WHY ARE TEXT MESSAGES SO POPULAR?

by

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ABSTRACT

This report describes a study carried out in the United Kingdom on the use of the mobile phone Short Messaging Service (SMS), more commonly known as text messaging. Text messaging is currently undergoing a phenomenal rate of growth and is now a multi-million pound business. The profile of SMS has been raised by press articles and several television shows, although there has been little work conducted so far, which might explain this trend.

Few people believed SMS would ever catch on, with its 160-character limit and difficult method of input. Given the dreadful user interface, it still achieved huge growth and therefore it needed to be looked into further. A questionnaire was developed and administered both on the web and paper, and complemented by a number of short interviews. The purpose of the survey was to identify who is using text messaging and for what reasons and to put this into the context of communication methods. Overall, a total of 317 questionnaires were returned. SMS has been found to be particularly prevalent amongst the younger generation and factors including cost, discreetness and modality (replying by text when receiving one) have been identified as influencing people's decision to make use of it. These findings are discussed comprehensively along with suggestions for further study.

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ABBREVIATIONS

CDMA Code Division Multiple Access

CGI Common Gateway Interface

EMS Enhanced Messaging Service

HCI Human Computer Interaction

HTML Hypertext Markup Language

GSM Global System for Mobile Communication

MDA Mobile Data Association

MMS Multimedia Messaging Service

PC Personal Computer

SMS Short Message System

SMSC Short Message System Centre

URL Uniform Resource Locator

US United States

WAP Wireless Application Protocol

Chapter 1

1. INTRODUCTION

1.1 Overview

SMS, more commonly known to its users as text messaging, stands for Short Message System and is the ability to send and receive text messages to and from mobile telephones. SMS was an accidental success that took nearly everyone in the mobile industry by surprise. Mobile phone screens are small and entering text messages can be difficult because the keypads were not designed for this purpose. Given this dreadful user interface, there was still a huge explosion in usage, therefore there are clearly other factors that make it so attractive as a means of communication. Having been an avid user of text messaging for several years, the author found it a compelling subject to research. The intention of this project was to try and find out what is motivating people to use text messaging and whether they are abandoning other forms of communication in favour of it.

1.2 The History of SMS

Developments started in the early 80's when the European Union's telephones department decided that they needed a system capable of working across all national boundaries. Engineers from each of the member countries major phone companies were persuaded to invent such a system. By 1992, the engineers had managed to create a form of radio communication called the Global System for Mobile Communication (GSM). Some of the engineers had heard of the Internet, and thought that people might want to send messages to it with their phones. Therefore they built into the system a facility that allowed users to send a bit of text. The technology was designed for company messages to the phone but nothing more than that.

There are various claims as to when the first ever text message was sent. According to Nokia [29], the first text message was sent in 1993 by engineering student Riku Pihkonen. Other sources, such as GSM World [15], report that the first message was sent in December 1992 from a Personal Computer (PC) to a mobile phone on the Vodafone network in the UK.

Text messaging has caught the imagination of mobile phone users all over the world and over 1 billion are now sent every month in the UK. The next section examines how this exponential growth came about.

1.3 The Growth of SMS

In 1877, when referring to the very first telephones, the engineer-in-chief of the British Post Office stated, "my department is in full possession of full knowledge of the details of this invention and the possible use of the telephone is limited" [17]. It is very hard to imagine now, what the world without telephones was like. We live in a world where phone calls, the Internet and now more recently, text messaging, are beginning to rule our lives.

In the same way that the British Post Office did not recognise the potential of the invention of the telephone, mobile telephone companies were slow to recognise the possible use and popularity of text messaging. The development of SMS technology was rather half-hearted mainly because the network engineers could not foresee "a public predilection for sending silly 160-letter letters to each other" [11].

To begin with, nobody realised the huge potential of this new communication channel, so SMS initially attracted little interest from the networks. Texting was originally only allowed within their own networks and so it was useless for most people. Eventually in 1999, Orange, Vodafone, BT Cellnet and One2One made it possible to use text messaging across different networks.

Nobody had predicted what was going to happen next. The figures for text message usage are quite phenomenal. When cross-network SMS first appeared in January 1999, 40 million messages were sent a month between January and April. The introduction of prepay mobile tariffs acted as a catalyst to the take up of SMS, especially in the youth market. Pay-as-you-go mobile vouchers made the need for credit checks and direct debit bank accounts obsolete, meaning that mobile phones were now available to the mass market of under 18 year olds. All the networks now agree that the youth market was the "key driver" in popularising SMS, and make deeply appreciative statements about "young people" and their "non-technophobia" [11]. By December 1999, the figures hit 271 million and have not stopped rising since.

More and more people begun to make use of SMS and now over 1 billion messages are being sent a month, with this figure still rising. According to figures from the Mobile Data Association (MDA) 1.3 billion were sent in December 2001 [28]. It is estimated that about 10% of these are work related, which means 90% are not! This represented nearly 200 million more than the entire total for 1999 and an increase of almost five times on December figures that year. During December 2000, 756 million texts were sent throughout the UK. *Figure 1.1* shows the figures for the number of text messages sent each month between December 2000 and January 2002. The slight anomaly in the data shown by the peak in January 2001 can be explained by the huge numbers of people wishing friends and colleagues a 'Happy New Year' in the form of a text message. This New Year was also slightly different in that it was also the new millennium, which is likely to have

exaggerated the figures further still. Interestingly, these figures show the number of chargeable person-to-person text messages sent across the four networks and so exclude those sent via the Internet.

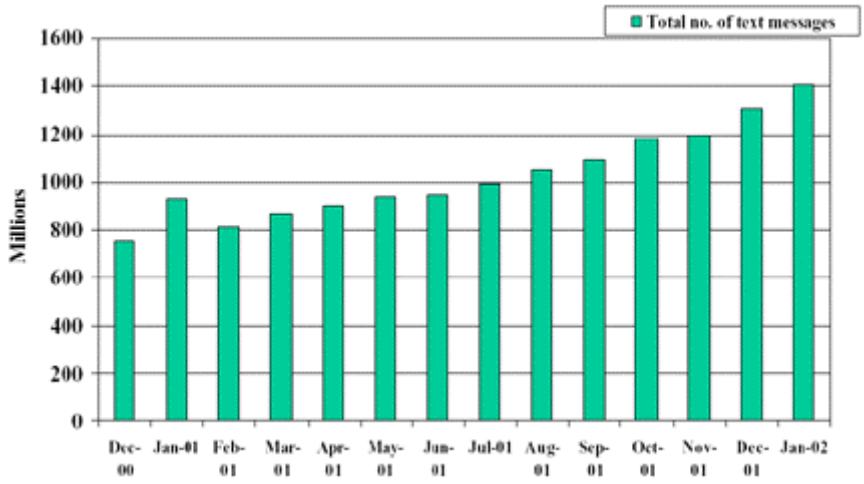


Figure 1.1: December 2000 – January 2002 UK text messaging figures (Source: MDA)

The number of New Year text messages recorded between 12am (midnight) and 3am on January 1st 2002 was around 64 million. [47]. This figure virtually doubled from the previous year and some messages took as long as 2 days to be delivered. A staggering 57.5 million messages were sent on Valentine's Day 2002, which dwarfed 2001's total of less than 25 million [45]. As far as daily text messaging figures are concerned, Britons are sending approximately 45 million texts a day compared to 29.9 million this time last year and only 8.7 million in 1999. This is becoming close to representing one message per person per day. *Figure 1.2* shows the daily text messaging figures for 2001.

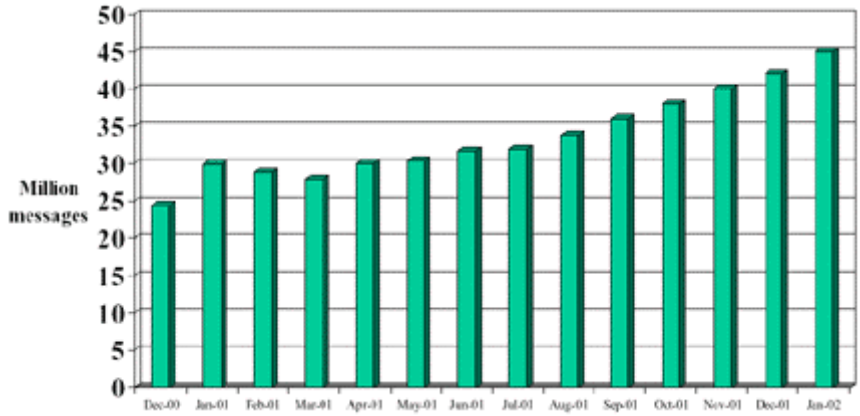


Figure 1.2: Average number of text messages sent per day in the UK (Source: MDA)

Text messaging is not only prevalent in the UK, but all over the world. The Philippines has been described as "the text messaging capital of the world" contributing roughly 20 per cent of the world's daily text messages [23]. SMS became the preferred method of mobile telephone use once the two major networks, Globe and Smart, introduced free, and then later on, low cost text messaging. SMS has even been shown to be an important political medium in the Philippines (see *2.5 SMS in the News* for more details).

Interestingly, the United States has not embraced SMS in the same way as Europe or more to the point is not able to, as it uses a number of different technologies to provide wireless services. SMS generates a huge revenue stream and so the US is potentially missing out on a lucrative business, given its vast population. Section *2.3 Business Aspects* discusses in more depth why the decision was taken not to make use of GSM. *Figure 1.3* shows a timeline highlighting the key events in the development of SMS.

December 1992:	SMS begins life in Vodafone offices in Newbury.
1995:	SMS messaging introduced on mobile networks for commercial use
January 1999:	inter carrier SMS enabled in the UK (40 million SMS messages recorded)
September 1999:	SMS usage exceeds 100 million messages per month
May 2000:	SMS traffic hits half a billion a month
June 2001:	BBC airs a 45 minute documentary dedicated to SMS
August 2001:	SMS traffic hits 1 billion a month
2002 – Today:	43 million texts sent every day (1.3 billion per month)

Figure 1.3: SMS timeline (Source: www.mobiledatadata.com)

1.4 Human Factors

To make use of SMS, it is necessary to be able to input 52 upper- and lower-case letters, plus 10 digits, punctuation, spaces and controls through perhaps 10 or so buttons. In addition, the user is constrained to only being able to enter 160 characters per message. Some character sets such as Arabic and Greek have an even lower limit of only 70 characters per message. Any HCI expert would have asserted that text messaging would never catch on given this poor user interface, however it has proved to be an extremely popular method of communication. Mobile Lifestreams [13] describe it as "quick and dirty, hard to use the keypad, abrupt, punctuation challenged and incredibly useful and popular." SMS is a clear case where the advantages of it far outweigh the disadvantages.

Mobile phones are forever becoming more compact and so entering texts on small keypads can be troublesome. *Figure 1.4* shows a typical keypad layout as used on Nokia phones. Here, the '0' key is used for

spaces and the '1' for punctuation. The core problem with entering the text is that each key is mapped to three of four different letters.

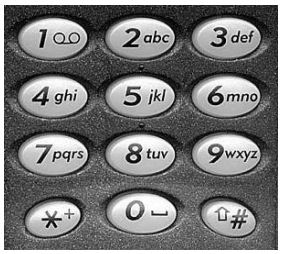


Figure 1.4: Keypad layout as used on Nokia phones

There are three main input methods currently used on phones in the UK, all using slightly different techniques.

- **Multi-press with timeout** – the user presses each key between one and four times depending on the letter required. For example, key 7 is pressed once for 'p', twice for 'q', three times for 'r' and four times for 's'. The main problem with this method is that when two consecutive letters are on the same key, the phone does not know whether subsequent key presses 'belong to' the previous character or represent a new character. The sequence '2,2,2' may mean the user wants to enter 'abc' or it can also be interpreted as 'c'**.** This technique therefore uses a fixed timeout to decide when the user has finished cycling through letters on a key. So, to enter 'ab', the user must press '2', and then wait for the timeout to expire. They then press the '2' key twice, where the two presses are separated by less than the timeout interval, i.e. in quick succession.

- **Multi-press with 'next' button** – this technique replaces the timeout with a 'next' button. Instead of waiting between successive letters, the user presses the 'next' button to signify that they have finished cycling through letters on that key.

- **Two keypress** – instead of cycling through letters on a key, two key presses are used, where the first press indicates the desired key and the second press identifies the position on that key. For example, the letter 'g' is on key '4' at position 1, so the user would press the sequence of key '4' followed by key '1'.

- **Predictive input** – the user presses each key once only and the phone uses an algorithm to calculate the most likely word from the keys pressed. The most commonly used algorithm is the T9® input method which "uses a dictionary as the basis for disambiguation" [42]. The problem with this technique is that several words can match the same input pattern. For example, pressing

'4,3' could map to either 'if' or 'he'. When this happens, a 'next' key is generally used to cycle through the different possibilities. With T9®, the user is not constrained to just the original dictionary, it is possible to add custom words.

The Nokia Research Centre carried out a study of predicted input speeds for the three methods [42]. Using twelve volunteers, two tests were carried out, firstly to press a predetermined sequence of keys as quickly as possible and secondly to press two keys alternately. The measurements were taken for entry using the thumb on one hand or both index fingers. *Table 1.1* shows a summary of the results obtained from Nokia's experiments.

METHOD	THUMB	INDEX FINGER
Multi-press		
- wait for timeout (1.5 seconds)	20.8	22.5
- 'next' button	24.5	27.2
Two-key	22.2	25.0
T9®	40.6	45.7

Table 1.1: Predicted entry speeds in words per minute (Source: Silfverberg et al)

The T9® predictive entry method was shown to be the quickest by far. It has certainly helped to alleviate the problem of entering texts to some extent, although still requires some getting used to.

1.5 Summary

Text messaging has delivered an unlikely windfall for the mobile phone network operators as nobody predicted that it would catch on like it has. It would seem from the growth of SMS that the limited user interface has not deterred people from using it and so there are obviously other reasons why it is so popular that need looking at more closely. Very little work has been carried out in the UK in this area, and what work has been done seems to be based almost entirely on anecdotal observation. Through the combination of a questionnaire and interviews, this project aims to try to establish who is using text messaging and for what purposes.

1.6 Layout of the Report

The introductory section has identified the purpose of the project and its scope. Chapter *2. BACKGROUND* discusses some of the reasons for this apparent popularity in text messaging and considers how it is having an effect in a number of different areas. This is followed by section *3. METHOD*, which describes how the research was conducted and gives an overview of the sort of results that were expected.

Chapter *4. RESULTS* presents the main results, whilst *5. FINDINGS* attempts to interpret what these results illustrate. The final chapter of the report brings all the evidence together and tries to answer the ultimate question as to why text messaging has become so popular.

Chapter 2

2. BACKGROUND

2.1 Why is SMS so Popular?

There has been hardly any non-commercial empirical research carried out so far as to who is text messaging and why they are choosing that particular medium. Faulkner and Culwin [20] carried out a small-scale questionnaire, which was administered by their students. They found that women are slightly more active than men when it comes to texting and that there is a degree of modality involved when using the medium, i.e. when people receive a text, they are more likely to reply with a text. Another UK report published by Barclays, suggests that people in the 15 to 25 year old age range were abandoning email in favour of texting [5]. The BBC also claims that 80% of 15-24 year olds are conducting their social lives via text messaging [8]. In a report published by Mobile Lifestreams [14] there are some interesting points about why text messaging is particularly prevalent in the youth market. They suggest that the steep learning curve of learning to manipulate the difficult-to-use interface is one of the things that appeals to youngsters. Older people are interested in content – completing the communication as quickly and easily as possible, whereas younger people are as interested in context – being seen to be doing something interesting and killing time. SMS singly demonstrates that people want to use their phones for point-to-point communications rather than tacky entertainment packages, a point illustrated in Andrew Odzylko's paper, Content is Not King [30]. This is the main reason for the failure of the Wireless Application Protocol (WAP).

McLuhan [27] has some interesting ideas about the telephone being an intruder. He describes it as "an irresistible intruder in time or place." Text messaging has to some extent quelled this idea, which might help to explain their popularity. We are able to respond to a text in the same way as we would a letter or an email, it can wait for our response. We take control of the medium rather than the medium taking control of us.

Stroem [44] comments on how "telecommunication services have become one of the most important means of expressing opinions and personal experiences". He goes on to suggest how rhythm and flow are essential for a means of expression to offer a strong immediate satisfaction. The user is first of all satisfied by capturing the expression, and then satisfied again by distributing it to others. Telecommunications includes the telephone, email and text messaging, although it is clear to see how text messaging can fit into this theory and explain why people are using them so frequently. A user can type in their text message and then distribute it to as many people as he desires, which suits this model perfectly. Csikszentmihalyi [19] explains how immediate feedback increases the satisfaction, whereas time with nothing to do disrupts the satisfaction.

SMS makes it possible to receive replies within minutes, if not seconds as opposed to other forms of communication, which may take longer to receive a reply. Stroem [44] sums up by discussing how telecommunication services such as SMS are allowing ordinary people to distribute their opinions and expressions with speed and ease and a consequence of this is an almost addictive urge to express something.

Perhaps the popularity of text messaging could be part explained by users becoming addicted to it. The Joy of Text [3], which was an evening of programmes shown on BBC One dedicated to text messaging, supports this view. Several 'addicted' users were interviewed and spoke of how they compulsively sent texts to friends and colleagues, resulting in extremely high phone bills. There is even one report of a Scandinavian chauffer who once checked into rehab due to his 200 texts a day habit [7]. It is not just the BBC who has acknowledged this new fad; all of the other major television channels were quick to make use of SMS to provide their viewers with a more 'interactive' experience. ITV's Survivor and Channel 4's Big Brother were among the first programmes to include viewer-interactive text voting.

One of the primary reasons for the popularity might be attributed to cost. For example, many phone companies will charge their users 35p a minute to call a landline or the same network, and perhaps as much as 50p a minute for a cross-network call during the day. A text message, irrespective of time of day, costs around 10p. It is also natural to a generation that has grown up with email, remarks Benson [11], a generation who want instant communication modes for next to nothing cost. Receiving a text gives the ultimate mobile rush, like receiving a hug. Text messaging has transformed the mobile phone into the definitive flirting accessory. Benson [11] also comments that text messaging has encouraged men to write and call more. If they feel they cannot say 'I love you in person', they can text it. According to Keegan [24], "Text messaging has created a whole new layer of remote person-to-person social exchanges". Still on the theme of love, Peachey [34] makes the point how the secretiveness of the Short Message System has made it a perfect method of communication "for the increasing numbers of married and 'involved' people who are now using texting to carry on affairs." Take a moment to ask yourself if you have seen your partner's mobile bill recently. Do you recognise that reoccurring number?

2.2 Technical Features of SMS

The Short Message System is defined within the GSM digital mobile phone standard as having several features:

- A single short message can be up to **160 characters** of text in length. Those 160 characters can comprise of words or numbers or an alphanumeric combination. Non-text based short messages (for example, in binary format) are also supported. These are used for ringtones and logos services for instance.

- The Short Message Service is a **store and forward service,** in other words, short messages are not sent directly from sender to recipient, but always via an SMS Centre (SMSC) instead. Each mobile telephone network that supports SMS has one or more messaging centres to handle and manage the short messages.

- The Short Message Service features **confirmation of message delivery.** This means that unlike paging, users do not simply send a short message and trust and hope that it gets delivered. Instead the sender of the short message can receive a return message back notifying them whether the short message has been delivered or not.

- Short messages **can be sent and received simultaneously with GSM voice, Data and Fax calls.** This is possible because whereas voice, Data and Fax calls take over a dedicated radio channel for the duration of the call, short messages travel over and above the radio channel using the signalling path. As such, users of SMS rarely if ever get a busy or engaged signal as they can do during peak network usage times.

