowded place, looking elsewhere etc.). Both the text entry mechanisms require a significant amount of visual searching to find a needed letter or word. This results in them not to adopt using SMS at times as making a call would be much faster and less cumbersome. Slow text entry mechanism which includes the multiple key presses involved in accessing characters has also been cited as one of the usability issues of mobile phones by Axup *et al.* (2005). Moreover, two males who use *multitap* and predictive text entry system interchangeably agreed that texting using the latter system is faster. However, having to cycle through to select the correct word can be frustrating, especially when texting needs to be done in a hurry. When this situation arises, *multitap* would be the preferred method. Interestingly, females being more satisfied than males could also be contributed to the fact that females generally have smaller fingers, thus they are able to make multiple key presses on the keypads with lesser error and faster. Another possible reason could be that females spend more time in texting and send more messages in a day than males (see table 2). This statistic is also consistent with some other studies (Ling 2003, Reid and Reid 2003, Faulkner and Culwin 2005). Heavy texting among the females might have made them an expert in keying in the text.

Table 4-ANOVA test for text entry factors satisfaction, based on age

Text entry factors	F	*p*
Speed or Efficiency	2.50	0.116
Learnability	28.81	0.000*
Simplicity	2.67	0.102
Navigation	4.67	0.026*

F: F statistic; *p*: *p*-value; *: significant at $p < 0.05$

In table 4, age was found to have significant effect with users' satisfaction towards learnability and navigation. Tukey Post-Hoc analysis revealed that teenagers are more satisfied with learnability ($p < 0.001$) and navigation ($p = 0.003$) compared to users in their thirties. Moreover, users in their twenties are also more satisfied with the navigation than those in their thirties ($p = 0.023$). Younger users have the capability and the interest in learning new techniques fast compared to their older counterparts. Moreover, they are keener in adapting to new environment or changes as well. This could be the reason for their satisfaction towards learnability compared to the older users. One participant in his late thirties commented that "*I remember that I started*

using SMS only seven months after purchasing my mobile phone, I found it to be complicated and cumbersome…and my SMS coach was my 12-year old nephew!!". This comment hints at a fact that it is the younger generation that has taken the lead in SMS messaging. This notion is also supported by findings from other studies (Ling 2003, Reid and Reid 2003, Faulkner and Culwin 2005). The male participant who uses Nokia Communicator™ commented "*I love messaging using my Communicator as it is the fastest way to send romantic text to my girl-friend*". However, upon further discussion, he also mentioned that he only uses the QWERTY keyboard instead of the standard 12-key keypad to text as it is much faster and easier. Learnability is not an issue here but unfortunately the majority of mobile phone users carry standard 12-key mobiles.

Apart from facing the difficulty in learning text entry methods, mobile phone users need to know the language and syntax of SMS communication. Using text relies on the creative use of language in order to maximize the 160 characters that are allowed per message. Once the maximum characters are reached, then the sender is charged for a second message. This is the main reason why text message users truncate and alter conventionally written language. For example, it is very common to type '*hru?'* instead of '*How are you?*' or '*c u l8r'* instead of '*See you later*'. One must be able to decipher the meaning of all the abbreviations used to understand the content of a message. Younger users who text frequently feels very comfortable in using these SMS language, however, this might not be the case for the older users. One male in his early twenties responded that he once felt very embarrassed with himself as he couldn't understand what '*tc*' means; only to find out from a friend later that it simply means '*take care*'. Thus, having to master the technique of text entry and also being able to communicate successfully using SMS language affects learnability of mobile phone users, especially among the older ones.

