A Look into SMS Usage Patterns among Malaysian Youths

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This article reports findings from a study in which a total of 110 youths were interviewed to analyze the overall pattern of Short Message Service (SMS) usage among Malaysians. Structured interview questionnaires were used to collect the required data. The selected respondents were between 17 and 25 years old, an age category that has proven to represent the most active SMS users worldwide. Descriptive statistics including frequencies and mean values were used to analyze the data. The results indicate that Malaysian youths are as active SMS users as youths in other countries, with the majority sending between five to seven messages daily. As for gender differences, females are found to be more actively involved in SMS activities compared to the males. The findings should prove interesting for those examining the use of SMS among the younger users, especially in an Asian country such as Malaysia.

Keywords: gender issues, messaging, Short Message Service (SMS), usage patterns

Short Message Service (SMS) is a mechanism for delivering short messages over the mobile phone networks. The messages themselves are also sometimes referred to as SMSes, text messages or texts. Similarly, the process of keying in the messages or texts into the phone is referred to as messaging or texting. Essentially, any information that fits into a short message can be delivered by SMS. It is considered to be more convenient than e-mails as these messages can be instantly delivered to mobile phones that are typically kept in the user's pocket.

SMS allows users to be mobile and to take their communities with them. They are not tied to a geographical location, and they can arrange their social outings as they are on the move. SMSes are sent for practically all social and communication activities. These include sending greetings, making, rearranging and confirming appointments, or just for fun (Haste 2005; Höflich & Rössler 2002). For some mobile phone users, sending a text message may be more important for building and maintaining relationships than for coordinating practical arrangements (Ling & Yttri 2002). This is especially true among women, who have a central role in maintaining the social network and "kin-keeping" (Ling 2001).

SMS has gained immense popularity among its users, especially the youths. This pattern of high adoption has been observed in many countries, despite various cultural differences. According to a study by the Pew Internet and American Life Project (2005), the most likely mobile phone texters belong to "Generation Y", that is, between the ages of 18 to 27 years old. A survey conducted among 2,000 adults and 1,200 children in Australia reported that on an average day two thirds of people aged 18 to 29 use SMS, compared to only 3% of those above 60 (Hunt 2005). A similarly high adoption of SMS among youths was reported in the Netherlands (Mante & Piris 2002), Germany (Höflich & Rössler 2002), the United Kingdom (UK) (Eldridge & Grinter 2001), Italy (Fortunati & Magnaneli 2002) and Japan (Ito & Daisuke 2003).

The popularity of SMS among its younger users can be attributed to many factors. SMS helps the younger users to overcome awkwardness and develop social and communication skills through frequent communication with friends and family (Ling 2000). In a study among undergraduates, it was found that the majority of messages were used for friendship maintenance and romantic and social functions associated with highly intimate and relational concerns (Thurlow 2003). Moreover, SMS allows the youths to create their own communities based on text messages "virtually unintelligible to outsiders", thus excluding the adults in their lives and others outside their "privileged" circle. Generally it gives young people a freedom of communication that they never had before (Höflich & Rössler 2002; Ling & Yttri 2002; Mante & Piris 2002).

Other reasons driving SMS growths include privacy. SMS offers privacy as users can send and read their messages discreetly. It can be used when making a phone call would be inappropriate, for example early in the morning or very late at night (Hedbring 2002). Moreover, SMS is asynchronous in the sense that the recipient does not need to immediately reply to a message. It allows users to write messages at their own leisure and the opportunity to reflect on the messages received. This helps the youngsters to monitor the content and manage the way they construct and present themselves in their messages, and thus avoid any embarrassing communications (Ling 2005; Mante & Piris 2002). SMS is also less direct, and more informal and convenient. It can be used to avoid long, unwanted rambling conversations. Finally, SMS is undoubtedly inexpensive. In Malaysia, DiGi (mobile operator) users are charged MYR 0.07 (USD 0.02) for each SMS sent within the same network and MYR 0.15 (USD 0.05) to other networks, including international networks (DiGi 2009). No mobile operators offer free SMS services in Malaysia. However, mobile phone users may occasionally be awarded with a limited number of free SMSes during promotion times.