- **Ways of sending multiple short messages are available.** SMS concatenation (stringing several short messages together) and SMS compression (getting more than 160 characters of information within a single short message) have been defined and incorporated in the GSM SMS standards.

To make use of the service, users will also need the relevant hardware and subscriptions, specifically:

- A subscription to a mobile telephone network that supports SMS;

- Use of SMS must be enabled for that user;

- A mobile phone that supports SMS;

- Knowledge of how to send or read a short message using their specific model of mobile phone;

- A destination to send a short message to, or receive a message from. This is usually another mobile phone but may be a fax machine, PC or Internet address.

It is also worth drawing attention to the fact that text messages can be sent using one of the free services on the Internet such as Lycos (http://sms.lycos.co.uk/mobile/), which do not require the use of a phone.

2.3 Business Aspects

Text messaging has become a huge market, as demonstrated by the fact that 260 billion messages were sent in the UK throughout 2001. It is unusual in that "it exploded without the aid of big advertising budgets, and without evangelising from the carriers who provided the service as an afterthought" [33]. An interesting question to pose is why SMS attracted so little interest from the phone companies. Perhaps if one of the major players had recognised the potential earlier, the mobile phone industry today might tell a very different story with one company dominating the market.

The phone companies have changed their whole approach in that they now actively market text messaging. They have realised that SMS is now a lucrative part of the business. CNN reported at the end of 2001 that text messaging was accounting for nearly 9% of Vodafone's revenue, up from 6% the previous year [18]. You only need to flick through a national newspaper to come across a bold advert promoting the medium. In the Mail on Sunday [25], there were 2 half-page advertisements from Vodafone expressing the fact that "No one overhears a text message" and tempting people to "Make love on the bus". These two advertisements are pushing the discreet aspect of text messaging in that if you cannot say what you want out loud, then send a text. A recent television campaign run by Orange is encouraging users to "Touch someone with a text message".

The interesting point about this advertising is that text messaging is not unique to one particular network and so promoting SMS is surely beneficial not just to the company running the advertisement, but to all phone operators. This might be explained by the presence of the Mobile Data Association (MDA) [28], which has been instrumental in promoting cross network messaging. In 2001, the MDA agreed to endorse a 'Text Messaging Campaign' on behalf of the four GSM network operators. The aim of the campaign was to promote the concept of text messaging to 20 to 30-year-old non-text users. This shows that the operators are working together to increase the awareness of SMS, as it is clearly advantageous to all. In September 2001, the MDA launched the website www.Text.It which is an official and comprehensive website dedicated to text messaging providing information for consumers and the mobile industry community.

From a business perspective, it is also worth considering whether the saturation in the mobile phone market will have any effect on text messaging figures and hinder further growth. In January 2002, Carphone Warehouse provided evidence of this saturation by warning that slowing handset sales would knock 10% off its annual profits [16]. This might suggest that the number of texts being sent could start to level off as everybody who wants to use a phone has got one. This is discussed further with suggestions for additional research in the section *6.3 Future Work*.

As mentioned earlier, text messaging is not used in the same way in the US as it is in Europe. Are the US therefore missing out on millions of dollars of potential revenue? The reason for this differing technology is a series of influential essays written in the early 90s penned by a man named George Gilder. Gilder assured investors that the US had a year's-long technology lead over the Europeans, with their technology-inefficient GSM air interface. "Why imitate European failures?" asked Gilder [21]. He then spent the 90s talking up Code Division Multiple Access (CDMA), wireless broadband and in particular Qualcomm (the company who pioneered and commercially developed CDMA). He predicted that wireless broadband would become the conduit for video on demand and entertainment services. SMS proved this model to be wrong and so the US has missed out where others have profited.

Finally, as brought up at the beginning of this chapter, WAP was a failure and so soon after companies realised that it was SMS and not WAP that had the addressable audience of users and the clearer business case. A BBC article reports how a number of trial SMS advertising services were set up at the start of 2001 [6]. Wireless firm, The Mobile Channel signed up 1,000 people for a trial of its service. In return for receiving messages, participants were offered vouchers for money off their phone bill or goods made by the advertisers. Companies who sent advertisements by SMS included Carlsberg, Tango, Cadbury's and Thomas Cook. The analysis of the trial showed that 74% of people read all the messages they were sent and 63% replied to the message or did something as a result of it. Direct mail campaigns are considered a big success where response rates of 3% or higher are achieved, and so there is a definite rationale behind turning mobile phones into portable billboards. It would appear that Cadbury's Schweppes' recent text messaging competition helped the group to a 12 per cent rise in pre-tax profits, from £792 million to £886 million, for the year January to December 30th 2001. The company ran a competition on wrappers inviting customers to "text and win", and got 5 million messages back [46].

2.4 Language

A whole new alphabet has even emerged as a result of SMS as messages took a long time to enter and were quite abrupt as people attempted to say as much as possible with as few keystrokes. Abbreviations such as 'C U L8er' for 'See you later' sprung up for timesaving and coolness. The use of 'emoticons' or 'smileys' :-) to reduce the abruptness of the medium and to help indicate the mood of the person in a way that was difficult with just text has also become popular. *Figure 2.1* shows some examples of the types of shortcuts adopted by mobile phone users, while *figure 2.2* gives examples of emoticons.

Are you OK?	**RU OK**
As far as I know	**AFAIK**
Before	**B4**
Great	**GR8**
Mate	**M8**
Thanks	**THX**
Tomorrow	**2MORO**
What	**WOT**

Figure 2.1: Abbreviations

:-)	**SMILING**
:-(	**FROWNING**
;-)	**WINKING**
:-*	**KISSING**
:-\	**UNDECIDED**
:'(	**CRYING**
:-D	**LAUGHING**
>:o	**YELLING**

Figure 2.2: Smileys

If the Guardian newspaper's text message poetry competition is anything to go by, we can surely make assumptions about how SMS might be changing the way we use language. Andrew Wilson [48] claims that "more people are using words creatively and inventively than at any time in the history of the English language". As the infamous media guru Marshall McLuhan pointed out, changing forms of communication tend to change the way we talk and so text messaging must certainly give evidence to the phrase "the medium is the message" [27].

There is also some suggestion that the Short Message System may not have replaced other forms of communication, but rather increased levels of communication. Reeta Räty [36] notes that about 700 million text messages were sent in Finland during 2000 but that telephone bills have at the same time doubled. She

also comments that Finns call mobile phones "kännykkäs", which is derived from käsi, the Finnish word for hand. They are effectively an extension of the human body allowing one to express themselves whenever and wherever they want.

One final point to note is that the verb 'to text' has even evolved to designate the act of sending such messages.

2.5 SMS in the News

There are lots of different news services available for delivery through SMS, ranging from the latest news headlines through to horoscopes and football results. However, text messaging has also started to make the news rather than just deliver it. A lorry driver who was sending a text message to his girlfriend when he hit and killed a man was sentenced to five years in jail for causing death by dangerous driving [9].

According to the Philippine Daily Inquirer [38] the rapid distribution of news and opinions through forwarded text messages played a crucial part when the Philippine president, Joseph Estrada, was forced to resign in January 2001. Demonstrators beeped the latest news to fellow protestors via SMS and were able to start a 'revolution' against Estrada.

It seems that SMS is having a major impact on some people's lives, another newspaper article [35] documents how a couple were wed after a sales assistant working in a mobile phone store sent a text to a girl he had a just sold a phone to. They exchanged texts and were engaged two weeks later. The man in question commented, "It's been a pretty heavy textual relationship." The Register [26] reports on a system being piloted in Dublin where users can summon a taxi by simply sending a text message. The system works by the user sending a text to E-Taxis' number. Triangulation is then used to check out the location and the message is automatically routed to the nearest cabs. A driver then calls the mobile to check on the fare.

In stark contrast to the story mentioned above, the method of communication has even helped to save lives too. In February 2001, a British tourist was rescued from a sea storm off the coast of Thailand after she contacted her boyfriend in Britain [40]. She set off an international search-and-rescue operation with a mere text message. The boyfriend called the Thames Coastguard, who called the Falmouth office. They then called their counterparts in Australia, who contacted the Indonesian authorities via the embassy in Canberra. Eventually, an Indonesian Navy gunboat was dispatched from Lombak to carry out the rescue. Do not underestimate the power of the text message! BT has acknowledged the popularity of text messaging and set up nearly 3,000 text kiosks across the country so people without mobile phones can join in. [22]

2.6 Other Applications of SMS

SMS has also been one of the greatest technological advances in communications for those who are deaf or hard of hearing. The technology was not intended particularly for this group of people, but has proved to be of great benefit. Text messaging has transformed the telephone - which was previously a device that a deaf person could only use with sophisticated equipment costing many hundreds of pounds and even then, if they wished to talk to a hearing person, they had to go via a relay service (TypeTalk) - into an invaluable communication aid. There are no exact figures on what proportion of the 8.7 million deaf or hard of hearing people in the UK are making use of text messaging, but their increasing adoption of SMS is certainly contributing to the ever-growing number of messages being sent per month. Given the ubiquity of mobile telephones, this is one technological communication aid that has been welcomed by the deaf community, as it does not mark a deaf person out as being different. A deaf user of SMS was interviewed about text messaging who commented that it was a "lifesaver" for him (see *Interview A*). One2One now aims special packages for cheaper texting at those with hearing difficulties. With deaf people in mind, the AA has now even made itself contactable through text messaging [1]. Previously, thousands of deaf motorists, who broke down often had to flag down a passer-by in order to contact a breakdown organisation. The Home Office is also considering introducing text messaging for 999 emergency calls.

Voters in Liverpool and Sheffield will be able to cast their ballot by sending a text message in May's local election [10]. The aim of the scheme is boost the number of younger people who vote, and comes in the wake of the low turnout at last year's general election, which dipped below 60%.

2.7 Summary

This chapter has examined the technical aspects of SMS, looked into the business side and discussed some of the applications of it. The following chapter *3. METHOD* explains how the research was embarked upon and outlines the justification behind all the decisions that were taken throughout the project.

Chapter 3

3. METHOD

3.1 Methodology

The first two chapters have identified the project area, looked into the background of SMS and talked a little about some of the possible reasons for its popularity. In order to try to identify who is using text messaging and for what purposes, the following research was carried out:

- The design and distribution of a questionnaire via the web as well as a paper based alternative;
- Analysis of the data from these questionnaires; and
- The carrying out of a number of semi-structured interviews.

3.2 Questionnaire

The decision was taken to devise a questionnaire to investigate the popularity of SMS. Other approaches were considered, however the questionnaire seemed the most feasible option for a number of reasons. Firstly, it was the most efficient method for retrieving a relatively large amount of data, at a relatively low cost, in a short period of time. It was also felt that the standardised nature of a questionnaire would help in the analysing stage later on, because the quantitative data would be far easier to process. There were obviously problems associated with this method too, although care was taken to try and reduce these to a minimum. There is no guarantee that respondents will report their opinions accurately, however the questionnaire allowed for anonymity, which helps by encouraging respondents to answer more honestly. The other main problem thought of was that respondents might not understand or misinterpret some of the questions leading to inaccurate data. This led to the decision of testing a pilot survey on a small sample first to see if it could be easily comprehended. *Section 3.2.3 Feedback from the Pilot Questionnaire* deals with this issue in more depth.

The other main approach contemplated for research was the use of a focus group, which is effectively a group interview based on a set theme, in this case text messaging. The major problem with the focus group was that it would have simply been far too time consuming for this type of study, not only from the author's perspective but also finding people prepared to give up the necessary time, to participate in such an event. It is only possible to cover a limited number of questions and a typical group will consist of only eight to

twelve participants [43]. The other main disadvantage was that a focus group lacks anonymity and so respondents can be intimidated and therefore not express their true opinions. This type of approach however is able to extract information that a questionnaire cannot and so to avoid missing out on this potentially valuable source of information, it was concluded to complement the survey with a number of interviews (see *3.5 Interviews* for more details). Observation as a means of data collection was ruled out due to it being time-consuming plus there is an issue concerning the extent to which an observer affects the situation being observed. It could have been achieved by keeping a diary of mobile phone behaviour over a period of time, but the questionnaire was adjudged to be the more worthwhile method. Attempting to observe people either sending or receiving texts would not have been practical.

3.2.1 Hypotheses

From personal use and observations of text messaging, it was decided to create a number of hypotheses to be tested. These also helped in the phrasing of questions as the hypotheses made it clear what was being investigated.

Hypothesis 1 – People often reply by text when receiving a text

When receiving a text, users will normally reply by sending a text back as opposed to telephoning or by some other means.

Hypothesis 2 – People send text messages to kill time

It is a common sight to see people walking along or waiting for a train tapping away at a text message. This puts forward the suggestion that people are perhaps communicating when otherwise they would not.

Hypothesis 3 – Text messaging activity decreases with age

The younger generation have grown up with SMS and so have accepted it more readily than older people who are more accustomed to more traditional methods of communication. Texting is also likely to be seen as fashionable in circles of youngsters.

Hypothesis 4 – Text messaging is used as a discreet form of communication

People are using text messaging when they do not wish others to hear what they are saying. This might be whilst sitting in a crowded place for example.

Hypothesis 5 – SMS is a cheap method of communication

The majority of people will be of the opinion that text messaging is cheap.

Hypothesis 6 – Interaction is a factor affecting whether people use SMS

People use SMS to avoid having to speak directly to another person and will often text things that they would not say in conversation.

3.2.2 Design of the Questionnaire

Having thoroughly researched the field of SMS and read various articles and papers, the author had a good idea of the sorts of aspects that needed to be investigated. It was also decided to use a pilot questionnaire to begin with, which could be distributed to a small sample of people. Piloting was necessary to evaluate the instructions, the questions and the response systems.

The direct objective of the questionnaire was not to try and find out absolutely everything about text messaging, but more to focus in on some of the possible areas that are influencing its popularity. Some broad dimensions for the questionnaire were then devised from a brainstorming session with Alistair Edwards. This then gave a focus for the type of questions that needed to be asked. The following dimensions were established:

- Cost
- Privacy/Discreetness
- Interaction
- Asynchrony – sending & receiving
- Fashion

Having contrived the dimensions, the next step was to work out what type of questions should be asked. Three key areas were identified:

- *Personal details* – this was to include personal information such as age and gender and the number of texts being sent and received;
- *Opinions of SMS* – an insight into why SMS is being used; and
- *SMS vs. Telephone* – an attempt to discover why SMS might be used in preference to the telephone.

The pilot questionnaire was drawn up and given out to 50 people asking them to complete it and give comments on layout, ease of understanding and range of questions. Where feasible, the pilot questionnaires were administered personally so that the candidate could be observed and quizzed where necessary. Having done this, it was then possible to incorporate the comments and feedback when creating the final questionnaire. Please refer to *Appendices A and B* for the pilot and final questionnaires respectively.

3.2.3 Feedback from the Pilot Questionnaire

Positive feedback was received from distributing the pilot questionnaire, which was taken into account in the final draft. The overall look of the questionnaire was changed as a result of the comments and observations. The style of the check boxes was improved to give the questionnaire a more professional appearance and the introduction section was lengthened to explain the purpose of the research. The questionnaire was also physically divided into three separate sections, which helped to group the various parts together. When filling out the question regarding the number of text messages being sent and received, several 'infrequent-text' respondents made the point that the 'few a week' box, which represented the least frequent option, did not accurately describe their text habits. This was easily rectified by the inclusion of a 'few a month' box.

The question concerning proportion of texts sent from the Internet in comparison to the mobile handset was also slightly adapted. Originally, respondents were asked to circle two percentages totalling 100%, which many found to be confusing and misleading. Having a single tick box for each combination of percentages solved this problem (see question 10 on *Appendices A and B*). It also contributed to maintaining consistency as asking people to circle two values was not inline with the tick box method of response. One of the questions asked, "Does your mobile phone support predictive text messaging input?" Some of the respondents, particularly in the older age category reported that they had no idea what predictive input was, let alone whether their mobile phone supported it. A simple definition was therefore included with the question to try and obtain a more accurate picture. A 'don't know' option was also included, with the purpose of this being to prevent respondents having to make a decision about something they knew little about. The impartial option made analysis more difficult, however without it accuracy would have been lower and some respondents might have deemed the question too difficult to answer.

Next, the pilot questionnaire included the statements "I use SMS for sending jokes to friends" and "I text ringtones and operator logos to friends" and then asked people to say how strongly they agreed or disagreed with it. The majority of people raised the point that they were in fact both 'yes/no' questions and should not be included under the statements section. This problem was subsequently resolved in the final draft by incorporating them as 'yes/no' questions in section A. Finally, the issue of anonymity was reinforced in the final version so that respondents were fully aware they would not be identified in any way.

The pilot study helped throw up some of the inevitable design issues and should therefore have contributed to obtaining more reliable data.

3.2.4 Explanation of Questions

This explanation makes reference to the final copy of the questionnaire, which can be found in *Appendix B*.

Section A

The first section was predominantly aiming to capture personal details, such as age, gender and type of phone. Question 3 asked, "Do you use a mobile phone?" and question 6 enquired as to whether people had actually used SMS. The point of these was so that people who exclusively send SMS from the Internet were not excluded and to identify those people who have never used text messaging before. Question 5 invited respondents to specify whether they had a contract phone or pay as you go. This was encompassed so that analysis could determine if this had any effect on people's text messaging habits. Questions 7 and 8 were attempting to look at text habits of sending and receiving respectively.

Questions 9 and 10 were added into the questionnaire to firstly see whether people were using the Internet to send texts and if so what proportion compared to the number sent from their handset. The poor user interface associated with entering texts has already been discussed (see *1.4 Human Factors*) and therefore questions 11 and 12 were associated with this. Are people who use predictive input perhaps sending more messages than those who are not using it? Finally, questions 13 and 14 were seeking to discover if jokes and ringtones were a factor in the usage of SMS.

Section B

This section was the main focus of the questionnaire, which was investigating the factors outlined in the hypotheses (see *3.2.1 Hypotheses*), and so needed to measure people's attitudes towards SMS. The decision to adopt a summated rating (or Likert) scale was taken, because this was felt the easiest and most simple to develop. It is also very widely used, easy to understand and "people often enjoy completing a scale of this kind" [37]. If respondents are interested, they are more likely to give considered answers, but more importantly if it appears boring, they may not wish to cooperate at all. Other scales including the cumulated scale and the equal appearing interval were looked at, but were ruled out predominantly on the grounds of their complexity. It seemed insensible to adopt a more cumbersome approach, when a simpler and just as effective alternative was available. The cumulated (or Guttman) scale is also more suited when measuring a well-defined and clear-cut dimension, which in this instance was not the case. The response categorisation system used five fixed-alternative expressions of 'strongly agree', 'agree', 'unsure', 'disagree' and 'strongly disagree'.

Questions 17, 21, 26 and to some extent question 27 regarding flirting, were included to explore the issues of privacy and discreetness. Do people text things to stop other people hearing what they are saying and is it more acceptable, for example, to communicate late at night with a text message? The flirting question in particular was enthused by an advertisement seen in a magazine entitled "TXT 'N' FLIRT", which is a sort of text messaging equivalent of a dating service. 24, 25 and 28 deal with people's perception of cost when using text messaging. Question 28 was asking the broad question as to whether text messaging is cheap, whereas the emphasis of 24 and 25 was to determine whether people are using SMS simply as a cheaper alternative when calls are expensive.