The younger users were also found to be more satisfied with the navigation while texting than users in their thirties. Navigation problem occurs due to the nature of the keypads that are overloaded to accommodate all the available letters, numbers and punctuations. It is obvious to know that the letters 'A', 'B' and 'C' are placed on the 2-key, however, symbols and punctuations are not presented clearly. Users have to 'look' for these characters by making multiple key presses and not knowing which key to press complicates the procedure. Knowing which key to press might not be a problem among the younger users due to their active messaging, but it will slow down texting process among the older mobile phone users. Moreover, the pattern of messages written further complicates navigation problems among the older generations. Older subjects tend to pay more attention to capitalization, spacing and punctuations than teenagers. This results in them having to access the key that is mapped to these characters frequently. Mapping of the appropriate navigational keys to the desired object was also found to be cumbersome by a study conducted among middle-aged users (Soriano *et al.* 2005), e.g. locating the key to access the 'ABC' (non-predictive) menu that allows a user to change from different character input types, i.e. from alphabetical to numerical is not a straight-forward and clear process. However, this finding is solely based on Samsung T400 model.

Table 5-ANOVA test for text entry factors satisfaction, based on *age x gender*

Text entry factors	F	*p*
Speed or Efficiency	0.08	0.921
Learnability	4.30	0.039*
Simplicity	0.41	0.671
Navigation	1.59	0.11

F: F statistic; *p*: *p*-value; *: significant at $p < 0.05$

Table 5 shows that the interaction effect of *age x gender* was found to be significant for learnability.

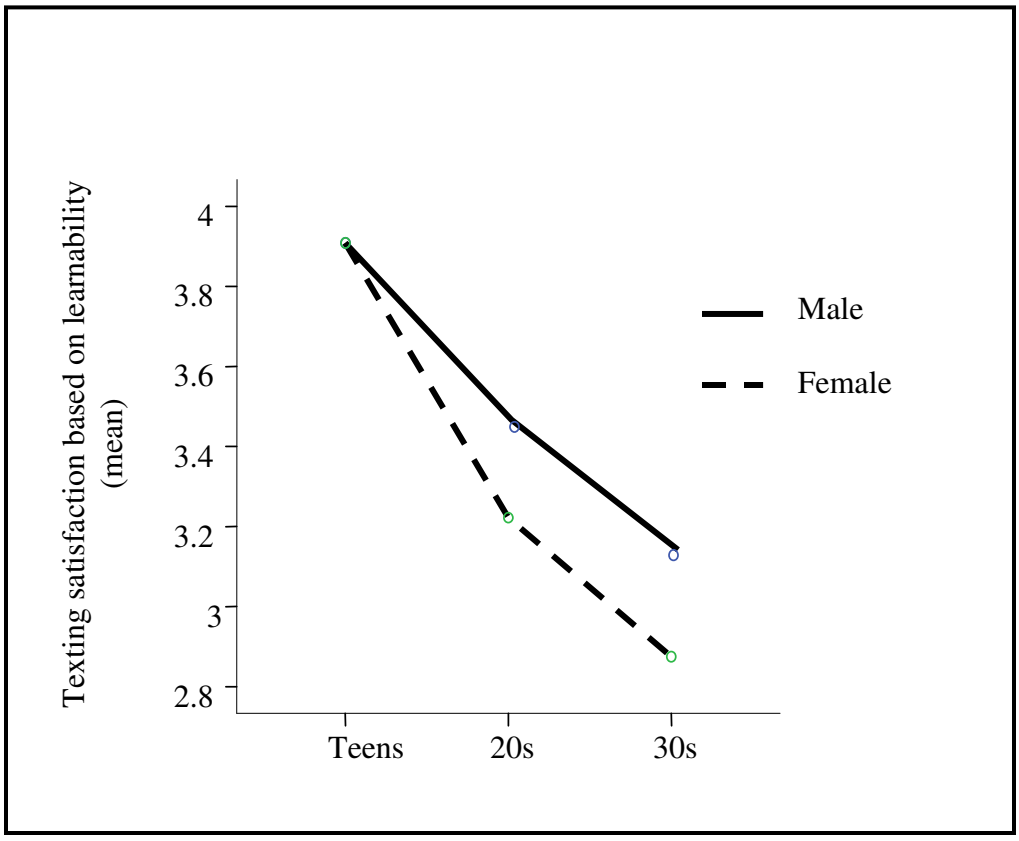

Figure 2- Interaction effect of *age x gender* on learnability

Figure 2 shows a clear difference between the genders in the twenties and thirties categories, with the males being more satisfied than females with respect to learnability. The males have the capability of learning and understanding technical things faster than the females, thus making them to be more satisfied than females. All six females in their twenties and thirties agreed that learning the art of texting was difficult as it seems to be a complex feature. Learning the method to make key presses and knowing the mapping of other characters to the keys were cited as the major obstacles. Females also have the tendency to include more literary flourishes like proper salutations, capitalization and punctuations in their messages. They are also more likely to write longer and complex messages that include emotional elements in their communications