Generally, statistics and other studies around the world have reported similar findings related to mobile phone and SMS usage among youths. For example, SMS usage was found to be most frequent among youngsters between 13–28 years old in many countries (Eldridge & Grinter 2001; Hunt 2005; Ito & Daisuke 2003; Mante & Piris 2002). The youngsters were found to be favouring SMS mainly because it is convenient, informal, fast and cheap (Eldridge & Grinter 2001). A global homogeneity can thus be noted among the young SMS users around the world despite their various cultures, backgrounds, and beliefs.

The International Telecommunications Union (ITU) indicators for the year 2006 (ITU 2006) show that in Malaysia, nearly 76 out of every 100 inhabitants use a mobile phone, with 81.8% of telephone subscribers being mobile phone users. Recent statistics in 2007 revealed that there are approximately 81 mobile phone subscribers for every 100 inhabitants in Malaysia. According to Hand Phone Users Survey 2006, most Malaysians were prepaid users (80.4%) with Selangor state having the largest share of mobile phone users at 21.7% while Perlis and Labuan states recorded the least number of users, at 0.9% and 0.3% respectively.

Males comprised 58.3% of the total subscribers while females accounted for 41.7%. Among the three main ethnic groups, Malays accounted for 57.3% of the total subscribers, Chinese made up 28.9% and Indians 6.2%. It was also reported that the mobile phone usage among users up to the age of 19 is on the rise, with 20.5% in 2006 compared to 13.1% in 2005 and 12.3% in 2004 (Malaysian Communication and Multimedia Commission [MCMC] 2006).

Similar to other countries around the world, SMS is also the biggest mobile data service in Malaysia (Wong & Pang 2005). Statistics show that 46.1% of Malaysians sent more than five SMSes per day compared to 41.8% in 2005. It was also found that the number of non-SMS users has dropped from 25.9% in 2004 to 16.4% in 2006, indicating an increase in the adoption of SMS among Malaysians (MCMC 2006). And with specific regard to the age variable, it is noteworthy that Malaysian youths generally leave high-school and pursue their studies in higher education institutions such as colleges and universities at the age of 17. Therefore, the probability of 17-year-olds and above owning a mobile phone is higher than for those in the younger age groups such as 13 or 14 year-olds. As such, the target respondents in the present study were determined to be youths between the ages of 17 and 25.

The mobile phone and SMS application are chosen as the focus of the present study due to their overwhelming popularity, targeting the youths as the respondents. As illustrated above, many studies related to mobile phone and SMS adoption have been conducted in various countries; however, the pattern of SMS adoption and use is yet to be studied in Malaysia. It would be interesting, firstly, to learn whether Malaysian youths use SMS in a manner similar to other youths around the world. Secondly, being a multi-racial country, it is also common for the Malaysians to communicate using "Manglish" or Malaysian English – a combination of English with other local languages such as Malay, Chinese and Tamil. This provides another avenue to examine if the languages used become a barrier when using the SMS application. This article presents results from a study that aimed to analyze the overall SMS adoption among Malaysian youths. In addition, a gender analysis was also conducted to see if there are any differences between the males and females with regards to their SMS usage patterns.

Literature Review

Cross-gender analyses have been conducted by several researchers on mobile phone SMS usage. For instance, a study among German adolescents by Höflich and Rössler (2002) found that females generally write more messages than males. Moreover, they also tend to write longer messages. Females prefer using SMS to pass time or just for fun. It was concluded that males are more inclined to explore the technical opportunities provided by the mobile phone while females are more socio-emotionally oriented. A similar finding was reported by Potts (2004) based on his study in America. Potts' study demonstrated that males make more use of the Internet functions of the mobile whereas females restrict their usage to more communicative functions.

In Norway, Ling (2005) reported that women are more enthusiastic about using SMS than males, based on an analysis of an SMS corpus. Their data showed that only 36% of males reported messaging daily compared to more than 40% of females. Women were also found to receive more SMS messages than their male counterparts. A similar pattern was observed in the UK by Faulkner and Culwin (2005) who found females sending an average of 6.3 messages daily and males 4.8 messages. Eldridge and Grinter (2001) analyzed texting patterns among British boys and girls between 15 and 16 years old. Their logging study showed that females sent and received more SMS messages than males. These messages are commonly used to adjust meeting times from conversations that already took place between two people. Most importantly, SMSes are used because they are cheap, convenient and quick. In another cross-gender study, however, Potts (2004) found that men and women text at an almost equal frequency based on his studies among college students in America.