Question 19 was asked for the sole purpose of investigating hypothesis 1, about whether there was modality involved in using SMS. Section C chose to compare the use of SMS and the telephone but did not include anything on e-mail, and so question 20 touched upon this issue by asking respondents to indicate whether they thought SMS was faster and more efficient than e-mail. Question 30 was inspired by the high media awareness concerning safety issues with mobile phones. It was decided to explore whether this was influencing people to text rather than call, thus avoiding the potential dangers of radiation associated with making a call.

The inspiration behind questions 15, 16, 23 and 29 was to examine the theme of how text messaging is affecting the way people are interacting with others (see hypothesis 6). Is SMS making people more confident in the things that they say to others and is it regarded as an impersonal means of communication? Question 22 was included with the suggestion in mind that people are using texting to kill time. It may be that people are sending messages at times when they would otherwise not engage in contact, in order to subdue boredom or perhaps even to give the illusion of subduing the boredom. Despite the increasing coverage of the mobile phone networks, some areas still experience bad reception. Question 18 was therefore enquiring as to whether bad reception is a reason for resorting to SMS.

Section C

This section was included due to the fact that when using a mobile phone, there is this choice of communicating in two different ways, either through a conventional telephone conversation or by using SMS. The interesting area was to try and establish when users might use SMS in preference.

The aim of questions 34, 36 and 40 was to look into this idea of using text messaging as a quick, direct form of communication. In particular, question 40 about passing on your address to someone was incorporated to see whether SMS was helping to solve the all too common 'I can't find a pen' scenario. Question 37 was again examining cost to see if people found it cheaper to communicate back home from abroad using text messaging.

Questions 32 and 33 were very similar in that they both referred to arranging a time and venue to meet, however question 33 specified meeting a group of friends as opposed to just one friend. The intention here was to try and make a comparison between the two to see if the situation of having to contact a number of people might influence the form of communication used. For example, a text message can be composed and sent to as many people as you wish, so could prove to be a quicker and cheaper option than phoning people individually. We have all been in the situation where we are sat on a train and forced to listen to somebody else's telephone conversation, which can prove to be quite irritating and distracting. This was the motivation behind question 38 to find out if the discreet aspect of texting was a factor that people found attractive.

Questions 35, 41, 42 and 43 were included to deal with the issue of interaction or to some extent not wanting to interact. Question 42 "Asking someone out on a first date", in particular carries with it the possibility of rejection and embarrassment. Telephoning someone is potentially more difficult to handle and so SMS can help alleviate this problem. Finally, question 44 asked whether users had sent anyone a 'New Year' or 'Valentines' greeting. There is already empirical evidence to show that text messaging activity increases on these days (see *1.3 The Growth of SMS*), so it was thought interesting to try and ascertain who exactly is sending these messages, with respect to age and gender. A comments section was also included at the end, which allowed respondents to express freely any other opinions they had on text messaging.

3.3 Distribution

The approach to the research was dominated by the importance of gaining as much credibility to the data as possible, and so a high response rate was desirable. It was therefore decided to administer the questionnaire both via a traditional paper based survey and an online version. It was accepted that differences might exist in the data between the online and the paper based questionnaires, however using both channels meant for a much higher response rate, thus contributing to the integrity of the data. It could be argued that users filling in an online questionnaire are more likely to have a certain level of ability and familiarity with technology than those filling in the paper questionnaire, and so therefore might have differing opinions of SMS. It must be remembered however, that the object of the exercise was to obtain opinions on text messaging from a broad range of people and so it could actually provide for some interesting findings.

3.3.1 Increasing Response Rates

Oppenheim [32] lists several factors that empirical evidence shows to increase response rates to questionnaires. These factors were taken into consideration when distributing the questionnaire.

- *Incentives* – respondents were offered a summary of the results in return for participating in the survey by allowing them to submit an email address. Ideally, money would have been used as an

incentive as more people are likely to have responded to this, yet it would have proved far too expensive and impractical, particularly when reimbursing the web based respondents

- *Confidentiality* – all respondents were assured that any information disclosed would be treated as strictly confidential and that results would be presented so that they could not be attributed to any specific individual.

- *Excessive precision* – In this case numerical answers might have best been categorised within the question, rather than at the analysis stage in order to save time. However, asking respondents to give very precise answers might have made some of them difficult to answer. Therefore respondents were offered a range of answers e.g. 3-5 per day, as it is far easier to tick a box next to a range that looks reasonable, than to calculate a precise answer.

- *Instructions* – The response method for all questions was clearly indicated and a tick box was consistently used to avoid confusing the respondents by suddenly asking them to circle something for example.

- *Appearance* – Oppenheim [32] states that although several experiments with general layout, type face, colour and quality of paper have been carried out, there are no clear general conclusions. A clear and concise layout was therefore chosen making the questionnaire as easy to read as possible. The response boxes were consistently positioned in order to speed completion and also to avoid inadvertent omission of responses. A different font was also chosen for displaying the instructions so that there was a distinct differentiation between instructions and questions.

- *Length* – The decision was made to allocate one side of A4 to each section, thus limiting the length of the questionnaire to three sides to encourage as many people as possible to participate.

3.3.2 Paper-based Survey

The paper-based questionnaires were distributed around the University of York and to other friends and colleagues. The approach taken was to use a simple random sampling technique, where every member of the population effectively had an equal chance of being chosen. It was accepted that handing out the questionnaires around the university might not represent an entirely random sample, but it was deemed the most sensible method for this kind of study. The university offered access to a large volume of people combined with the fact that students were more likely to be willing to partake in research than 'people off the street'. Administering the questionnaire in the town would have proved far too time consuming, as it was felt that there would have been a very low response rate. To help in obtaining a random sample, a snowballing approach was also adopted in some instances, whereby five questionnaires were given to some

people who subsequently passed them on to their friends and family. This allowed parents and older people to take part in the research, therefore gaining a broader range of views and opinions. A stratified random sample was considered, whereby the population would have been divided up into subgroups based on age to ensure that all groups were adequately represented, but this was rejected due to the inclusion of the online questionnaire. It would have been impossible to control exactly who was filling in the online questionnaire, as the URL was sent out to hundreds of people via mailing lists and newsgroups (see *3.3.3 Online Questionnaire*).

3.3.3 Online Questionnaire

In an attempt to maximise the response rate, an online version of the questionnaire was constructed using HTML and JavaScript with the results being processed using CGI scripts written in Perl. The code for this can be found under *Appendix C. Section 3.3.4* gives a short explanation of the coding. Perl was chosen over any other CGI language due to the fact that it required a minimal amount of new learning and could be coded effectively. In addition, the departmental servers provided the facility for hosting the Perl scripts, which made it seem like the most sensible solution. The option to use CGI was chosen in preference to emailing the questionnaire as an attachment for a number of reasons. Firstly, it was felt that people would be more likely to click on a URL in an email linking to the survey, than open an attachment, fill in the details and then send it back. Secondly, by using CGI it meant that the results could be automatically totalled up as opposed to manually sifting through hundreds of attachments. *Figure 3.1* shows the online questionnaire. A similar format to the paper-based questionnaire was chosen and radio buttons were used as opposed to check boxes, in order to constrain the user to making only one selection per question. It was also considered forcing respondents to select an answer to every question through a small JavaScript implementation, however it was judged that people should have the choice of leaving an answer blank if they wanted to. If they were not given this choice, the accuracy of the data would have been jeopardised in that respondents would have selected a response only because they had to, which would not have reflected their true opinion.

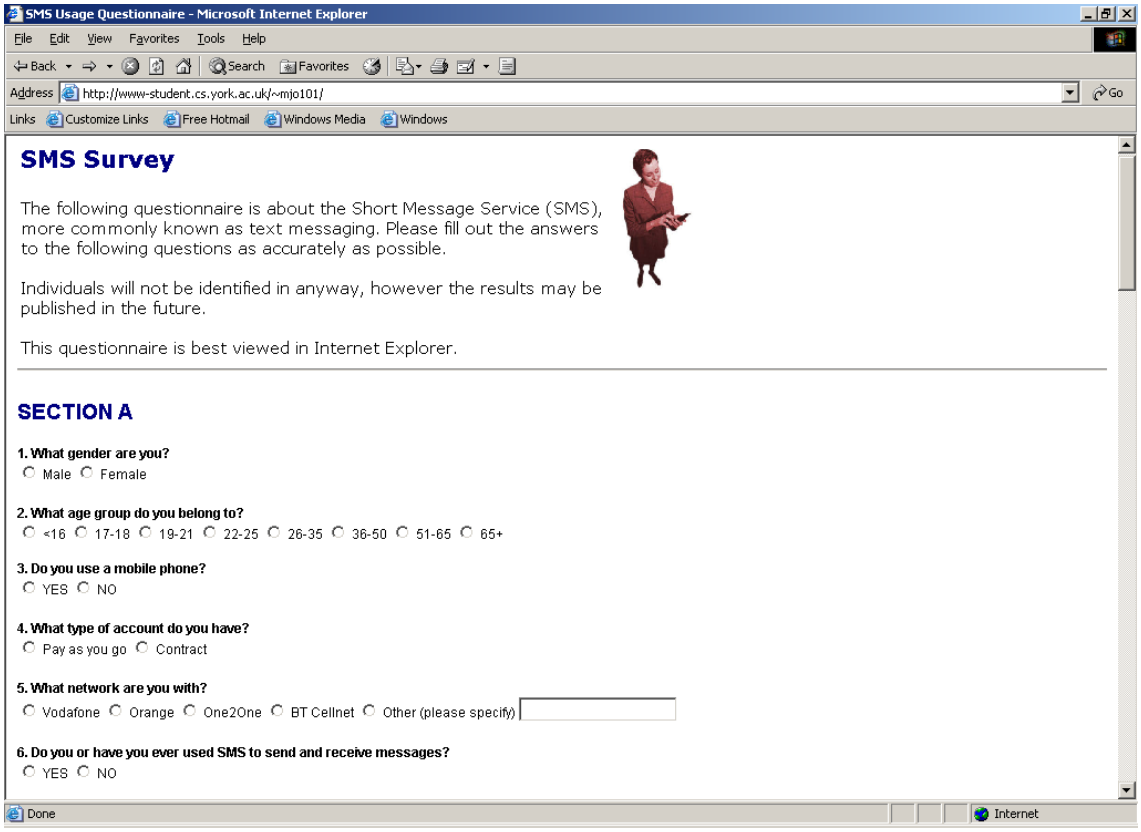


Figure 3.1: Online Questionnaire

The URL for the survey was then sent via email to friends and colleagues in the university, posted on newsgroups and mailed to the British HCI mailing list. This list includes individuals working in the field of HCI at universities and institutions from all over the world. It was accepted that there were flaws in this method as it was automatically introducing a bias, but due to time constraints it was the most efficient and cheapest method of obtaining a lot of data fast. It was felt that the benefits of sampling a large population outweighed the negative aspect of introducing a bias. People interested in HCI are likely to have very different views about text messaging as opposed to members of the general public, particularly because from a HCI perspective the text messaging interface is not user friendly. On the other hand though, it could be argued that the respondents are more experienced in their use of communication technologies and so provide more interesting data. The following sections, *4. RESULTS* and *5. FINDINGS* help to shed some light on what is happening.

3.3.4 Explanation of the Code

This description refers to the code listing under *Appendix C*. Three Perl files were used for this implementation, SMS.pl, SMS_comments.pl and SMS_stats.pl, along with a static HTML page containing the questionnaire.

SMS.pl

The HTML page posted to this script, which contained an array of all the questions to be processed. Another array was used for holding the comments to be processed by the form. The script worked by first loading the form variables into Perl and then for each question, a separate file was opened, locked and then the result was printed to a new line within that file. The file was then unlocked and closed. Locking was used to stop two people from editing the same file at any one time. The same process was employed for processing the comments, which were also stored in separate files. Finally, the script printed out a confirmation message to the user, thanking them for completing the questionnaire.

SMS_stats.pl

This script was written for the purpose of viewing the data held within the files. It presented all the responses that had been logged in an easy to view browser interface. (see *Figure 3.2*). An array containing the questions to be processed was used, and then for each item within the array, the script iterated through and processed each file in a loop. The file was opened, locked, read, unlocked and then closed. For each line within the file, a counter was incremented and then the data was displayed in a tabular format. Links were also printed out for viewing the files containing comments.

SMS_comments.pl

When a comments link was clicked, the question number was passed into this script so that it could display the contents of the file.

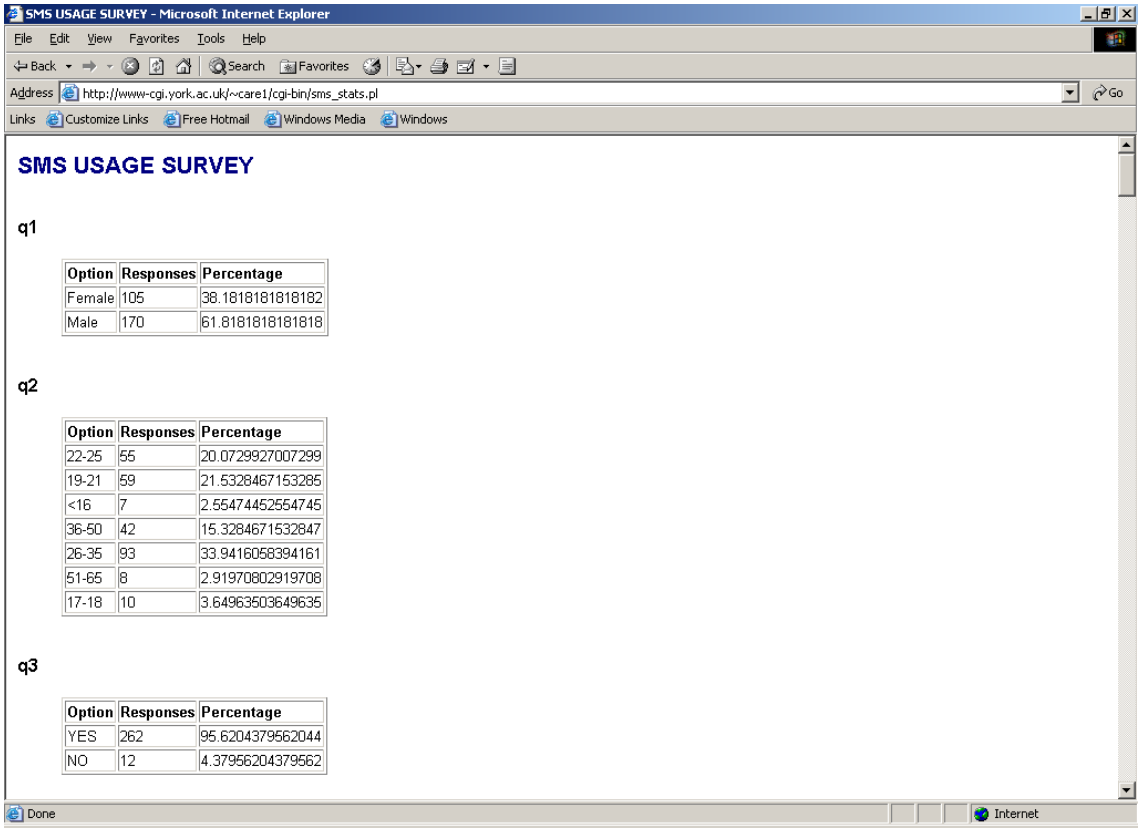


Figure 3.2: Statistics Summary

3.4 Analysis of the Data

A total of 317 usable questionnaires were returned. The responses from both the paper based and online questionnaires were collected together and entered into an Access database. This was done as it allowed the data to be viewed in many different ways and carry out queries on any of the fields. It was therefore relatively simple to retrieve for example 'the number of males who strongly agreed that they use text messaging for flirting'. Excel was then used for manipulating the data and carrying out statistical tests. The χ^2 (chi-square) test was applied to some of the questions to see if differences in gender were significant or not. It was chosen because it compares the observed frequencies in each of the cells of a contingency table with the expected frequencies for each cell if the differences are due to chance, as stated by the null hypothesis. The chi-squared test is also only effective when there are a sufficient number of subjects to be allocated to each category, so that the expected value for each cell comes out to a minimum of 5. This was not a problem due to there being 317 subjects and so it seemed sensible to look for significant differences using this test.

A Spearman rank correlation coefficient was used for measuring the amount and significance of a correlation between people's scores on two statements. The non-parametric Spearman test was chosen as it can be used

with any data, whereas the Pearson product moment correlation requires the variables to be normally distributed, which was not always the case.

3.5 Interviews

It was considered of value to speak to several of the respondents about their experiences with text messaging, as it is not always possible to extract all the necessary information from a questionnaire. In particular, the author thought that it would be extremely useful to interview a deaf user of SMS, as this is one group of people who have definitely benefited from the technology (see *2.6 Other Applications of SMS*).

A number of short interviews were conducted with friends and family of varying ages. The decision was made to interview nine subjects in total, choosing a male and female from 4 different groups based on age, as well as the deaf user. The groups chosen were:

- *Children*
- *Students*
- *People in their thirties*
- *'Older people'*

The interviews were tape-recorded and a summary of the main points can be seen in *Appendix D*. The objective of the interviews was to obtain some information and opinions to back up and reinforce the findings of the questionnaire and potentially throw up anything interesting that had previously not been thought of.

It was decided to carry out semi-structured interviews, which meant there was a fairly open framework for questioning allowing for focused, conversational two-way communication. Instead of formulating detailed questions ahead of time, as with a structured interview, general topics were chosen such as cost, which then gave the flexibility to probe for details or discuss issues. The interviews allowed for further understanding of some of the main issues being investigated. Self-administered questionnaires cannot pick up on the non-verbal cues, which very often contain important information.

3.6 Summary

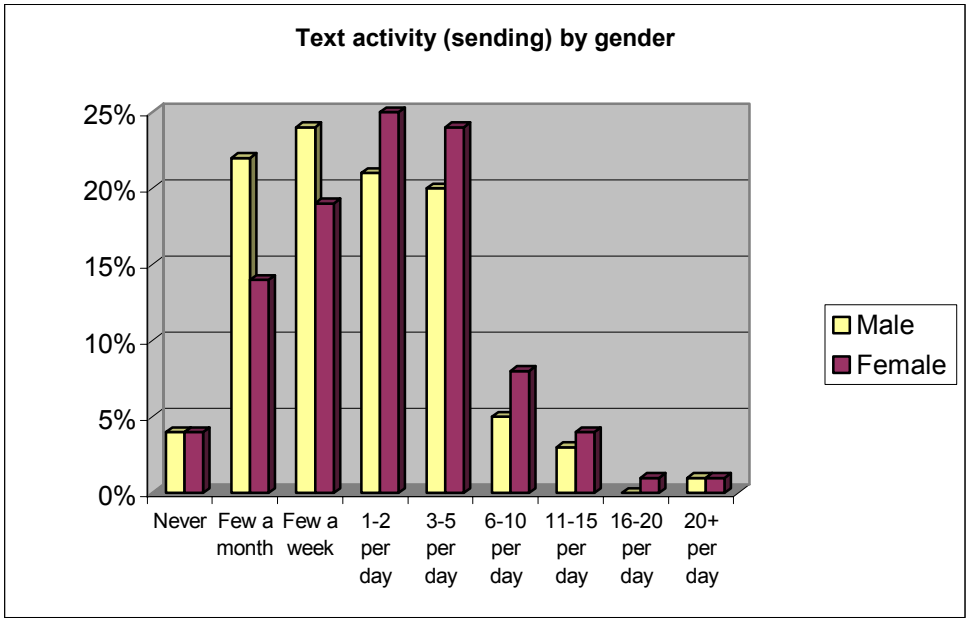
This chapter described the research method that was undertaken during this study. Chapter *4. RESULTS* shows how the data was analysed and presents the results graphically.