(emoticons to reflect happiness and sadness). In addition, their messages tend to retain more of the traditional conventions associated with other written forms than men (Sattle 1975, Rosenthal 1985). This requires them to make more key presses, and most importantly, they also agree that they tend to forget the correct key to press especially when they are stressed. Men on the contrary writes short text that is simple and straight to the point, often only using a single sentence or a single word (Ling 2003).

It can also be noted that the users' satisfaction declines as the age increases. The older a person gets, the more difficult it is to learn and adapt to new technological products. A similar finding was reported by Ling (2003) and Faulkner and Culwin (2005). The majority of the subjects in their thirties (4/6) stated that they rather make phone calls instead of texting as texting can be tedious and time consuming at times. Two males in this category responded that they only text when it is really necessary or unavoidable (when in meetings or conference, cinema or when pre-paid credit is low), otherwise they prefer phone calls. Moreover, subjects in their twenties and thirties are working professionals who have a steady income, thus they can afford to make phone calls unlike the teens. Subjects in twenties and thirties also rarely or never use predictive text entry as they feel that *multitap* technique is straight-forward, thus faster. Subjects also commented that no unnecessary interruptions take place while messaging using *multitap*, unlike having to press the *next* key to make word selections in predictive text entry. Learning to use predictive text entry was found to be more difficult than *multitap* system. Moreover, one has to practice using it to understand the mechanism behind it. The older users neither have the time nor the interest to learn this mechanism. The younger generations, teens in this case, have the capability of learning new things faster compared to the older generations, regardless of their gender. This explains as to why the difference is not pronounced between the males and females in their teens. Though they are more satisfied than subjects in their twenties and thirties, they also feel that predictive text entry software should be further enhanced to cater to their needs, such as, to support more SMS languages or interestingly, to support local dialects (Chinese, Malay or Tamil) and even slang frequently used among the teens like 'kewl' (cool), 'omigod' (Oh my God), '*eh*', '*lah*' (local slang) and many more. Data in this study (see table 2) also indicate that teens use abbreviations and slang more frequently compared to users in their twenties and thirties. Data obtained by Ling (2003) for Norwegian mobile users also indicate that teens are more inclined to use dialects than older users.

5 CONCLUSION

Structured questionnaire interviews' results involving 18 subjects comprising of mobile phone users from three age categories (teens, twenties and thirties) were presented. All subjects use Nokia mobile phones, thus the text entry methods and keypad layouts are similar (except for one male participant who uses a Nokia Communicator™). Focus of this study was mainly on text entry factors that could affect mobile phone users' satisfaction in texting, seen from the perspectives of gender and age variations. Females were found to be more satisfied with the speed or efficiency of text entry mechanism (*multitap* or predictive text entry) than males. Older subjects (twenties and thirties) are less satisfied with the navigation and learnability of the text entry method than teenagers. Moreover, the interaction between *age x gender* was found to be significant for learnability as well, with the differences between genders being clear for those who are in their twenties and thirties. Males were found to be more satisfied with learnability than females in the same categories. This study revealed that gender and age do influence texting satisfaction among mobile phone users. Two factors that were found to significantly affect their satisfaction are learnability and navigation. These factors were prominent among older users and they took a longer period to learn the text entry mechanism as it was found to be complicated, hence resulting in them using SMS on a rare basis only. Subjects who use predictive text entry system indicated that support for abbreviations, slang, emoticons and dialects would increase their texting satisfaction. Mobile phone designers should look into incorporating other possibilities of text entry mechanism (Mackenzie 2002, Wigdor and Balakrishnan 2004, Gong *et al.* 2005). Perhaps customized mobile phones can be designed to cater for specific needs for different targets.

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