Kasesniemi and Rautiainen (2002) observed that girls tend to write longer messages than males, often using up all the 160 characters of an SMS, filled with references and social gossip, while boys often write messages of 40 to 50 characters with plain language. This finding was reported based on their study among young users in Finland. A similar finding was reported by Prøitz (2004) based on a study of young Norwegians' gender performances in text messaging. Girls were found to write long, detailed and emotional text messages whereas boys generally write short

and straight messages. This is also in accordance with Ling (2005) who reported that men generally are prone to using short one-word answers in their SMS messages based on his linguistic analysis of SMSes among 2,003 Norwegians. In a similar study among 1,000 Norwegians between 13 and 35 years old, young females were found to write longer messages than their male counterparts (Ling 2007).

In Asia, a survey among 455 college students in Hong Kong revealed that 85.4% of females were frequent users of SMS compared to 62.9% males. It was also found that more females (93.5%) than males (80.3%) preserved their messages, especially for future pleasurable remembrance. Females also offered and received significantly more SMS based emotional support when they had problems than did the males (Lin 2005).

Similar to the above studies, the present study analyzes gender differences among Malaysian youths in terms of, for example, SMS adoption and frequency of use.

Text Entry Methods

SMS messages are entered via the keys on the mobile phone keypad. The most popular forms of text input on a standard 12–key mobile phone are multitap and predictive text entry.

Multitap

Multitap is the most widely used text entry method on mobile phones (Gong *et al.* 2005). Multitap works by cycling through letters on a key with each successive press. For example, the first press on key-2 enters an 'a', a second press enters a 'b' and a third enters a 'c'. Thus to enter 'deaf', users need to press 3-3-3-2-3-3-3, which is a total of seven keystrokes. A problem arises when two consecutive letters residing on the same key need to be entered. In the word 'deaf', the two consecutive letters are 'de' which reside on the key-3. Most phones employ a built-in time-out mechanism to solve this problem; typically requiring the users to wait between 1–1.5 seconds before entering a new letter with the same key. Thus, 3–332333 (– indicating a time-out) is entered for 'deaf'. Some phones use a next key (# or *) instead of the time-out. In this case, users need to type 3#332333 to enter 'deaf' (Starner 2004).

Multitap is simple and unambiguous, but also inefficient due to multiple characters being represented on the same key and therefore often criticized for being slow (MacKenzie 2002). Previous studies have found multitap messaging rates of 15.5 words-per-minute (wpm) (MacKenzie *et al.* 2001) and 5.3–10.5 wpm (James & Reischel 2001), which is far below other text entry devices, such as the computer keyboard.

Predictive Text Entry

Several predictive methods have been introduced in recent years to alleviate the shortcomings of multitap. These include T9® by Tegic Communications (Grover *et al.* 1998) and eZiText® by Zi Corporation (Ackermans 2000). Just like multitap, multiple keys correspond to the same key; however, keys are pressed only once. The phone will predict the word as it is being entered. A next key (e.g. '#') can be used to cycle through the potential words. The word 'deaf' is entered with 3-3-2-3, requiring four key presses as compared to seven in multitap. However, the first word to be guessed by T9® is 'dead'. Users need to press the next key to make the intended selections. If the intended word is not in the dictionary, then the user must delete the input and enter the word using multitap (Starner 2004).

Although predictive text entry is faster than multitap (James & Reischel 2001), it can be quite frustrating and slow when the phone does not recognize the words that are being entered (Starner 2004). Moreover, it is also impossible to enter numerals, acronyms or any combinations of letters and numerals (e.g. 'l8r' for later). Users also have to visually monitor the display to resolve ambiguities, unlike multitap that can be operated "eyes free" by experts (Cox *et al.* 2008).

Research Methodology

The results reported in this article are based on data gathered in another study that investigated the factors affecting users' SMS satisfaction in Malaysia (Balakrishnan & Yeow 2007). This particular study focused on the effects of the mobile phone design factors such as keypad and screen design on users' satisfaction in using the mobile phones to send and receive SMSes. Structured questionnaire interviews were administered to gather the data. The interview questionnaire consisted of two major sec-

tions. Section A was designed to gather the users' background information, including years of using SMS applications, frequency of messaging etc. Section B required the users to assess their satisfaction/dissatisfaction levels based on five-point Likert scales. The present article only discusses data collected from Section A. The interview questions are presented in Table 1 below (demographic questions related to gender, age etc. are omitted in the table).