4. RESULTS

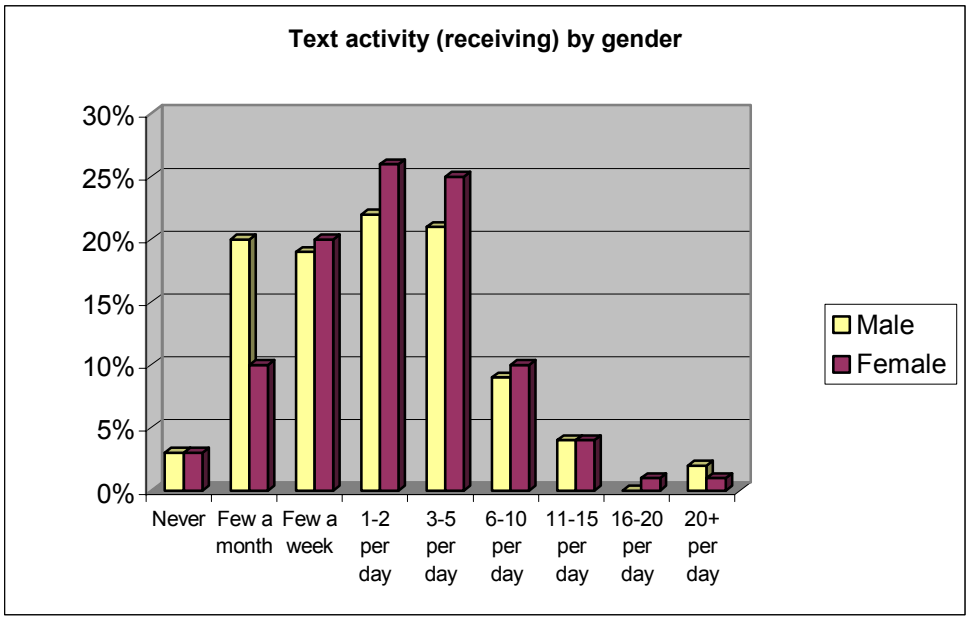
4.1 Results

This section summarises the results overall and identifies the most significant findings. Chapter *5. FINDINGS* discusses what these results mean and how they are linked together. A total of 317 questionnaires were filled in, comprising of 235 completed on the web and 82 by hand. For a full summary of the results, please refer to *Appendix E*. For the purposes of analysing the results, the total number of respondents from both the paper-based and online questionnaire is being used. They were combined together as there did not appear to be any important differences between them.

4.1.1 Section A



Graph 4.1: Text messaging activity (sending) by gender

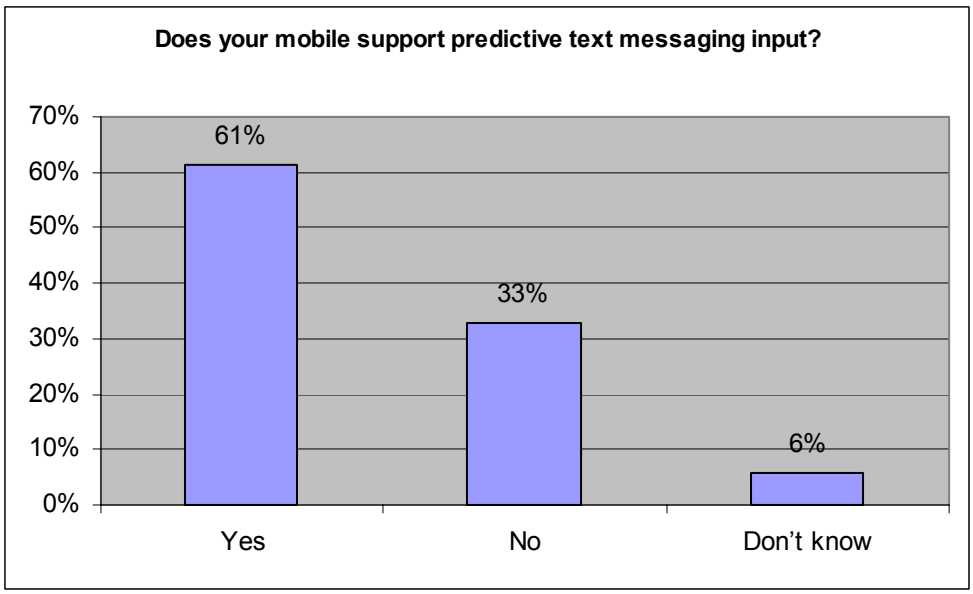


Graph 4.2: Text activity (receiving) by gender

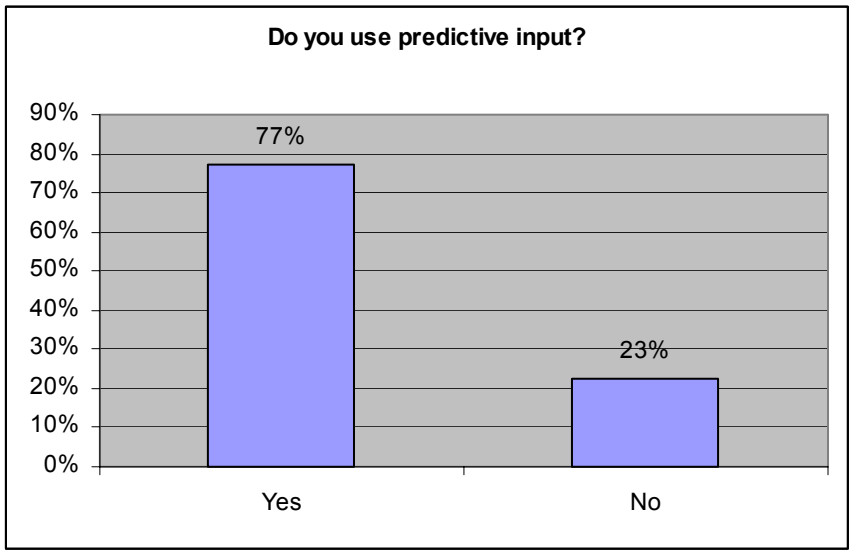
Age	Never	Few a month	Few a week	1-2	3-5	6-10	11-15	16-20	20+
<16	**0**	**0**	**0**	**1**	**3**	**3**	**2**	**0**	**0**
n=9	0%	0%	0%	11%	33%	33%	22%	0%	0%
17-18	**0**	**0**	**0**	**10**	**24**	**4**	**4**	**3**	**1**
n=46	0%	0%	0%	22%	52%	9%	9%	7%	2%
19-21	**0**	**4**	**10**	**15**	**30**	**15**	**5**	**1**	**1**
n=81	0%	5%	12%	19%	37%	19%	6%	1%	1%
22-25	**0**	**4**	**16**	**9**	**12**	**4**	**2**	**2**	**0**
n=49	0%	8%	33%	18%	24%	8%	4%	4%	0%
26-35	**2**	**18**	**24**	**15**	**15**	**3**	**2**	**1**	**2**
n=82	2%	22%	29%	18%	18%	4%	2%	1%	2%
36-50	**5**	**16**	**7**	**5**	**4**	**0**	**0**	**0**	**0**
n=37	14%	43%	19%	14%	11%	0%	0%	0%	0%
51-65	**2**	**4**	**3**	**0**	**0**	**0**	**0**	**0**	**0**
n=9	22%	44%	33%	0%	0%	0%	0%	0%	0%

Table 4.1: Text messaging activity (sending) by age

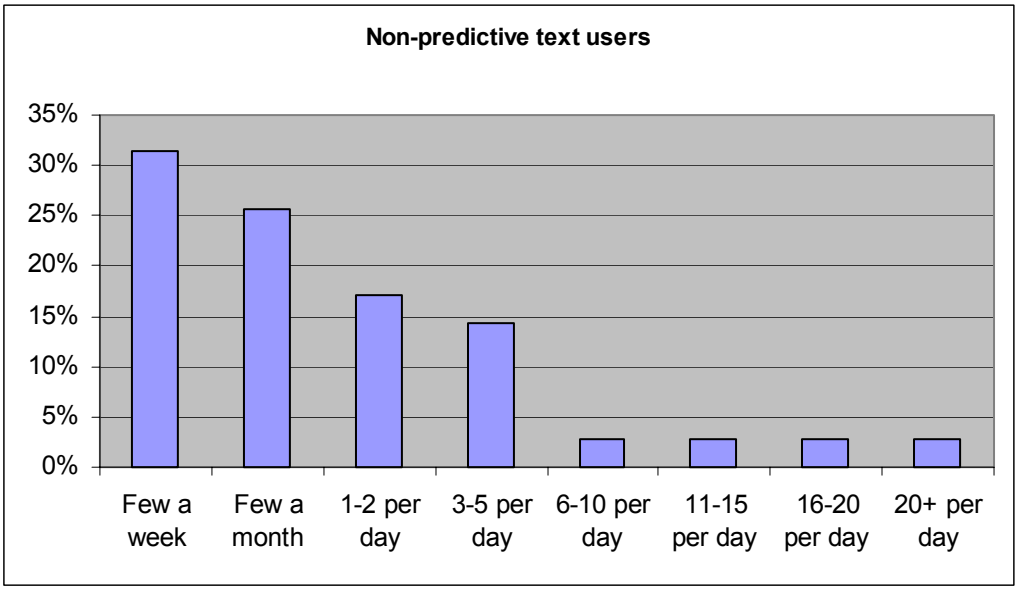
Investigating predictive text input



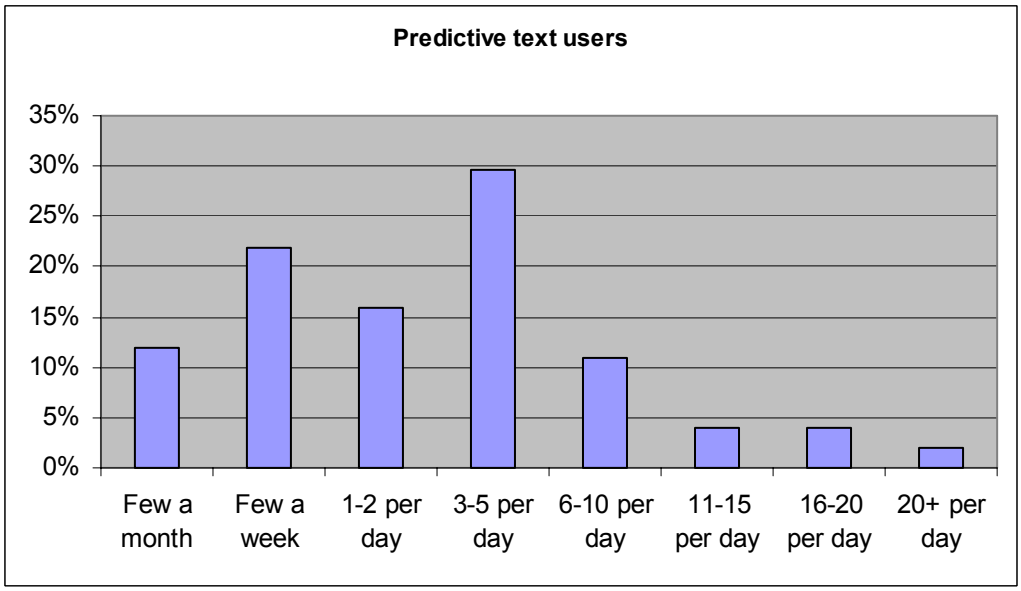
Graph 4.3: Predictive text facility



Graph 4.4: Usage of predictive input



Graph 4.5: Text activity of non-predictive text users



Graph 4.6: Text activity of predictive text users

4.1.2 Section B

Section B involved respondents reading a number of statements and then indicating whether they agreed or disagreed with it. A weighting was given to each level of opinion as indicated in *Figure 4.1* shown below.

STRONGLY AGREE	AGREE	UNSURE	DISAGREE	STRONGLY DISAGREE
2	1	0	-1	-2

Figure 4.1: Weightings

In order to describe how the weighting system was used, it is best to refer to a specific example.

	STRONGLY AGREE	AGREE	UNSURE	DISAGREE	STRONGLY DISAGREE
Text Messaging is impersonal	20	50	33	132	72

An overall score was calculated as described below:

i) Multiply the number under "Strongly Agree" by 2, i.e. 20 x 2, the number under "Agree" by 1, i.e. 50 x 1, the number under "Unsure" by 0, i.e. 33 x 0, the number under "Disagree" by –1, i.e. 132 x –1 and "Strongly Disagree" by –2, i.e. 72 x –2.

ii) Sum the totals of the multiplication together, i.e. 40+50+0+(-132)+(-144) = -186

iii) Divide the sum of the multiplications computed in (ii) by the number of respondents, i.e. 20+50+33+132+72=307 to give an average weighting score.

The average weighting score was calculated in order to eliminate the variable of different respondent numbers to each question. By assigning a value of 0 to "Unsure", these results were effectively ignored. "Unsure" could have meant that the respondent either did not understand the question or was undecided on the issue.

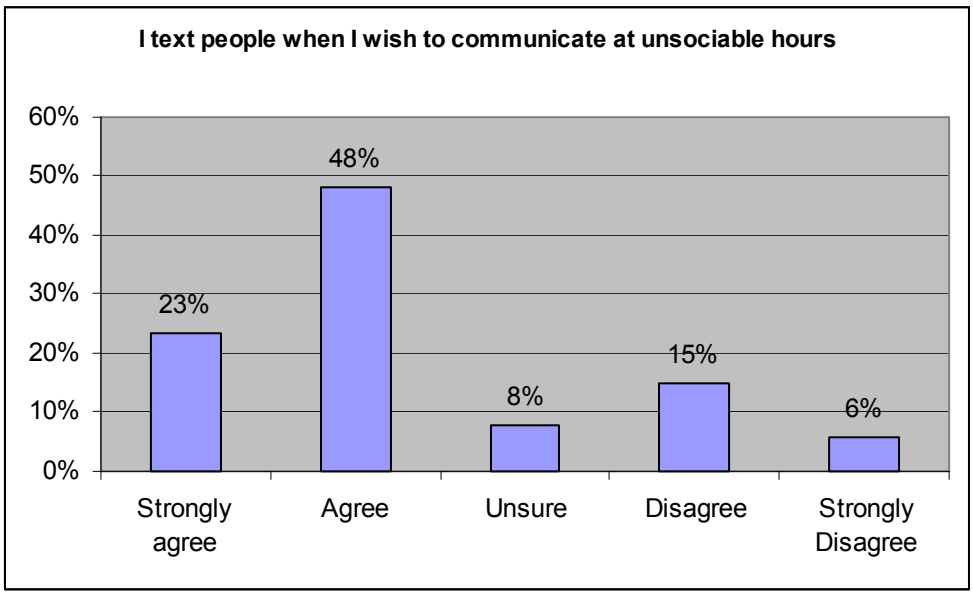
The scores for the statements are shown in *Table 4.2*. The weighting system was used to identify where there were strong biases either way. A large positive score indicates a strong agreement for the statement, whereas a large negative score suggests a disagreement. Where the figure is close to zero, this could be either because there were split views with equal numbers of people agreeing as disagreeing or because the majority of respondents were unsure.

When I receive a text, I will often reply by text.	119.9
Most of my friends use text messaging as a form of communication.	79.2
I text when I do not want to interrupt people.	69.9
I text people when I wish to communicate at unsociable hours.	68.2
Text messaging is a cheap form of communication.	56.5
I text when contacting people on other networks in order to save money.	46.9
SMS is a faster and more efficient method of communication than e-mail.	30.6
I send texts when contacting people during peak call periods.	18.4
I use text messaging so that I don't have to spend time talking to people.	18.2
I use text messaging when I do not want others to hear what I am saying.	15.3
I often send texts when waiting for things to kill time.	9.1
I use SMS when I am in a bad reception area.	-5.6
I text things that I would not say in conversation.	-27.7
I use text messaging to flirt with people.	-32.0
I use SMS when I do not know the person very well.	-53.6
Text messaging is impersonal.	-60.6
I would rather text than call due to safety issues with radiation.	-108.2

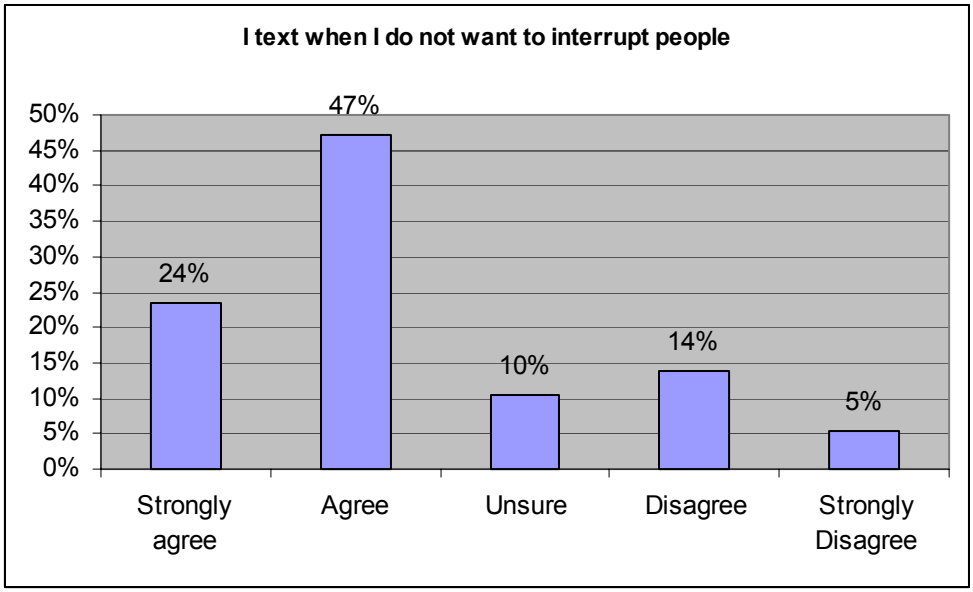
Table 4.2: Assigned scores

The following graphs show the levels of agreement as a percentage for some of the statements. The scores are indicated in brackets below each graph.