Table 1. List of questions related to this article.

No.	Questions
1	How long have you been using a mobile phone to send SMSes? a) <1 year b) 1–2 years c) 2–3 years d) 3–4 years e) > 4 years
2	What is the average time (in minutes) you spend on SMS in a day? a) < 1 min. b) 1–3 mins. c) 3–5 mins. d) 5–7 mins. e) > 7 mins.
3	What is the average number of SMSes you send in a day? a) 1–3 b) 3–5 c) 5–7 d) > 7
4	What is the average number of SMSes you receive in a day? a) 1–3 b) 3–5 c) 5–7 d) > 7
5	What is the average length (number of characters) of your SMSes? a) < 25 b) 25–75 c) 75–160 d) > 160
6	Which text entry method do you use to SMS? a) Multitap b) Predictive c) Both d) Others (please specify):_____ text entry
7	How often do you use abbreviations? *(e.g. "hru?" instead of "how are you?")* a) Always b) Sometimes c) Never
8	How often do you use slang? *(e.g. "lar", "ler", "hor")* a) Always b) Sometimes c) Never
9	How often do you use emoticons? *(e.g. a smiley ":-)" to indicate happiness)* a) Always b) Sometimes c) Never

From Table 1 above, it can be noted that options for having sent or received zero messages were not included. This is because the initial study aimed at assessing users' satisfaction in using the mobile phone to SMS. Hence, the target respondents were those currently using an SMS application. It was believed that those who are using SMS would have some experience in using the mobile phones to message, and thus would be better suited to participate in the study.

All the interviews were conducted face-to-face on a one-to-one basis. The questions were read out to the respondents by the interviewers, and they were encouraged to give comments, opinions and suggestions. For example, when a respondent mentions that he/she never uses abbreviations, then the interviewer will encourage the respondent to provide reasons. All verbal comments were noted by the interviewer. Each interview session lasted for about 30 minutes. About eight weeks were consumed to complete all 110 interviews. Two interviewers participated in the interview activities.

Respondents

A total of 110 youths were recruited using convenience and proportional quota sampling by sending out flyers, by bulletin board announcements (at public libraries and a university), and also by personally approaching potential respondents at shopping malls and colleges. Though the respondents were recruited from various geographically distributed places, the majority (64.5%, 71/110) of the interviews were conducted in an office environment in Melaka. The rest (35.5%, 39/110) were conducted in a public library in Perak. All the respondents were Malaysians, comprising the three major ethnicities of the country (Malays, Chinese and Indians). Proportional quota sampling was used based on the respondents' gender, resulting in an equal number of males and females (55 each). The respondents were between 17 and 25 years of age with mean = 21.5 years. The majority (80.9%, 89/110) of the respondents used multitap and only 11.8% (13/110) used predictive text entry. The rest of them (7.3%, 8/110) used both these methods interchangeably. All the respondents had prior experience in using SMS, with mean = 3.8 years. Only six respondents had less than one year of experience in using SMS.

Results and Discussion

All the findings provided next are based on descriptive statistics such as frequency and percentile. The analyses were performed using Statistical Package for Social Science (SPSS) version 13.0.

Text Entry Method Adoption

As stated above, the majority of the respondents in this study used multitap compared to predictive text entry (80.9% vs. 7.3% respectively). This is in line with data from Norway that showed about half of the mobile phone users in the country using the multitap system (Ling 2007). However, most of the respondents in the present study (61.8%, 68/110) stated during the interviews that multitap technique is time consuming as every character needs to be entered compared to predictive text entry where the words are guessed by the software as the characters are entered. This finding concurs with other studies that have reported multitap as being slow and inefficient (Balakrishnan & Yeow 2007; MacKenzie 2002). Previous research has predicted maximum expert typing rates of 20–27 wpm (Silfverberg *et al.* 2000) and 5.3–10.5 wpm (James & Reischel 2001).

When prodded further, 27 out of the 68 respondents above who used multitap stated that they do not use predictive as it seems quite complicated, and thus they are not interested in learning the mechanism. It was mentioned that using predictive requires some learning, and they are either too "lazy" or simply not bothered to waste their time in learning the method. The respondents have also grown accustomed to multitap, therefore, they are not that willing to switch to another technique that requires time to master. This finding accords with Weiss (2002) who reported that users find the predictive method confusing or too difficult and subsequently resort to the familiar multitap. It has been claimed that more than half of all users who have predictive software supported in their mobile phones do not use it (Eatoni Ergonomics 2006). This probably explains the high number of respondents who are multitap users in the present study (89/110).

Six respondents who used predictive text entry reported that this method can be fast if one has learned the art of using it. This statement was agreed upon by five respondents who used both multitap and predic-

tive interchangeably. This statement concurs with findings that experts using predictive text entry can achieve a rate of 26 wpm as opposed to 11 wpm for multitap, while novice participants achieved 11 wpm for predictive text entry and 10 wpm for multitap (James & Reischel 2001). However, the respondents also stated that texting activity becomes tedious when the words entered are not recognized by the predictive text entry software. This especially happens when they attempt to message using abbreviations (e.g. "2day" for today) and emoticons (":)" for happy). Moreover, the predictive software also fails when Manglish is used. Some popular examples include the use of "lah" (normally used to affirm a statement), "lor" (used when explaining something), and many others. This practice has also been observed in other countries. For example, mobile phone users in Hong Kong were found to include both English and Cantonese words in their SMSes (Lin 2005) while in the Philippines, texters were found to heavily use Taglish, which involves the combination of English, Tagalog and Spanish (Rafael 2003).

Therefore, when the entered words are not recognized, users are required to switch to multitap to enter abbreviations, emoticons and slang. Predictive users in the current study stated that they did not mind switching between the methods as they have grown accustomed to the predictive method. However, all thirteen respondents who used both methods interchangeably preferred to use predictive only when the need to compose quick and short messages arises. They agreed that an inclusion of a unique Malaysian dictionary may improve their satisfaction towards predictive method. Some predictive software, such as iTap® in Motorola, has a "self-learning" capability (new words are automatically entered into the dictionary). However, not all mobile phones employ this software.

In addition, the thirteen respondents who used both techniques interchangeably also highlighted that it is impossible to enter text without looking at the screen when predictive method is used. Predictive users have to visually monitor the display to resolve ambiguities, unlike multitap that can be operated "eyes free" by experts (cf. MacKenzie & Soukoreff 2002).

Overall SMS Usage Pattern

Table 2 shows the overall SMS pattern reflected by all the respondents in the study. All the figures depicted are in accordance with other studies that have reported SMS to be hugely popular among youths, despite the drawbacks of the mobile phone design and SMS application (e.g. poor keypad design and small screen size) (Balakrishnan & Yeow 2007).

Table 2. Overall Profiles of Respondents' SMS Usage Pattern

Profile	Categories	#	%	Profile	Categories	#	%
Average length of SMS (characters)	< 25	14	12.7	Average SMSes sent daily	1–3	22	20.0
	25–75	42	38.2		3–5	38	34.5
	75-160	54	49.1		5–7	48	43.6
					> 7	2	1.9
Average time spent on SMS daily (mins.)	1–3	13	11.8	Average SMSes received daily	1–3	28	25.5
	3–5	30	27.3		3–5	50	45.5
	5–7	66	60.0		5–7	30	27.3
	> 7	1	0.90		> 7	2	1.9

\# – Frequency, % – Percentage

It can be noted that the majority of the respondents (60.0%) spent more than five minutes messaging daily as opposed to only 11.8% who spent less than 3 minutes on SMS daily. The rest of the respondents (27.3%) spent between three to five minutes on SMS daily and only one of them spent more than 7 minutes daily messaging.

In addition, 43.6% (48) of the respondents sent five to seven messages on a daily basis, followed by 34.5% between three to five messages and 20.0% between one to three messages. Only two users sent more than seven messages daily (maximum 11). On the other hand, the majority of the respondents (45.5%) received between three to five messages daily. About 26% of the respondents received between one to three SMSes daily whereas 27.3% of them received five to seven messages.

Similarly, the same two users received more than seven messages daily (maximum 10).

These statistics of high SMS usage among the youths (as shown in Table 2) is in line with many other studies that have been conducted worldwide. For example, in England, a study conducted among 1,058 young users aged between 11 and 21 found that nine out of ten users sent SMSes at least daily, and 54% more than five times per day (Haste 2005).