Investigating the issue of discreetness

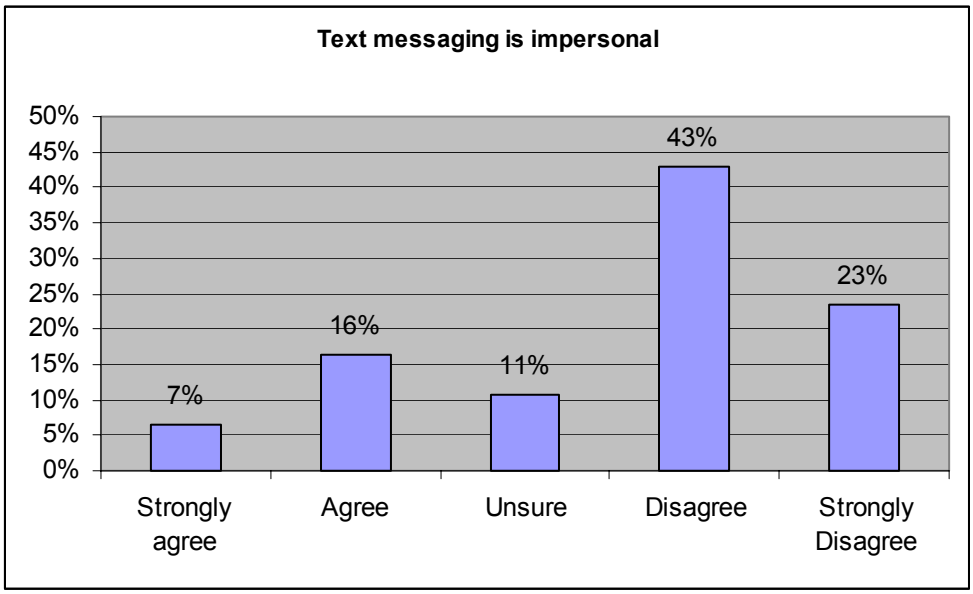


Graph 4.7: Communicating at unsociable hours (68.2)

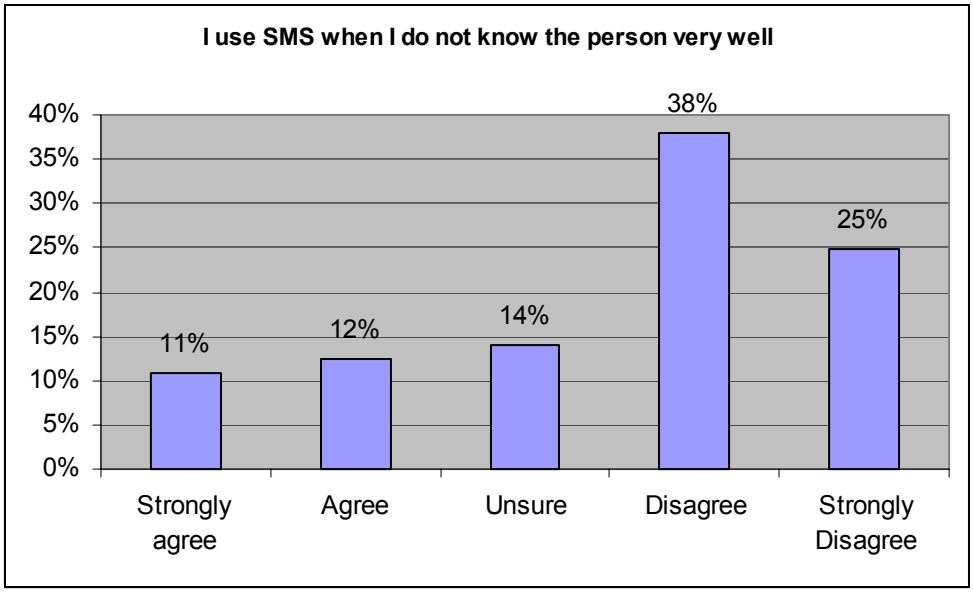


Graph 4.8: I text when I do not want to interrupt people (69.9)

Investigating interaction

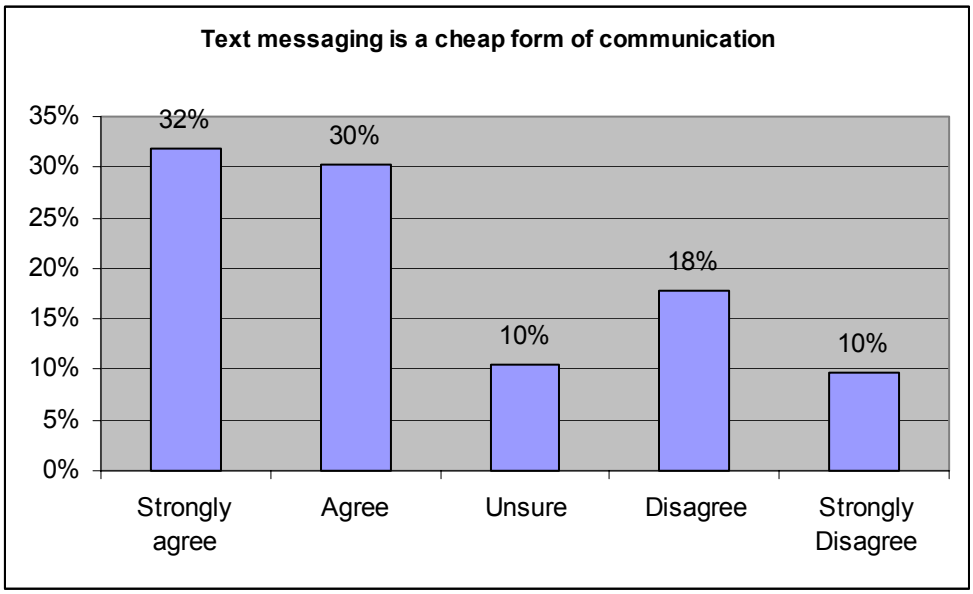


Graph 4.9: Text messaging is impersonal (-60.6)

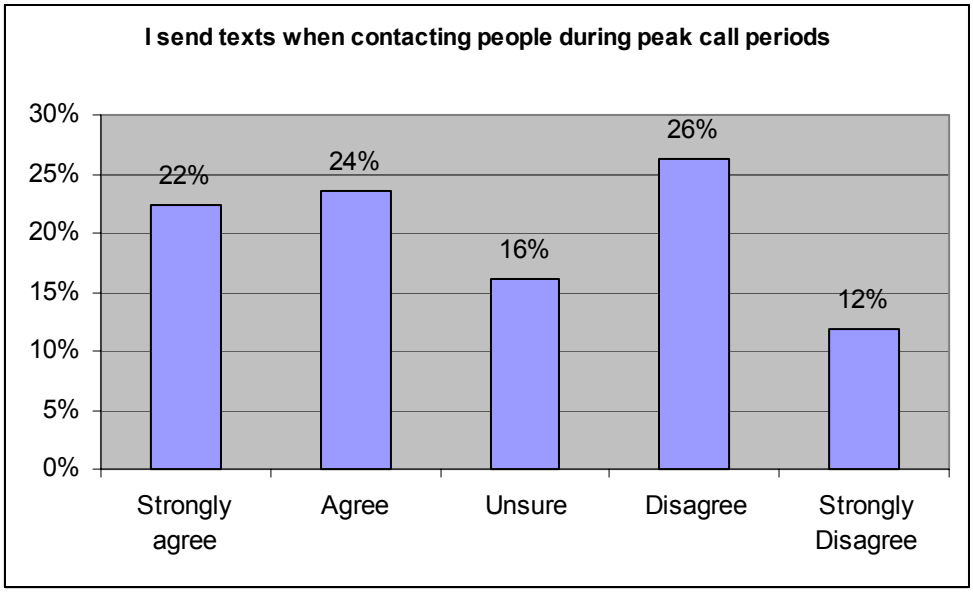


Graph 4.10: I use SMS when I do not know the person very well (-53.6)

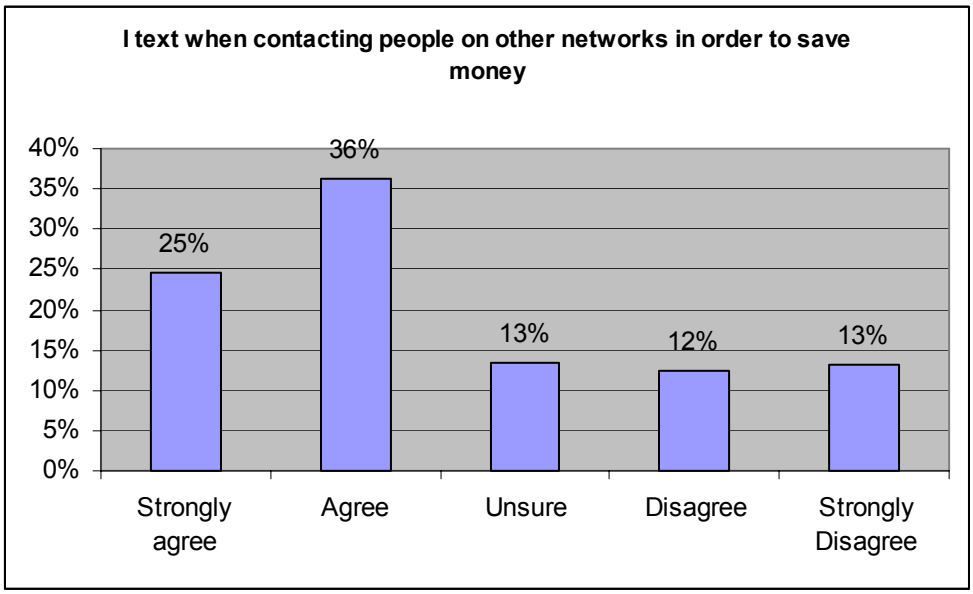
Investigating cost



Graph 4.11: Text messaging is a cheap form of communication (56.5)

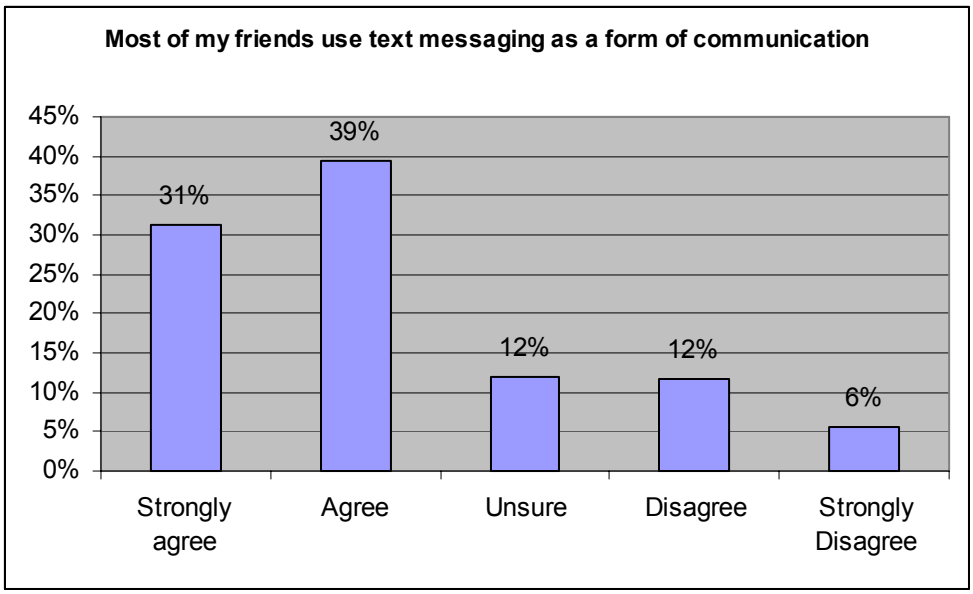


Graph 4.12: I send texts when contacting people during peak call periods (18.4)

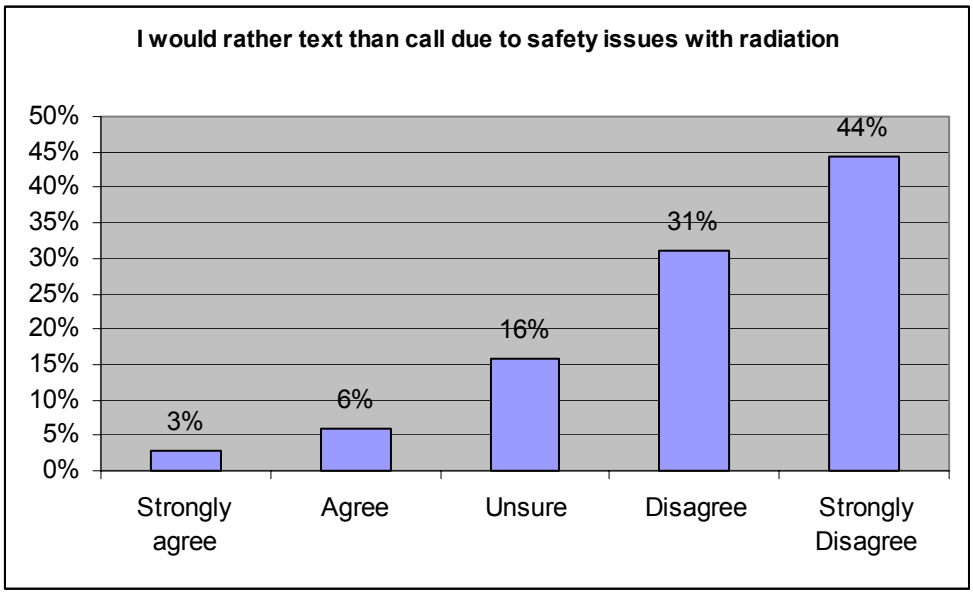


Graph 4.13: Texting people on other networks (46.9)

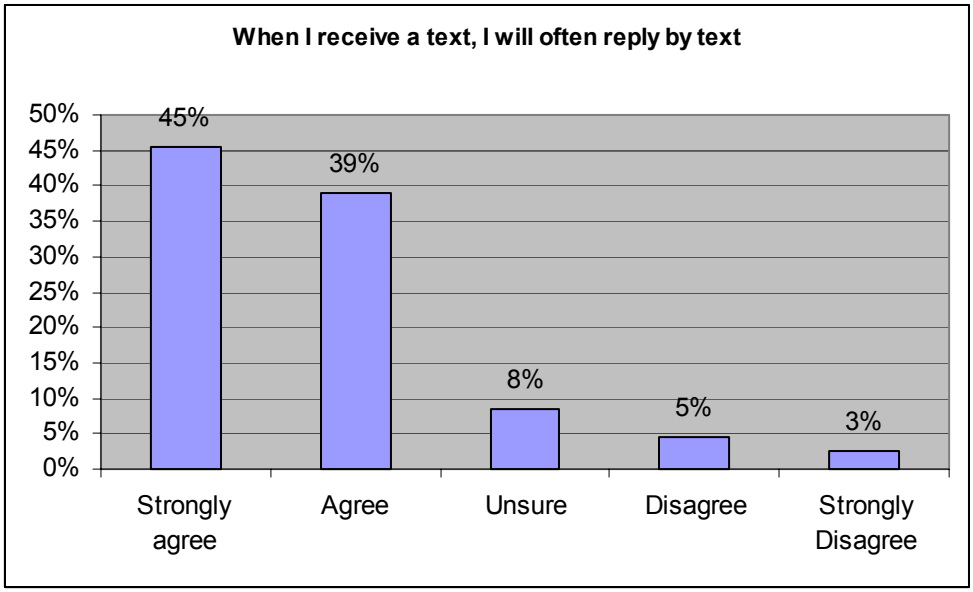
Other results



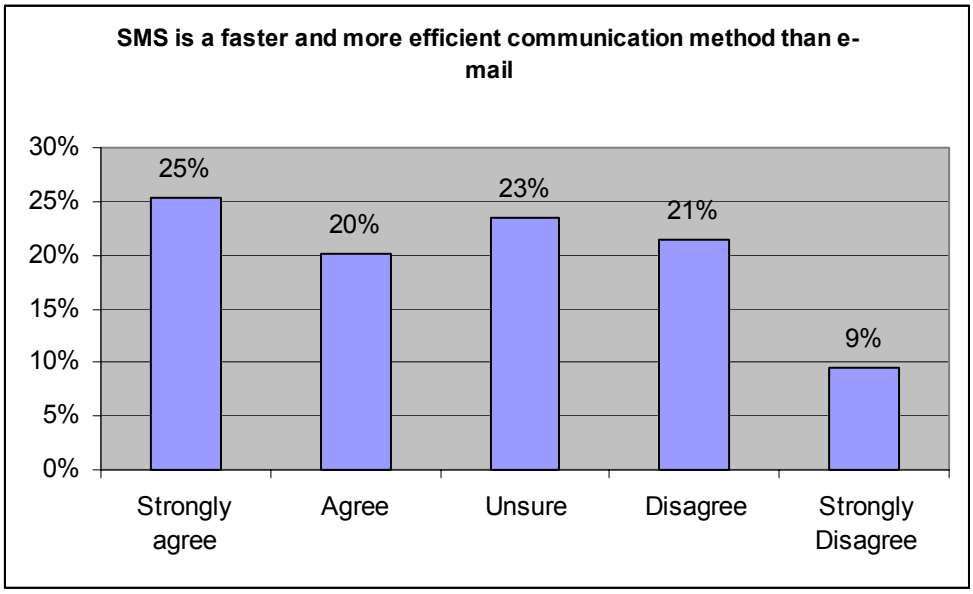
Graph 4.14: Most of my friends use text messaging (79.2)



Graph 4.15: Safety issues (-108.2)



Graph 4.16: When I receive a text, I will often reply by text (119.9)



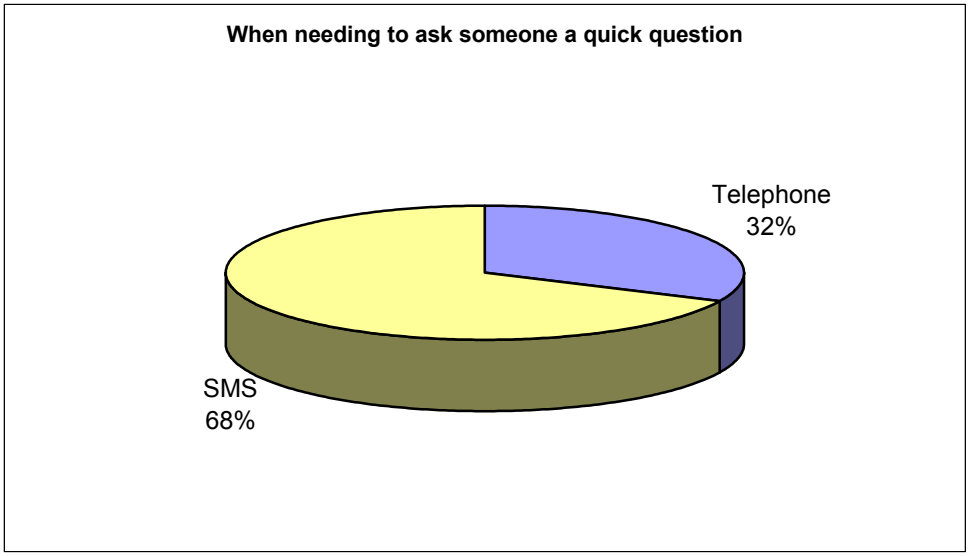
Graph 4.17: SMS vs. e-mail (30.6)

4.1.3 Section C

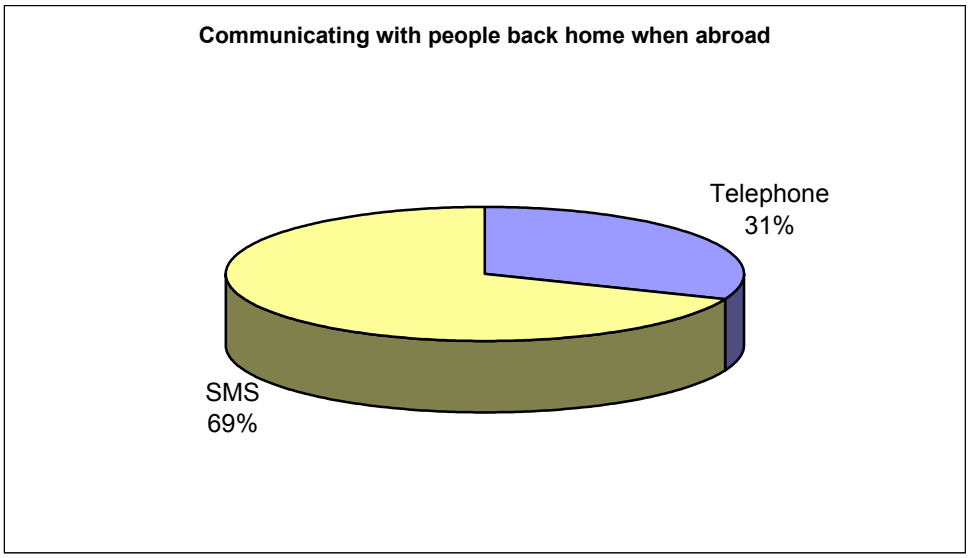
Section C attempted to find out how different circumstances might affect people's choice of communication medium. The respondents were given 12 scenarios and asked to choose whether they would be more likely to text or phone. *Table 4.3* shows the total number of responses.

	SMS		PHONE	
You have arranged to go out with a friend for the evening, but haven't decided on a time or place.	98	32%	206	68%
You have decided to meet a group of friends for the evening, but haven't decided on a time or place.	118	39%	184	61%
Contacting someone when you are short of time.	135	45%	168	55%
Informing your partner/parents you are going to be late home.	88	29%	214	71%
When needing to ask someone a quick question.	206	68%	97	32%
Communicating with people back home when abroad.	202	69%	91	31%
Contacting someone whilst you are sitting on a crowded train.	262	87%	38	13%
Wishing a friend happy birthday.	110	37%	191	63%
You want to give someone your address.	212	71%	88	29%
Contacting an old friend you haven't spoken to for a while.	80	27%	221	73%
Asking someone out on a first date.	61	21%	226	79%
You have had an argument with a friend and want to apologise.	83	28%	213	72%

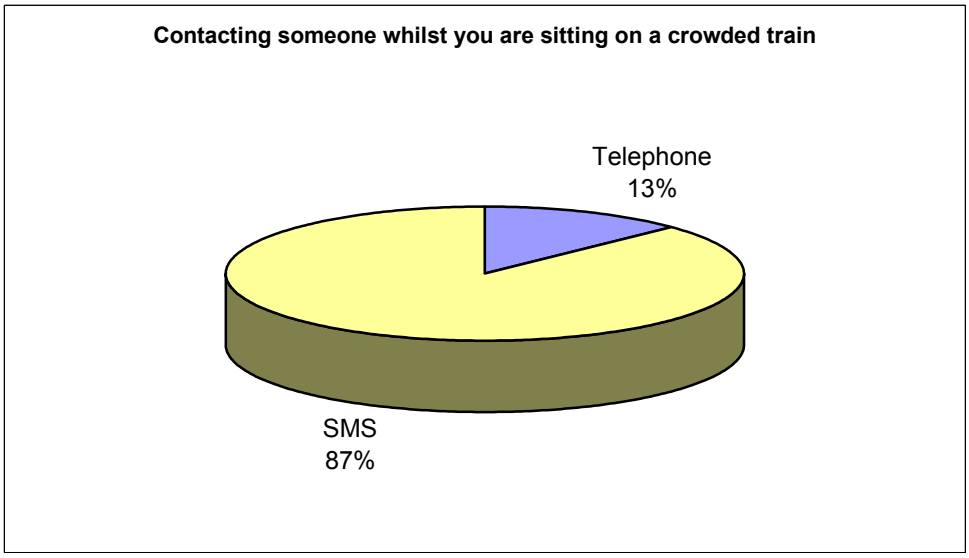
Table 4.3: SMS vs. Phone responses



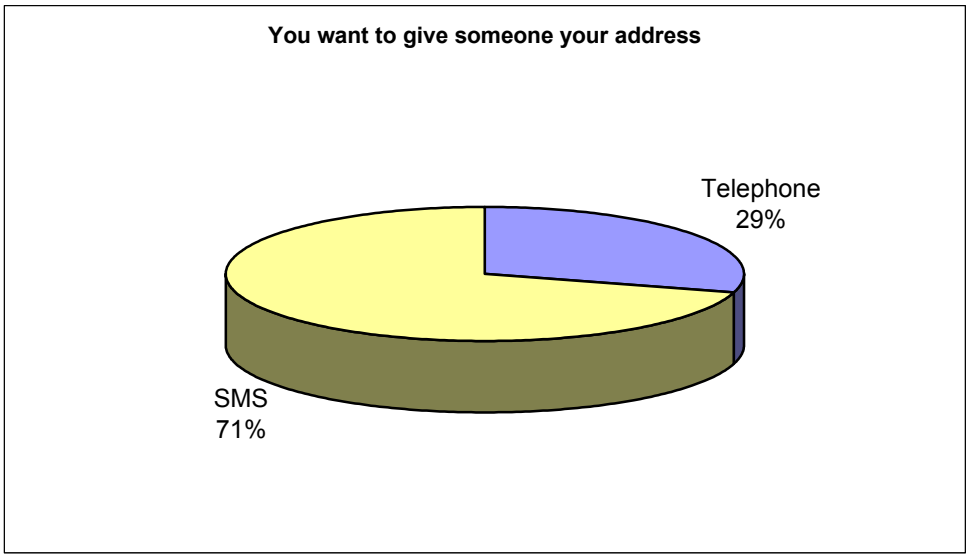
Graph 4.18: When needing to ask someone a quick question



Graph 4.19: Communicating with people back home when abroad



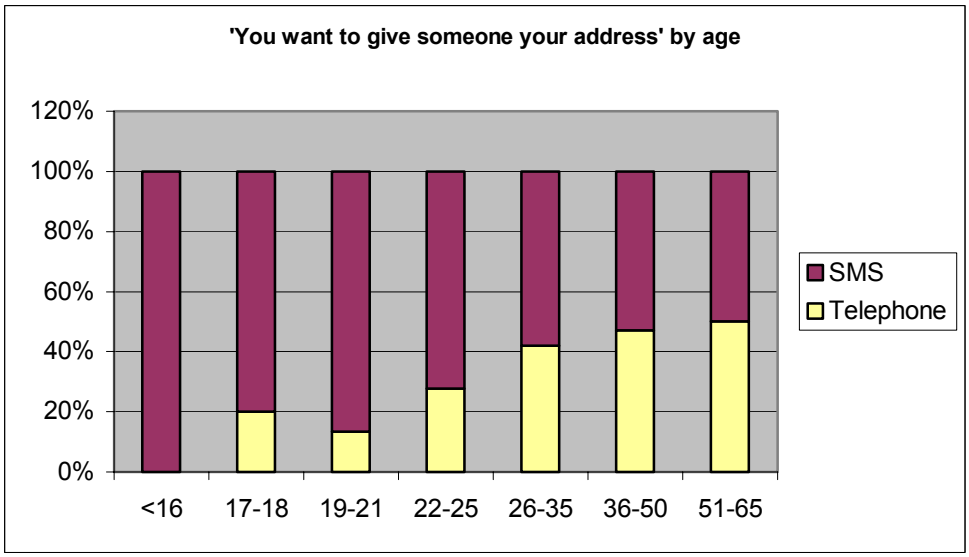
Graph 4.20: Contacting someone whilst you are sitting on a crowded train



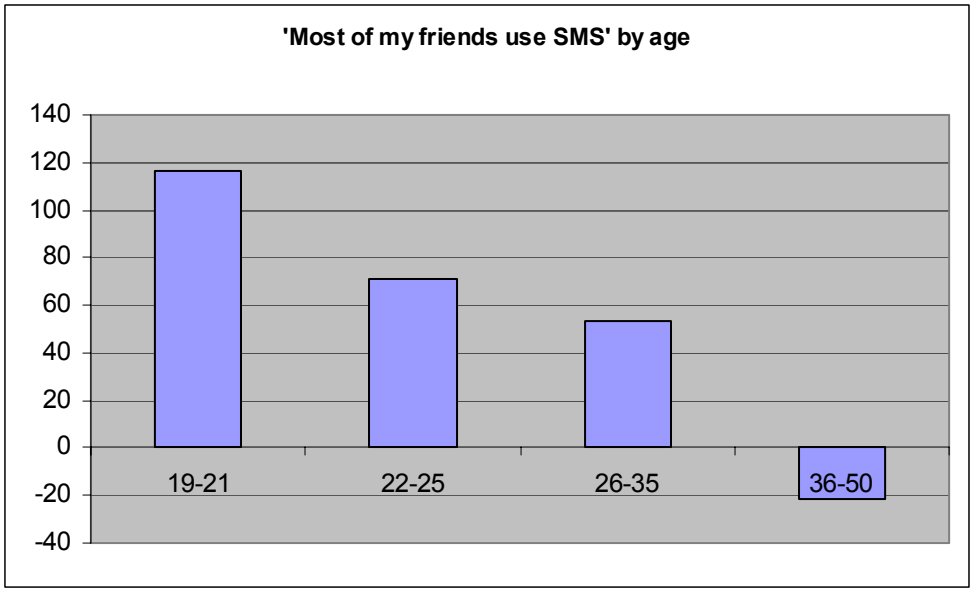
Graph 4.21: Giving someone your address

4.2 Other Relationships

As well as looking at the gross figures for each question, it was felt important to break down some of the questions according to age and gender, in order to try and identify any interesting factors. It must be stressed that only the interesting findings are presented in this section, as the number of interrelationships are potentially unlimited, particularly when combining several factors such as the effect of age and gender on usage.



Graph 4.22: 'Giving your address' by age



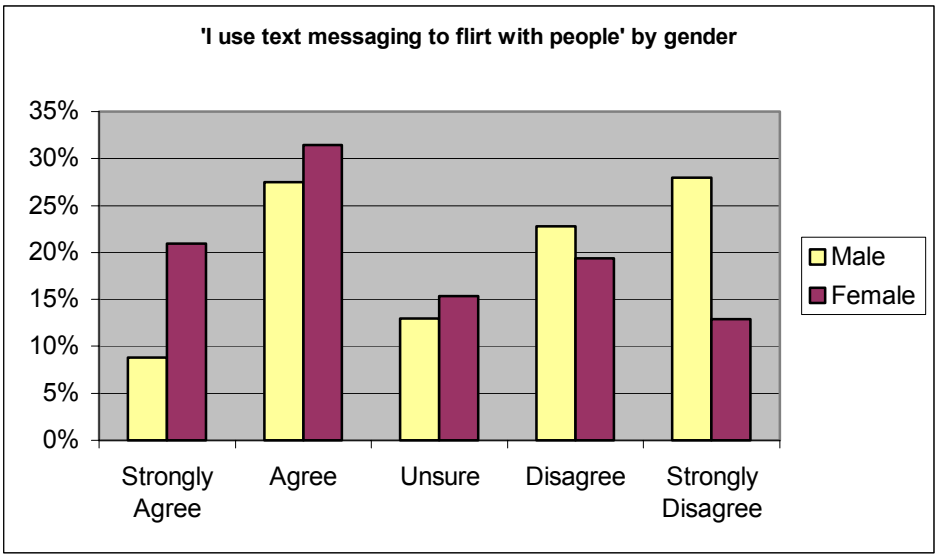
Graph 4.23: 'Most of my friends use SMS' by age

I use text messaging to flirt with people by gender

	Male	fe	d	D^2/fe	Female	fe	d	D^2/fe	Total
Strongly Agree	17	26.18	-9.18	3.22	26	16.82	-9.18	5.01	43
Agree	53	56.01	-3.01	0.16	39	35.99	-3.01	0.25	92
Unsure	25	26.79	-1.79	0.12	19	17.21	-1.79	0.19	44
Disagree	44	41.4	2.6	0.16	24	26.6	2.6	0.25	68
Strongly Disagree	54	42.62	11.38	3.04	16	27.38	11.38	4.73	70
Total	193	193		6.7	124	124		10.43	317
	0.61				0.39				

	0.05	0.01	0.001	**chi^2=**	**17.14**
degrees of freedom=4	9.49	13.28	18.47		

Table 4.4: Chi-squared test



Graph 4.24: 'I use text messaging to flirt with people' by gender

4.3 Summary

This chapter presented the interesting results in a graphical format. The following chapter now discusses what can be derived from these results.

5. FINDINGS

5.1 Section A

Faulkner and Culwin [20] found that the younger age groups contain smaller proportions of people who have never sent text messages with this figure rising as the age of the respondent increases. In this particular sample however, only 9 people had never used SMS compared with 304 who had and so there is not enough evidence here to support this view. *Graph 4.1* and *Graph 4.2* show the text messaging activity by gender for sending and receiving respectively. The suggestion from the data here would be that women are slightly more active than men, which is inline with Faulkner and Culwin's findings. *Table 4.1* shows the text messaging activity for sending by age. As expected (see hypothesis 3) the activity declines with age, which is in accord with the Faulkner and Culwin [20] report. It could be the case that due to financial constraints, mobile phones are more readily available to the younger age groups, whereas perhaps computers with e-mail facilities are more available to the older age groups. It was not possible to calculate the average number of messages being sent and received by men and women however, due to the inclusion of the few a month and few a week categories.

Another interesting area looked at in this section was the use of automatic text completion. Subjects were asked whether their phone supported predictive text input and if so, whether they used it. Out of 303 respondents who answered this question, 186 said their handset had text completion, 99 said they did not have it and the remaining 18 said they didn't know (see *Graph 4.3*). Of the 186 who knew they did have it, 77% of these said they used it (see *Graph 4.4*). Faulkner and Culwin [20] suggest in their research that only a minority of people use predictive input, however these findings would appear to contradict this. This might be attributed to the fact that this research was carried out more recently and so more people have realised the potential of this facility. Following on from these findings, it seemed sensible to see whether a relationship existed between the use of predictive text input and the number of texts being sent. It has already been demonstrated that predictive input speeds up the task of entering a message (see *1.4 Human Factors*). GSM World estimate that incorporating predictive text input into mobile phones leads to an average increase in SMS traffic of 25% per enabled user [15]. The evidence presented here would to some extent support this view. *Graph 4.5* shows the breakdown of text activity (sending) for all the respondents who said they had predictive text input but did not use it. *Graph 4.6* shows the text activity (sending) for all the people who said that they had predictive input and made use of it. It would appear from this sample that on average more texts are being sent by those using predictive entry than by those who are not. This could either be

explained by the fact that those people who are sending a lot of texts anyway are using predictive input because it is quicker or the ease of using predictive input for entering messages is encouraging people to send more.

Only 29% of respondents said that they used SMS for sending jokes and a minority of just 14% said they used SMS for sending ringtones and operator logos. This can be perhaps accounted for by the view that people are using SMS for direct one-to-one communication, which is compatible across all types of phone, whereas many of these jokes and logos are not. It is also a relatively new area, when considering SMS as a whole and so may become more popular in the future. Finally, as will be seen throughout this entire section, age plays a very important part in differing views. As one might expect, nearly all the people who answered 'YES' to either of the questions were below the age of 25. This would lead us to believe that this somewhat trivial use of text messaging appeals more to younger people.

5.2 Section B

71% of the respondents either strongly agreed or agreed that they use text messaging to communicate at unsociable hours (see *Graph 4.7*). Linked in with this, as shown in *Graph 4.8*, 71% also either strongly agreed or agreed with the statement "I text when I do not want to interrupt people". This would certainly give rise to the explanation that SMS is being used due to its discreet nature. Perhaps sending a text late at night is deemed more acceptable than telephoning. It also means that users are still able to communicate with someone even when they do not wish to interrupt them. SMS allows the receiver to read the message, reflect upon it and then reply at leisure.

The statements "I text things that I would not say in conversation" and "I use text messaging to flirt with people" both showed an overall level of disagreement from this sample. In both cases over half of the respondents disagreed. This was attempting to investigate whether SMS is perhaps giving people more confidence in the way they are interacting with people, as face-to-face conversations or even telephone calls can present the problem of embarrassment for some people, when addressing certain issues. There was a tendency for people who agreed that they text things they would not say in conversation, to also agree that they used text messaging for flirting, therefore hinting at a positive correlation. A Spearman rank correlation coefficient was calculated on the two variables, where the observed value of 0.56 exceeded the critical value of 0.478 for $p < 0.005$ (one-tailed). It can therefore be concluded that there is a significant relationship between the two variables (refer to *3.4 Analysis of the Data* for an explanation of the Spearman test). This would certainly tie in with the BBC's suggestion that text messages "eliminate social barriers like extreme shyness, and other things that ordinarily stop you talking to that special someone" [7].

68% of the sample either strongly disagreed or disagreed about text messaging being impersonal (see *Graph 4.9*). One respondent even remarked, "It is a very personal medium, because it goes straight into the person's pocket!" There was also a noticeable slant of disagreement with the statement "I use SMS when I do not know the person very well" as shown in *Graph 4.10*. This might be explained by the fact that a considerable number of respondents mentioned in the comments section that one of the biggest factors in deciding whether to send a text message is how well they know the person they are contacting. It might be pure speculation, but on the basis that people are not sending texts when they do not know the person very well, perhaps they are predominantly sending messages to those with whom they are well acquainted. This would certainly be worth looking into as part of another study.

An overwhelming 84% either agreed or strongly agreed that when they receive a text, they will often reply by text, as is shown in *Graph 4.16*. One respondent also commented "I tend to use it almost exclusively in response to text messages sent to me". This is in strong agreement with Faulkner and Culwin's [20] findings and demonstrates that the incoming modality is affecting the choice of method for replying. Therefore, this could mean that in most cases for each initial text sent, one is sent back as a reply. It also might help to support the 'text conversation' phenomenon or as one respondent described it "SMS marathon". This idea can be backed up when considering the response to question 36 in section C. 68% of respondents said that when needing to ask someone a quick question, they would use SMS. If a mobile phone user for example texts a friend a short question saying, 'what time shall we meet?' he may get a response back '8:00'. This then may be clarified with a final message 'OK.cu there'. Users may actually be quite unaware of the fact that they are staying within this framework of the incoming modality. It would be reasonable to accept hypothesis 1 on the basis of these findings.

Graph 4.15 shows the results to the statement "I would rather text than call due to safety issues with radiation". This question was included in an attempt to discover whether people might be resorting to texting due to issues with radiation when making a conventional call. A mere 9% agreed with this statement and so this would indicate that radiation problems associated with mobile telephones are not a primary reason for people using SMS.

This particular research did not really consider in depth how SMS was fitting in with e-mail, this would be worthy of a separate study on its own. However, a very broad question was asked about whether people thought SMS was a faster and more efficient method of communication. As can be seen in *Graph 4.17*, the views on this were very split and no obvious pattern emerges. This sample is probably not entirely representative of the population though, due to the fact that a considerable proportion of the respondents were members of the HCI group. It could be argued that people working in that area might have very differing views on this particular topic. The question was also possibly a bit vague with 'efficient' being open to all sorts of different interpretations. On the one hand, there is a case for saying that SMS is more efficient

when a person is 'on the move.' The mobile phone is portable and fits comfortably in one's pocket, whereas a PC does not. On the other side of the argument, e-mail would probably be deemed more efficient than texting if sat in front of a computer with email facilities. Interviewee C pointed out that he preferred texting because "You can't just email someone when you are walking around somewhere", whereas one respondent commented that SMS is "the poor man's e-mail".

Graph 4.14 shows that the large majority of respondents were of the opinion that most of their friends use text messaging. Could this show anything interesting other than the obvious fact that SMS is used by lots of people? It might be related to the fashion or kudos surrounding mobile phones and in particular text messages. It was therefore decided to investigate whether various age groups responded differently to this question. *Graph 4.23* shows the responses by age. The responses were broken down by age group and then the weighting system was applied as described in *4.1.2 Section B*. Only four of the age groups are shown here because there were not enough respondents in the other age categories for it to be particularly representative. The scale is not that important, but the shape of the graph is. The bigger the bar, the greater the level of agreement with the statement. It illustrates that the level of agreement decreased with age until it even reached disagreement with the 36-50 age group. This suggests that text messaging is used more in circles of younger people, however it is suspected that this level of agreement with the statement would be even higher if the same question was asked of even younger subjects.

People, particularly teenagers, are easily influenced especially by their peers and so it could be that they have adopted this trendy new method of communication so as not to miss out. It is a well-known fact how important it is for children to fit in with what all the others are doing. Interviewee E even remarked, "We all send texts to each other at school." It is hardly surprising that school-goers would want to embrace SMS. Breaking voices do not register in a text message, playground gossip cannot be overheard and it could be the only way to ask that special someone out on a date. Perhaps not directly attributed to SMS but more to the mobile phone as a whole, there have been suggestions in the British Medical Journal that mobile phone ownership is leading to a drop in teenage smokers [4]. Apparently, the mobile phone has the same peer-group conformity associations as smoking, but allows the retention of individuality by the choice of model, colour and ringtone. If there had of been more time, this would have been a particularly fascinating area to explore by conducting a more thorough investigation into children's attitudes towards texting at school.