Studies have also shown that the high popularity of SMS use among the younger users is due to some of the attractive characteristics of SMS that are appealing and suitable to youngsters' lifestyles. Use of SMS creates communities and is favoured by price-sensitive youngsters for keeping in contact and developing networks. It is also fast and convenient. It offers privacy as users can send and read their messages discreetly. Moreover, SMS is less direct and more informal. In addition, SMS also gives young people a freedom of communication. It is also personal and yet able to be shared. Special text messages are saved for later review or to be shown to others so that a private text message can be used as a "gift" displayed to or shared with others (Eldridge & Grinter 2001; Fortunati & Magnaneli 2002; Höflich & Rössler 2002; Kasesniemi & Rautiainen 2002; Ling 2000; Mante & Piris 2002; Taylor & Harper 2002).

The SMS is limited to 160 characters; therefore, the writing space is limited as well. Table 2 shows that only 12.7% composed messages using less than 25 characters. Half of the respondents (49.1%) seem to stretch the messages to the maximum number of characters (75–160). This is mainly because messages that consist of more than 160 characters will be automatically sent as two messages instead of one, hence the users will be charged twice instead of once. Due to this, the youths have become very ingenious in attempting to circumvent the low number of characters permissible by inventing and adopting a large set of abbreviations, as shown in Table 3 below.

Table 3. The Overall Frequency of Using Abbreviations, Dialects and Emoticons

Profile	Categories	Frequency	Percentage
Frequency of using abbreviations/acronyms *(e.g. "4u2c", "b4", "hru?")*	Always	70	63.6
	Sometimes	32	29.1
	Never	8	7.3
Frequency of using slang *(e.g. "lah" – a popular local slang)*	Always	82	74.5
	Sometimes	25	22.7
	Never	3	2.7
Frequency of using emoticons *(e.g. ":)" for happiness)*	Always	55	50.0
	Sometimes	47	42.7
	Never	8	7.3

Table 3 shows that the majority of the respondents always used abbreviations, slang and emoticons, with 63.6%, 74.5% and 50.0% respectively. 32 respondents used abbreviations sometimes and only eight did not use it at all. As for the slang, 25 respondents used it sometimes and only three did not. Finally, 47 respondents used emoticons sometimes and eight did not. Overall, Table 3 shows that the number of respondents who never used abbreviations, emoticons and slang are very small compared to the respondents who used them.

These findings indicate that Malaysian youths are not different from youths around the world in extensively using abbreviations, emoticons and local slang (Höflich & Rössler 2002; Fortunati & Magnaneli 2002; Ling 2005; Mante & Piris 2002). Some common examples used by the respondents in the study include "hru?" (how are you), "2day" (today), ":D" (grin), ":)" (happy), "lah" and "ler" (popular local slang). Messages written by the youths are very informal and are normally exchanged among friends as a form of keeping in touch. The use of the local slang is mainly attributed to the Malaysian culture. On the other hand, the use

of abbreviations and emoticons also helps to expedite the messaging process. Moreover, the youngsters are also able to condense their messages so that lengthier messages can be exchanged within a single SMS. An analysis of SMS abbreviations from five Internet text messaging websites revealed that SMS users abbreviate messages in order to be able to write more in a condensed space (Bush 2005). These abbreviations are virtually universal such as "U" for "you", "2" for "to", "4" for "for", "GR8" for "great", "PLS" for "please", and "GTG" for "got to go".

Abbreviations and emoticons also help the younger users to express themselves in a way that is different from the older users, thus creating a language that is cryptic and unique for themselves. As a matter of fact, the use of abbreviations and emoticons are so intense that it has resulted in the birth of SMS dictionaries, in English as well as other native languages. For example, the *Oxford Advanced Learners Dictionary* (Kaur 2005) was created to help texters stay on top of the latest abbreviations in English. Another similar dictionary is *The ABC of SMS* which was created for Spanish users (Lorente 2002). Perhaps a similar dictionary can be created for Malaysian users in the native language as well, such as the Malay (national) language.

Table 3 also shows that only eight respondents never used abbreviations and emoticons, and three never used slang. It is interesting to note that the majority of the respondents who never used abbreviations and emoticons (5/8 and 6/8, respectively) are working professionals, who normally sent messages to confirm meeting adjustments with clients or colleagues. Therefore, their messages tended to be formal and short without any abbreviations and emoticons as it would be inappropriate to send such messages to other working professionals.