Hypothesis 2 offered the idea that people were resorting to texting to kill time. There was only a very minor agreement with the corresponding statement and so it would be unreasonable to accept the hypothesis on these grounds. Bill Bryson talks of the "Vodafone Man" who proceeds to make pointless calls to tell people he's on the mobile, on the train and will be home in so many minutes [12]. Bryson's work was published in 1995 long before the outbreak of SMS, and so this same line of thinking could probably be applied to text messaging today.

Nearly all the articles reporting on text messaging describe it as a cheap form of communication. While this may be true to some extent, and also supported by these findings, it is worth noting that over a quarter of respondents either strongly disagreed or disagreed about text messaging being a cheap method of communication (see *Graph 4.11*). Sending one text at a cost of 10 pence may be cheap, but start sending a few a day and it soon adds up. This was mentioned by interviewee F who commented how he had thought that using text messaging was cheap, but on inspection of the bill at the end of the month, it proved to be very costly. If this same question was asked of a larger sample, it might be the case that there would be as many people who think it is expensive as think it is cheap. To back this up, under the comments section of the questionnaire, there were equal numbers of people saying how cheap SMS is, as there were complaining about it being too expensive. "Very useful, it's a shame it's so expensive!" said one user of SMS.

There is also some agreement shown by this data that texting is being used when wishing to communicate with people on other networks (see *Graph 4.13*), however no useful conclusions can be drawn from the other question relating to cost that people send texts when contacting during peak call periods (see *Graph 4.12*). Possible explanations for these differing opinions are varying costs of text messages and call charges. According to the Carphone Warehouse, BT Cellnet and Vodafone charge 12p to send a message, Orange charges between 4p and 10p depending on the tariff, and with One2One it can cost 10p, 5p or nothing. Text messaging is therefore far cheaper for someone using a tariff costing 5p per message as opposed to another person who is being charged 12p per message, particularly when using SMS as a regular form of communication. Interviewee C made a good comment about how he thought text messaging was expensive when sending only one word such as 'thanks'. This is a fair point as each message costs the same whether all 160 characters are utilised or just a single one. From the service providers' perspective, each message is sent as a single packet and so they incur the same cost for each one, regardless of the number of characters used. Section *6.4 Business Lessons* makes some suggestions about how network operators could change the pricing structure for SMS messaging. It would be unreasonable to accept or reject hypothesis 5 on the basis of these results, as there is still a considerable amount of doubt surrounding the question of cost.

It would be safe to say that cost is an issue that is influencing the use of SMS, but to draw any concrete conclusions would require looking far more closely at this aspect. The interesting point to note is that SMS may not itself be cheap, but cheaper than other alternatives.

5.3 Section C

So what exactly does the data in section C show? To obtain a clearer picture about how text messaging is integrating with the telephone, it would be necessary to survey a much larger sample, but there is some evidence here about how SMS is being made use of. As expected, the telephone is still a very important method of communication and is no way being abandoned in favour of text messaging. However, it does

show that people have adopted SMS in all kinds of situations and in some cases even prefer to use it. It has been chosen to discuss the situations where SMS was shown to be the preferred method.

The results for question 36 are extremely interesting and also have a number of other implications (see *Graph 4.18*). 68% of respondents said that they would be more likely to send a text message than make a phone call when needing to ask someone a quick question. The use of SMS to ask a quick question might yield the answer to Benson's [11] question "what to do when you want to ask someone something without getting sucked into the pleasantries-and-gossip-vortex?" Text messaging eliminates this small chat and allows the user to get straight to the point. There is vague evidence to support this view from question 16, "I use text messaging so that I don't have to spend time talking to people". There was however only a slight agreement, and nothing significant. As discussed earlier, there is also this issue whereby if one texts a quick question, it can easily lead into a 'text conversation'.

This concept of quickness follows on in the next question. As *Graph 4.21* shows, 71% agreed that they would be more likely to send an address via text message than call. It would naturally seem far more sensible to send this information electronically where it can be stored and referred to later, than phone, dictate the address, which then has to be jotted down on a piece of paper (which is far easier to lose). This backs up Benson's [11] observation about SMS being useful when "you wish to ensure that the forgetful friend you're phoning has the directions to your house written down correctly". Interviewee F also pointed out the usefulness of text messages for sending addresses and phone numbers to friends.

69% said that they would be more likely to communicate back home from abroad with a text message than by a phone call (refer to *Graph 4.19*). The thinking here would be that SMS is a useful tool for staying in touch with people whilst abroad. This might be attributed to an issue of cost. From personal experience, it is clear to see that text messaging is far cheaper than calling. On a Vodafone contract, an SMS from Greece to the UK costs just 20p as opposed to making a standard call from the mobile costing nearly £1 a minute. One respondent commented on his questionnaire that he uses texts to keep in contact with friends in many European countries. He adds "It is a good way to stay in touch with friends, who I might have lost touch with otherwise." This brings us back to the whole topic of cost. Using text messaging from abroad is a very good example of where it is likely to be judged as being cheap, as it is far cheaper than the alternative.

There were no surprises when asking how people were more likely to communicate whilst sitting on a crowded train, as this is what was outlined in hypothesis 4. 87% of respondents said that they would be most likely to use SMS (see *Graph 4.20*). The reasoning behind this is for the vast numbers of people who wish to let someone know what time their train has left and what time it will be arriving, but as Benson [11] points out "wish to avoid 'I'M ON THE BUS' syndrome". Text messaging therefore allows users to communicate in a less embarrassing manner and again reinforces this idea of discreetness. Many train operators have

reacted to customer feedback about the irritation of loud telephone conversations in carriages by having designated 'quiet coaches'. The use of mobile telephones is prohibited in these coaches, but text messaging gets round this problem by allowing people to communicate in a non-verbal manner. Surprisingly, there was only a very weak agreement with the statement "I use text messaging when I do not want others to hear what I am saying". It might be the case that respondents did not understand the question fully or misinterpreted it.

Questions 32 and 33 about arranging to go out with a friend and a group of friends for the evening respectively both reflected a preference in favour of the telephone. However, more people chose SMS in the group scenario, which might lead us to believe that text messaging is being used when a common message needs to be communicated to a number of people. Take the example of meeting five friends in the pub at a specified time. A single message of '7:00 in the Red Lion' can be composed once and sent to all five people, which in theory requires much less effort and time.

Previous studies have shown that it is predominantly the younger generation who are making the most use of SMS, and so the high preference for use of the telephone might be explained by the fact that nearly half of the respondents were over the age of 25. One final point to note is that SMS is probably increasing levels of communication rather than replacing it. In an Oftel report published at the end of September 2001, Oftel reported that their qualitative findings showed that SMS is regarded "as an activity separate from voice calls and that text messages are largely additional to voice calls rather than a substitute" [31].

5.4 Other Observations

The comments section of the survey and the interviews threw up some other useful aspects of SMS, which had previously not been thought of. Several respondents made the point that it is good for when the batteries are low on your mobile. It would seem a sensible suggestion for a use of text messaging, but whether it is having a considerable effect on why people are using it remains to be seen.

Another observation that became clear was that text messaging is being utilised in noisy atmospheres, such as pubs and clubs. This questionnaire failed to examine this aspect, and so it would be beneficial to consider this in any further study. Interviewee B also revealed another disadvantage of SMS, being that it is relatively simple to send a text message to the wrong person. Unlike e-mail addresses, where names are primarily used, mobile phone numbers lack identifying characteristics making them harder to distinguish. It would be suspected that this somewhat trivial problem is unlikely to deter people from using text messaging.

Finally, a number of the respondents were either currently using a Genie contract or were thinking of swapping to one in the near future. Genie is the UK's leading mobile Internet company with over three million registered users of the Genie Internet portal (http://www.genie.co.uk/). The Genie mobile service

operates on the BT Cellnet network and the contract offers 600 free text messages per month for only £20 and so this would seem like a very attractive and cost effective deal for making use of SMS. Given such a large quota of text messages per month, it could be encouraging people to send messages simply because they are free.

5.5 Interrelations

In the scenarios section, the data obtained was analysed with respect to age and gender. An interesting pattern emerged as regards age, which helps support the view that text messaging is used more by the younger generation. Take for example, the analysis of age for the "you want to give someone your address" scenario, as can be seen in *Graph 4.22*. This graph shows for each age group the percentages that answered SMS and telephone. This was a question in which the majority of respondents said that they would use SMS in preference to the telephone, however it is worth drawing attention to the fact that as the age of respondent increases, the percentage that answered SMS gets smaller. This was the general trend throughout all the scenarios and can probably be explained by the fact that the younger generation have been much quicker in adopting SMS.

The statements in section B were inspected more closely to see if there were any variations by gender. Where there were noticeable differences, it was decided to investigate whether these differences were significant by employing a chi-squared test. When analysing the statement "I use text messaging to flirt with people" by gender using the chi-squared test (see *Table 4.4*), the observed value for χ^2 turned out to be 17.14 (see *3.4 Analysis of the Data* for an explanation of the chi-squared test). This value is greater than the critical value of 13.28 for $p < 0.01$ with 4 degrees of freedom. On this basis, it is possible to reject the null hypothesis that any differences between using text messaging for flirting by men and women are due to chance. *Graph 4.24* shows the percentages of men and women by their level of agreement with the statement. It is clearly women who are in stronger agreement that they use texting for flirting and as shown by the chi-squared test, this difference is significant. This could perhaps be explained by the presence of alcohol. Zed [50] recently conducted a survey looking at the effects of alcohol on people's text messaging habits. They claim that "women are by far the worst culprits when it comes to mixing alcohol and SMS, with a high proportion admitting to 'rude' texting". There is certainly some sort of relationship here and might be attributed to either alcohol or perhaps simply because text messaging is giving women the necessary distance to be more flirtatious.

5.6 Summary

Some interesting points have been raised in this chapter, however there is still a great deal of extra research to be done in this area. The next chapter summarises the main findings, evaluates the research method and makes some sensible suggestions for pursuing further work on the Short Message System.

6. CONCLUSIONS

6.1 General Conclusions

The advent of mobile phone technology has translated the telephone from a purely verbal medium into a visual communicative medium. It would appear from these findings that text messaging is particularly popular amongst the young, and that text activity decreases with age. Cost has been shown as an issue that is certainly influencing some people to make use of it, along with the issue of modality. It would also be reasonable to construe that the discreet properties of the Short Message System are playing a key part in its usage. SMS is allowing people to communicate 24 hours a day, 7 days a week and gives the recipient the flexibility to reply at a time convenient for them. There is also evidence to show that people have embraced text messaging for convenience purposes, particularly when wanting to send addresses and phone numbers. From this research, it would be difficult to draw any conclusions about which factors are the most important, however this could be addressed in an additional study.

It must be emphasised that this study was a relatively small one, although some interesting patterns have emerged. There are many split views about the use of text messaging, although it would be safe to say that it will be with us for at least the near future, if not longer.

6.2 Limitations

Some useful data was obtained, however it is important to bear in mind any problems that might introduce any sort of bias. Firstly, all of the data was obtained by asking the respondents to imagine how they might behave in the given scenarios and does not represent their actual behaviour, as might be obtained through observation. Secondly, the questions could have been interpreted differently by each respondent, particularly in section C of the questionnaire, where people were asked to indicate whether they would be more likely to phone or use SMS. For example, in the 'wishing a friend happy birthday' scenario, other factors such as how well you know the friend will affect whether you choose to telephone or text. It was considered incorporating a 'don't know' box, although it was felt that this would encourage people not to select either way, which would have been virtually useless. It must also be questioned how representative this sample is of the population. Would similar results be obtained if the same questions were asked of different people? There were possibly not enough respondents in the very oldest and youngest age groups to be able to get the whole picture. As has already been pointed out, many of the respondents belonged to the HCI group and

this is perhaps a much more technically aware group of people. However, there is a case for saying that this technically aware group of people are more experienced in their use of communications technology, providing for more interesting results.

It must be remembered however that this was an initial study attempting to primarily identify some of the reasons for people using text messaging. It was not a definitive study aiming to come up with all the answers, but more to get a feel for the subject and point further research in the right direction.

6.3 Future Work

Since text messaging is a relatively new phenomenon, there is a great deal of further work that can be done on it. On several occasions during the project, areas of interest were uncovered but not explored because either there simply was not sufficient time to do so or a decision was made to take the study in a different direction. Currently, the number of texts being sent each month is increasing, however it may be interesting to investigate whether this trend is likely to continue. When mobile handsets first became popular, they followed a similar pattern of growth, but now the market has started to become saturated. Will the number of texts being sent continue to rise, level off or perhaps even begin to fall? According to the Yankee Group [49] the next generation Multimedia Messaging Services (MMS) market will be worth $10 billion in Europe by 2006. MMS is the technology that will allow us to send high quality colour photos between mobile handsets. A further investigation could query the integrity of these claims and attempt to establish whether there really is a market for this technology or if it will just be seen as another gimmick.

This study has been rather broad in that the writer has managed to ascertain some of the key factors that make the Short Message System so successful. It would prove useful for a researcher to look further into each of these areas that have been identified. Taking cost as an example, this study shows that people generally think SMS is a cheap form of communication. As discussed earlier, this may not necessarily be the case and so examining people's perceptions of cost could shed some more light. For example, SMS might be a cheap form of communication for someone who wishes to stay in touch with friends in another country, but might be expensive for a student who is exchanging gossip with his friends. To look at this even more closely, it would be worth asking people whether they think text messaging is cheap, then look at their bill and work out exactly how much has been spent on texting within a month and ask the same question again. I am sure there would be a few surprises for some people, the author included!

During this research, an attempt was made to find some figures regarding the average character length of text messages being sent. It would appear that figures for this do not exist or if they do have not been published. An inquiry into this is another potential avenue to explore. It could be suggested tentatively that

message length is linked to cost, in that short messages appear to cost more as they are not as good value for money as when using all 160 characters of a text message.

Another interesting aspect to probe is the method of input for entering a text. This research suggests that the poor user interface associated with entering a text does not deter people from using the medium, although would people perhaps send more texts if they were easier to enter? There is some evidence from this work to support the case that those who use predictive text entry send more messages. Further work might look at how voice recognition might be used to effectively speak text messages into the phone and have predictive software convert the spoken sentences into abbreviations. Shenton [39] has already looked at a text compression algorithm for SMS and so combining something like this with speech input software might yield the answer. It would appear that some work has already been done on this, although nothing has currently been made available to the mass market. A speech recognition system called Elvis has been developed by a Massachusetts-based company allowing mobile users to dictate SMS messages and emails [2]. The company claims, "the software will free people from the frustration of using tiny keypads".

It could be useful to identify those people who do not like SMS and try and ascertain why, in order to see where possible improvements could be made. The questionnaire showed that there are a number of people who actually loathe the method of communication with one respondent going as far as saying "Text messaging is just part of the evil inherent in mobile phones". It would be suspected that the limitations posed when entering the messages is the main problem, however there might be other reasons.

Given that the explosion in SMS usage is relatively new, there are so many different areas surrounding it to be explored. In a recent article published in the Guardian, Shillingford [41] discusses how multimodality is the way of the future with SMS being just a part of this. This is the idea of "getting mobile messages in the form you choose, irrespective of how they were created". The article goes on to describe how SMS is being linked with instant messaging software, allowing people to effectively 'chat' with friends at their PC by sending a SMS. It could be beneficial to examine the merits of this multimodal model and evaluate whether it will work.

Finally, this project mainly compared how SMS is fitting in with the telephone, and failed to address properly what effects it is having on e-mail. A study focused on this issue could prove to be beneficial and help to understand people's communication habits better. It could be tackled by designing a questionnaire, and adopting a similar approach to that used in this project.

6.4 Business Lessons

As this study has shown, people will tend to reply by text when receiving one, and so from a business perspective of making money, the key issue is getting people to initiate the communication process by

sending a text to someone. Sending one message can lead to many being sent back and forth. In the case of jokes, gossip or rumours, it is also possible to witness this snowballing effect where texts are forwarded on and distributed to huge networks of people right across the country, or in some cases, international borders. It would seem to some extent that network operators have begun exploiting this approach, yet there could be better ways in tempting people to send that all important first message rather than waiting to receive one.

If technically viable, service providers might want to also consider marketing a differential pricing system for text messaging based on message length. For example, halve the cost of a message if it is less than 40 characters. It might seem insensible in that they will be making less money on the shorter messages, however it could be that people would send more messages, generating a greater profit in the long term.

There are important lessons to be learnt from the rise of text messaging. The phone operators only evaluated SMS for its capabilities and did not consider the context in which it might be used. As a result, they labelled it as near useless. The introduction of SMS has revolutionised the way people communicate, and so it would be in designers' interests to consider the SMS case study when developing any new communications technology.

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8. INDEX

APPENDIX A – PILOT QUESTIONNAIRE

Text Messaging Questionnaire

The following questionnaire is about the Short Message Service (SMS), more commonly known as text messaging. Please fill out the answers to the following questions as accurately as possible.

1. What gender are you? ☐Male ☐Female

2. What age group do you belong to? ☐<16 ☐17-18 ☐19-21 ☐22-25 ☐26-35 ☐36-50 ☐51-65 ☐65+

3. Do you own a mobile phone? ☐YES ☐NO
If NO then goto 6

4. What type of account do you have? ☐Pay as you go ☐Contract

5. What network are you with? ☐Vodafone ☐Orange ☐Other ☐BT Cellnet ☐One2One

6. Do you or have you ever used SMS to send and receive messages? ☐YES ☐NO
If NO then end, thank you for taking the time to complete the questionnaire

7. On average how many texts do you send from your phone?

☐Few a week ☐1-2 per day ☐3-5 per day ☐6-10 per day
☐11-15 per day ☐16-20 per day ☐20+ per day

8. On average how many texts do you receive on your phone?

☐Few a week ☐1-2 per day ☐3-5 per day ☐6-10 per day
☐11-15 per day ☐16-20 per day ☐20+ per day

9. Do you send text messages from the Internet? (e.g. Genie, Lycos etc)

☐Frequently ☐Occasionally ☐Rarely ☐Never

9a. If yes, please list below which services you use.

10. How do you send your text messages?
Please select a % from each scale so that the two combined total 100%.

Internet SMS
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Mobile
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

11. Does your mobile phone support predictive text messaging input?

☐YES ☐NO

12. If you answered YES, do you use this facility? ☐YES ☐NO

Please indicate how strongly you agree or disagree with the following statements regarding text messaging.

	Strongly Agree				**Strongly Disagree**
13. I text things that I would not say in conversation.	☐	☐	☐	☐	☐
14. I use text messaging so that I don't have to spend time talking to people.	☐	☐	☐	☐	☐
15. I text people when I wish to communicate at unsociable hours.	☐	☐	☐	☐	☐
16. I use SMS when I am in a bad reception area.	☐	☐	☐	☐	☐
17. When I receive a text, I will often reply by text.	☐	☐	☐	☐	☐
18. SMS is a faster and more efficient communication method than e-mail.	☐	☐	☐	☐	☐
19. I use text messaging when I do not want others to hear what I am saying.	☐	☐	☐	☐	☐
20. I often send texts when waiting for things to kill time.	☐	☐	☐	☐	☐
21. I use SMS when I do not know the person very well.	☐	☐	☐	☐	☐
22. I text when contacting people on other networks in order to save money.	☐	☐	☐	☐	☐
23. I send texts when contacting people during peak call periods.	☐	☐	☐	☐	☐
24. I text when I do not want to interrupt people.	☐	☐	☐	☐	☐
25. I use text messaging to flirt with people.	☐	☐	☐	☐	☐
26. Text messaging is a cheap form of communication.	☐	☐	☐	☐	☐
27. I use SMS for sending jokes to friends.	☐	☐	☐	☐	☐
28. I text ringtones and operator logos to friends.	☐	☐	☐	☐	☐
29. I would rather text than call due to safety issues with radiation.	☐	☐	☐	☐	☐
30. Most of my friends use text messaging as a form of communication.	☐	☐	☐	☐	☐

In the following situations when using your mobile, please indicate which method of communication you would be most likely to use.