Gender Analysis

Table 4 shows the majority of the males (52.7%) and females (67.3%) were found to spend five to seven minutes daily on SMS. The overall statistics show that females spent more time messaging than the males. Table 4 also shows that 25 (45.5%) of the males sent between three to five messages daily compared to 36 (65.5%) of the females who sent five to seven messages daily. The majority of the respondents received three to five messages daily, regardless of their gender (males=47.3% and fe-

males=43.6%). However, the overall results show that females received more SMSes daily than males.

Table 4. Profile Summary of SMS Patterns Based on Gender

Profile	Categories	Male (N = 55)		Female (N = 55)	
		Frequency	Percentage	Frequency	Percentage
Average time SMS daily (mins.)	1–3	7	12.7	6	10.9
	3–5	19	34.6	11	20.0
	5–7	29*	52.7*	37*	67.3*
	> 7	0	0.0	1	1.8
Average SMSes sent daily	1–3	18	32.7	4	7.3
	3–5	25*	45.5*	13	23.6
	5–7	12	21.8	36*	65.5*
	> 7	0	0.0	2	3.6
Average SMSes received daily	1–3	15	27.3	13	23.6
	3–5	26*	47.3*	24*	43.6*
	5–7	14	25.5	16	29.2
	> 7	0	0.0	2	3.6
Average length of SMSes sent	< 25	10	18.2	4	7.3
	25–75	33*	60.0*	19	34.5
	75–160	12	21.8	32*	58.2*
Frequency of using abbreviations	Always	32*	58.2*	38*	69.1*
	Sometimes	17	30.9	15	27.3
	Never	6	10.9	2	3.6

Cont'd.

Cont'd.

Frequency of using dialects	Always	40*	72.7*	42*	76.4*
	Sometimes	13	23.6	12	21.8
	Never	2	3.6	1	1.8
Frequency of using emoticons	Always	21	38.2	34*	61.8*
	Sometimes	30*	54.5*	17	30.9
	Never	4	7.3	4	7.3

* – Highest frequency in each category

That females spend more time messaging, sending, and receiving messages daily than males accords with findings reported in other studies. In Norway, Ling (2005) reported that women are more enthusiastic in using SMS than males, based on an analysis of an SMS corpus. Their data showed that only 36% of males reported messaging daily compared to more than 40% of females. Women were also found to be receiving more SMS messages than their male counterparts. According to a survey conducted among 455 university students in Hong Kong by Lin (2005), females were found to send and receive significantly more SMS messages than males (85.4% versus 62.9%). And Geser (2006), who studied the gender patterns of mobile phone usage in Switzerland among users between the ages of 17 and 21, also found that girls are significantly more prone to send messages than boys who prefer to make audio calls.

The fact that females seem to be more frequent users of SMS than males can perhaps be attributed to psychological reasons. Lohan (1997) stated that males are more "task-oriented" in the use of telephones whereas females are more "person-oriented". This conforms with the results of Potts' (2004) study which demonstrated that males make more use of the expanded Internet functions of the mobile, while women restrict their usage to communicative functions. In general, it can be concluded that males are more inclined to explore the technical opportunities provided by the mobile phone while females are more socio-emotionally oriented. Females use the SMS application as a way to keep in touch with friends and families and to maintain their social networks.

They typically build up high maintenance networks of predominantly one-to-one attachments, each of which needs to be separately cultivated through regular contacts (Benenson & Christakos 2003; Höflich and Rössler 2002; Kasesniemi & Rautiainen 2002; Ling 2005; Potts 2004; Skog 2002). In addition, females may feel awkward speaking aloud in public, and prefer to communicate via the less obtrusive SMS (Geser 2006).

Table 4 also shows that the females composed longer messages than the males did. 32 females (58.2%) composed messages that were 75 to 160 characters in length whereas the majority of males (60.0%) composed messages that were 25 to 75 characters in length. A similar finding was reported by Kasesniemi and Rautiainen (2002) who observed that Finnish young females tend to write longer messages than males, often using up all the 160 characters of an SMS, filled with references and social gossip, while the males often wrote messages of 40 to 50 characters with plain language. In another cross-gender study conducted among young Norwegians, females were found to write long, detailed and emotional text messages whereas boys generally wrote short and straight messages (Prøitz 2004).

Females being more verbose in their SMS usage than males are moreover consonant with conclusions other researchers have reached about gender differences in face-to-face spoken language (Clark & Schaeffer 1981; Treichler & Kramarae 1983) as well as in other forms of written communication (Cheshire 2002). Women were, e.g., found to often talk on landline telephones longer than men (Moyal 1989) and to get involved in gossip more than men (Fox 2004; Potts 2004). Moreover, in both spoken and written language, women are more likely than men to be supportive (Ellwood-Clayton 2006) and use more forms of courtesy, salutations and closings (Ling 2005). In addition, their messages tend to retain more of the traditional conventions associated with other written forms than men (Fishman 1978; Treichler & Kramarae 1983). These findings probably explain why females tend to write longer messages than males.

Finally, Table 4 shows that the majority of males (58.2%) and females (69.1%) always used abbreviations in their messages, with the females using abbreviations more frequently than males. 42 (76.4%) females always used slang and 40 (72.7%) males always used slang as well. Overall,

females used slang more frequently. A similar pattern was observed for frequency of using emoticons with the majority of females (61.8%) always using emoticons and the majority of males (54.5%) only using emoticons sometimes. Another study among 1,000 young Norwegians aged 13 years and above also found young women to use more emoticons and abbreviations than males (Ling 2005).

Judging from these results, SMS seems to be a gendered practice among Malaysian youths as well, with more females using the application. Analyses of the use of SMS also reveal that the females wrote lengthier messages and more frequently used abbreviations, emoticons and slang than males. This indicates that females are more comfortable using mobile phones to SMS. Perhaps this is due to the design of mobile phones and keypads as being awkward for larger hands and fingers, thus making messaging more difficult for males, as suggested by Balakrishnan and Yeow (2007).

Recommendations

Based on the results of the analysis of this study, some of the respondents' comments and suggestions are used to formulate recommendations for more user centred and context-aware design of SMS applications, especially for the Malaysian market. The respondents in the present study have particularly commented on the inability of the software to recognize abbreviations and emoticons, especially when messaging is done in Manglish. This reduces the speed of messaging when using the predictive method. Mobile phone manufacturers should look into the possibility of including an SMS dictionary, specifically aimed at Malaysian users, similar to the ones available in other native languages. Mobile phone manufacturers should also employ "self-learning" predictive software so that unrecognized words (especially the likes of Manglish) can be added to, and accumulated in, individual mobiles' dictionaries. This would expedite the SMS process, and thus increase Malaysian youths' messaging satisfaction as well.

The above assumed benefits notwithstanding, some of the respondents also mentioned that they preferred multitap, which is generally deemed to be slower than predictive text entry. This is because they do not have the time or the motivation to learn the predictive method

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which seems to be complicated and confusing. One possible approach that can be taken to help or encourage users to learn and use the predictive method might therefore be to include an interactive training session in the mobile phone itself. An analogy of this would be the commonly featured Help menu or help assistants included in many computer programs that interactively explains and teaches how to perform particular functions. Such an interactive training session can help the mobile phone users to familiarize themselves with the predictive text entry mechanism at their own pace. This might also reduce users' frustration as they need not employ the trial-and-error method.

Summary

Structured questionnaire interviews were conducted among 110 Malaysian youths in order to analyze their messaging patterns. In addition, gender analyses were also performed to determine if there were any differences between males and females with regards to their patterns of SMS usage. The results show that SMS messaging seems to be more popular with females, perhaps because they feel less comfortable speaking aloud in public, or due to the designs of the phones themselves which are awkward for larger thumbs or fingers and therefore more difficult for males to use (Balakrishnan & Yeow 2007). It was also revealed that Malaysian youths are not very different from youths around the world when it comes to adopting SMS. SMS seems to be a medium favoured by the young as it is cheap, convenient and suit their lifestyles (Eldridge & Grinter 2001; Ling 2005).

Some recommendations were provided based on the respondents' comments during the interviews. It is believed that these recommendations to improve the existing predictive methods may enhance users' satisfaction, and also help to encourage more users to use it. The findings presented in this paper generally give a picture of how active Malaysian youths are in messaging activities, but also highlight the differences between males and females in adopting the SMS application. These findings may serve as a knowledge base for other researchers who wish to examine the use of SMS among Malaysians, especially the younger generations.

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