	Phone	SMS
31. You have arranged to go out with a friend for the evening, but haven't decided on a time or place.	☐	☐
32. You have decided to meet a group of friends for the evening, but haven't decided on a time or place.	☐	☐
33. Contacting someone when you are short of time.	☐	☐
34. Informing your partner/parents you are going to be late home.	☐	☐
35. When needing to ask someone a quick question.	☐	☐
36. Communicating with people back home when abroad.	☐	☐
37. Contacting someone whilst you are sitting on a crowded train.	☐	☐
38. Wishing a friend happy birthday.	☐	☐
39. You want to give someone your address.	☐	☐
40. Contacting an old friend you haven't spoken to for a while.	☐	☐
41. Asking someone out on a first date.	☐	☐
42. You have had an argument with a friend and want to apologise.	☐	☐

43. Did you deliberately send someone a greeting on either Valentine's Day or New Year?

☐Neither ☐Valentine's Day ☐New Year ☐Both

44. Any other comments regarding the use of text messaging?

Thank you for taking the time to complete this questionnaire.
Your input is greatly appreciated.

If you would like a copy of the report when it is published,
please supply an email address: _____

APPENDIX B – FINAL QUESTIONNAIRE

Text Messaging Questionnaire

The following questionnaire is about the Short Message Service (SMS), more commonly known as text messaging. Please fill out the answers to the following questions as accurately as possible.
Individuals will not be identified in anyway, however the results may be published in the future.

SECTION A

1. What gender are you? ❑Male ❑Female

2. What age group do you belong to? ❑<16 ❑17-18 ❑19-21 ❑22-25 ❑26-35 ❑36-50 ❑51-65 ❑65+

3. Do you use a mobile phone? ❑YES ❑NO
If NO then goto 6

4. What type of account do you have? ❑Pay as you go ❑Contract

5. What network are you with? ❑Vodafone ❑Orange ❑Other _____ ❑BT Cellnet ❑One2One

6. Do you or have you ever used SMS to send and receive messages? ❑YES ❑NO
If NO then end, thank you for taking the time to complete the questionnaire

7. On average how many texts do you send from your phone?

❑Few a month ❑Few a week ❑1-2 per day ❑3-5 per day ❑6-10 per day
❑11-15 per day ❑16-20 per day ❑20+ per day

8. On average how many texts do you receive on your phone?

❑Few a month ❑Few a week ❑1-2 per day ❑3-5 per day ❑6-10 per day
❑11-15 per day ❑16-20 per day ❑20+ per day

9. Do you send text messages from the Internet? (e.g. Genie, Lycos etc)

❑Frequently ❑Occasionally ❑Rarely ❑Never

9a. If yes, please list below which services you use.

10. How do you send your text messages? Please select a % to show what proportion you send from the Internet and your mobile handset.

Internet SMS

0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
❑	❑	❑	❑	❑	❑	❑	❑	❑	❑	❑
100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%

Mobile

11. Does your mobile phone support predictive text messaging input? (*This is the facility whereby software tries to guess what word you are typing in order to save time*)

❑YES ❑NO ❑DON'T KNOW

12. If you answered YES, do you use this facility? ❑YES ❑NO

13. Do you use SMS for sending jokes to friends? ❑YES ❑NO

14. Do you use SMS for sending ringtones and/or operator logos to friends? ❑YES ❑NO

SECTION B

Please indicate how strongly you agree or disagree with the following statements regarding text messaging.

	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
15. I text things that I would not say in conversation.	❑	❑	❑	❑	❑
16. I use text messaging so that I don't have to spend time talking to people.	❑	❑	❑	❑	❑
17. I text people when I wish to communicate at unsociable hours.	❑	❑	❑	❑	❑
18. I use SMS when I am in a bad reception area.	❑	❑	❑	❑	❑
19. When I receive a text, I will often reply by text.	❑	❑	❑	❑	❑
20. SMS is a faster and more efficient communication method than e-mail.	❑	❑	❑	❑	❑
21. I use text messaging when I do not want others to hear what I am saying.	❑	❑	❑	❑	❑
22. I often send texts when waiting for things to kill time.	❑	❑	❑	❑	❑
23. I use SMS when I do not know the person very well.	❑	❑	❑	❑	❑
24. I text when contacting people on other networks in order to save money.	❑	❑	❑	❑	❑
25. I send texts when contacting people during peak call periods.	❑	❑	❑	❑	❑
26. I text when I do not want to interrupt people.	❑	❑	❑	❑	❑
27. I use text messaging to flirt with people.	❑	❑	❑	❑	❑
28. Text messaging is a cheap form of communication.	❑	❑	❑	❑	❑
29. Text messaging is impersonal.	❑	❑	❑	❑	❑
30. I would rather text than call due to safety issues with radiation.	❑	❑	❑	❑	❑
31. Most of my friends use text messaging as a form of communication.	❑	❑	❑	❑	❑

SECTION C

In the following situations when using your mobile, please indicate whether you would be more likely to text or phone.

	Phone	SMS
32. You have arranged to go out with a friend for the evening, but haven't decided on a time or place.	❑	❑
33. You have decided to meet a group of friends for the evening, but haven't decided on a time or place.	❑	❑
34. Contacting someone when you are short of time.	❑	❑
35. Informing your partner/parents you are going to be late home.	❑	❑
36. When needing to ask someone a quick question.	❑	❑
37. Communicating with people back home when abroad.	❑	❑
38. Contacting someone whilst you are sitting on a crowded train.	❑	❑
39. Wishing a friend happy birthday.	❑	❑
40. You want to give someone your address.	❑	❑
41. Contacting an old friend you haven't spoken to for a while.	❑	❑
42. Asking someone out on a first date.	❑	❑
43. You have had an argument with a friend and want to apologise.	❑	❑

44. Did you deliberately send someone a text message greeting on either Valentine's Day or New Year?

❑Neither ❑Valentine's Day ❑New Year ❑Both

45. Any other comments regarding the use of text messaging?

Thank you for taking the time to complete this questionnaire. Your input is greatly appreciated.

If you would like a copy of the report when it is published, please supply an email address:

_____

This is purely optional and you may remain anonymous if you wish.

Please return the questionnaire to: Mark Ocock
Halifax College, University of York, York, YO10 5DD

If you have any queries regarding this questionnaire please contact Mark Ocock on:

Tel: 08700 432180 Email: mjo101@york.ac.uk

APPENDIX C – PROGRAM CODE

SMS.pl

```
#!/usr/local/bin/perl
@Questions =
('q1','q2','q3','q4','q5','q6','q7','q8','q9','q10','q11','q12','q13','q14','q1
5','q16','q17','q18','q19','q20','q21','q22','q23','q24','q25','q26','q27','q28
','q29','q30','q31','q32','q33','q34','q35','q36','q37','q38','q39','q40','q41'
,'q42','q43','q44','q45','q46');
@Free_Questions = ('q5other','q9other','q45other','q46other');

%FORM=&read_input;

print "Content-type: Text/HTML

<HTML>
 <HEAD>
  <TITLE>SMS USAGE SURVEY</TITLE>
 </HEAD>
<BODY bgColor=#ffffff>

<H2><FONT color=navy face='Arial, Helvetica, sans-serif'>SMS USAGE
SURVEY</FONT></H2>
";

 foreach $item (@Questions)
  {
  $file = $item;
  open(INFO, ">>./responses/sms/$file");              # Open the file
  &lock(INFO);
  print INFO "$FORM{$item}\n";
  &unlock(INFO);
  close(INFO);                    # Close the file
  }
 foreach $item (@Free_Questions)
  {
  $file = $item;
  open(INFO, ">>./responses/sms/$file");              # Open the file
  &lock(INFO);
  if (chomp($FORM{$item}) ne "")
   {
   print INFO
"================================================================================\
n$FORM{$item}\n";
   }
  &unlock(INFO);
  close(INFO);                    # Close the file
   }

  print "
   <B>
   <H4 align=left>
   <FONT color=#000000 face='Arial, Helvetica, sans-serif'>
   Completed
   </FONT>
   </H4>
   </B>
  <FONT color=#000000 face='Arial, Helvetica, sans-serif'>
  Thankyou, your responses have been logged.

<br>
```

```
<br>

  ";


  print "
  </body>
  </html>
  ";

1;
sub lock {
$LOCK_EX=2;
  local($file)=@_;
 if ($ostype ne "w") { flock($file, $LOCK_EX); }
}


sub unlock {
$LOCK_UN=8;
  local($file)=@_;
 if ($ostype ne "w") { flock($file, $LOCK_UN); }
}

sub read_input
{
    local ($buffer, @pairs, $pair, $name, $value, %FORM);
    # Read in text
    $ENV{'REQUEST_METHOD'} =~ tr/a-z/A-Z/;
    if ($ENV{'REQUEST_METHOD'} eq "POST")
    {
        read(STDIN, $buffer, $ENV{'CONTENT_LENGTH'});
    } else
    {
        $buffer = $ENV{'QUERY_STRING'};
    }
    # Split information into name/value pairs
    @pairs = split(/&/, $buffer);
    foreach $pair (@pairs)
    {
        ($name, $value) = split(/=/, $pair);
        $value =~ tr/+/ /;
        $value =~ s/%(..)/pack("C", hex($1))/eg;
        $FORM{$name} = $value;
    }
    %FORM;
}
```

SMS_comments.pl

```
#!/usr/local/bin/perl
%FORM=&read_input;

print "Content-type: Text/HTML

<HTML><HEAD><TITLE>SMS USAGE SURVEY</TITLE>
<BODY bgColor=#ffffff>

<H2><FONT color=#003399>SMS USAGE SURVEY</FONT> </H2>
";

 $file = $FORM{"Suggestions"};

    open(INFO, "./responses/sms/$file");              # Open the file
    &lock(INFO);
 @lines = <INFO>;
    &unlock(INFO);
    close(INFO);                    # Close the file
print "
<br>
The following comments have been made under $file:<br><blockquote>\n
<pre>";
print @lines;


print "
</body>
</html>
";

1;

sub lock {
$LOCK_EX=2;
  local($file)=@_;
 if ($ostype ne "w") { flock($file, $LOCK_EX); }
}


sub unlock {
$LOCK_UN=8;
  local($file)=@_;
 if ($ostype ne "w") { flock($file, $LOCK_UN); }
}

sub read_input
{
    local ($buffer, @pairs, $pair, $name, $value, %FORM);
    # Read in text
    $ENV{'REQUEST_METHOD'} =~ tr/a-z/A-Z/;
    if ($ENV{'REQUEST_METHOD'} eq "POST")
    {
        read(STDIN, $buffer, $ENV{'CONTENT_LENGTH'});
    } else
    {
        $buffer = $ENV{'QUERY_STRING'};
    }
    # Split information into name/value pairs
    @pairs = split(/&/, $buffer);
    foreach $pair (@pairs)
    {
        ($name, $value) = split(/=/, $pair);
        $value =~ tr/+/ /;
        $value =~ s/%(..)/pack("C", hex($1))/eg;
        $FORM{$name} = $value;
    }
    %FORM;
}
```

SMS_stats.pl

```
#!/usr/local/bin/perl
print "Content-type: Text/HTML

<HTML><HEAD><TITLE>SMS USAGE SURVEY</TITLE>
<BODY bgColor=#ffffff>

<H2><FONT color=navy face='Arial, Helvetica, sans-serif'>SMS USAGE
SURVEY</FONT> </H2>
";

@Questions =
('q1','q2','q3','q4','q5','q6','q7','q8','q9','q10','q11','q12','q13','q14','q1
5','q16','q17','q18','q19','q20','q21','q22','q23','q24','q25','q26','q27','q28
','q29','q30','q31','q32','q33','q34','q35','q36','q37','q38','q39','q40','q41'
,'q42','q43','q44','q45','q46');
@Free_Questions = ('q5other','q9other','q45other','q46other');

foreach $question (@Questions)
 {
 $file = $question;
    open(INFO, "./responses/sms/$file");              # Open the file
    &lock(INFO);
 @lines = <INFO>;
    &unlock(INFO);
    close(INFO);                    # Close the file

 print "<br><h3><FONT color=#000000 face='Arial, Helvetica, sans-
serif'>$question</h3>\n<blockquote><table border=1>";
 %RESPONSES=$TEMP;
 foreach $item (@lines)
  {
  chomp($item);
  if ($item ne "")
   {
   if ((defined($RESPONSES{"$item"})) and
($RESPONSES{"$item"} ne ""))
    {
    $RESPONSES{"$item"}=$RESPONSES{"$item"}+1;
    }
   else
    {
    $RESPONSES{"$item"}=1;
                }
   }
  }
 $Total_Responses = 0;
    foreach $key (keys %RESPONSES)
        {
        if ($key ne "")
            {
            $Total_Responses = $Total_Responses+$RESPONSES{$key};
            }
        }
 if ( $Total_Responses eq 0)
  {
  print "</table>No option responses given";
  }
 else
  {
   print
"<tr><td><b>Option</td><td><b>Responses</td><td><b>Percentage</td></tr>\n";
   foreach $key (keys %RESPONSES)
    {
    if ($key ne "")
     {
     $PerCent = ($RESPONSES{$key} / $Total_Responses)*100;
     print
"<tr><td>$key</td><td>$RESPONSES{$key}</td><td>$PerCent</td></tr>\n";
     }
```

```
     }
    print "</table>";
   }


 foreach $sug (@Free_Questions)
  {
  if ((substr($sug, 2,3) eq "sug") and (substr($sug,0,2) eq $question))
   {
   print "<br><a href=sms_comments.pl?Suggestions=$sug>View
Comments\/Suggestions</a>";
   }
  if ((substr($sug, 3,3) eq "sug") and (substr($sug,0,3) eq $question))
   {
   print "<br><a href=sms_comments.pl?Suggestions=$sug>View
Comments\/Suggestions</a>";
   }
  if ((substr($sug, 3,3) eq "oth") and (substr($sug,0,3) eq $question))
   {
   print "<br><a href=sms_comments.pl?Suggestions=$sug>View
Other Option Responses</a>";
   }
  if ((substr($sug, 2,3) eq "oth") and (substr($sug,0,2) eq $question))
   {
   print "<br><a href=sms_comments.pl?Suggestions=$sug>View
Other Option Responses</a>";
   }
  }



 print "</blockquote>";
 }

print "
<br>
<hr>To reset the Stats count click <a href=sms_reset.pl>here</a>
</body>
</html>
";


1;



sub lock {
$LOCK_EX=2;
  local($file)=@_;
 if ($ostype ne "w") { flock($file, $LOCK_EX); }
}


sub unlock {
$LOCK_UN=8;
  local($file)=@_;
 if ($ostype ne "w") { flock($file, $LOCK_UN); }
}
```

APPENDIX D – INTERVIEW TRANSCRIPTS

Interviewee A (deaf user of SMS)
Age: 25 Gender: Male
17/12/01

What contract do you have?
BT Genie - £20 a month, which includes 50 minutes a day of off peak calls to BT Cellnet phones or landlines. My package also includes unlimited text messages (limit is supposed to be 1,500). When I got my contract, the package included unlimited text messages, although BT subsequently changed it to a 1500 per month limit due to some people using it excessively!

How has the introduction of SMS affected the way in which you communicate with people?
SMS is instant (sometimes) and cheaper than a pager, which I also have but do not use anymore. The pager was expensive, about 39p a message, and I couldn't reply to it unless I was at home. SMS allows me to text most of my friends and due to the cheap costs I usually get a reply. It also means I can keep in touch with people without having to be tied to the phone.

So does SMS allow you to stay in touch far easier? When you had the pager, were people reluctant to contact you because of high costs?
Definitely. Also SMS is two way, whereas a pager is one-way. SMS has been the next step on from paging.

Is SMS now your main form of communication? Do you prefer using SMS as oppose to email?
I use email to send letters or jokes or short messages to people, or whenever I want to say something that isn't urgent. I tend to use SMS when I need a reply quite quickly. Also I have a lot of friends in America who don't have mobile phones so I use email to contact them. However, I do prefer SMS as its easy and quick. I sometimes will send an email and then tell that person I have sent them one via SMS.

Do you know many other deaf people who use SMS? Do they share similar views to you on it?
Yes. Most of my deaf friends use SMS for the same reason. It allows us to keep in touch with each other and hearing friends very easily. It has greatly enhanced our lives and means there is not so much of a communication barrier anymore.

Any disadvantages or things you don't like about SMS?
Some people I know don't have unlimited text messages so it's hard when I don't get a reply as they have run out of credit! Also SMS can sometimes, when the networks become busy, take a long time and you need an urgent answer.

Do you use the Typetalk service less and use SMS instead?
Yes in contacting friends. In contacting businesses and companies it hasn't changed for example ringing up about a water bill or something.

Overall, would you say SMS has had a major impact on your life?
Yes it has. I'm so grateful to my friend James for telling me about it when he did. I couldn't wait to get my phone. I'm very lucky to get free text messages but then again I do pay for them!

Interviewee B
Age: 22 Gender: Female
03/01/02

What type of contract do you have?
I have a Nokia 8210 on Vodafone. My package includes 150 minutes free of calls anytime per month plus 50 free text messages.

How long have you been using text messaging and to what extent do you use it now?
I can't really remember. About 3 years. Well, it has increased from when I first started using text messaging. I probably send 4 or 5 texts a day now, not all from my mobile though.

Do you send some from the Internet then? Why?
Yes, I use Lycos and NUSOnline. It is a totally free way of communicating.

What do you like about text messaging?
There is less risk of radiation affecting the brain. I use it a lot because I have a long distance relationship with my partner and so it is a useful way of staying in touch all the time, even whilst busy. I also think it is cheap way of keeping in touch with friends back home whilst being at university.

Do you prefer SMS or email? Why?
SMS is more instantaneous because people nearly always carry their mobiles with them, whereas they will often not check their emails every day. You can't say as much in a text message as you can in email, however for me SMS is more efficient than email.

Any disadvantages to text messaging?
Texts are sometimes not delivered, which can be very frustrating. It does not happen often, but when it does happen, you still get charged for it! I have also occasionally received the same text message more than once, when the sender has only sent it once. A couple of times, I have also sent a message to the wrong person because it is really easy to select the wrong number from your phone book.

When receiving a text, will you normally reply by text? Do you ever engage in text conversations?
Yes. Sometimes when I'm arranging an evening out. I nearly always text when I am asking a quick question about university work for example.

Any other comments?
Texting is a useful source of communication, although slightly impersonal, an extremely efficient way of communicating in busy and noisy atmospheres.

Interviewee C
Age: 19 Gender: Male
06/01/02

What type of contract do you have?
Pay as you go on the Orange network.

What do you use text messaging for?
Arranging to go out with friends, asking people how they are, and staying in contact with people I probably would have lost contact with otherwise. I have got a lot of friends back home and at other universities and there just wouldn't be enough time to speak to all of them on the phone regularly. SMS is quick and convenient.

Who do you normally text?
Friends and family. For the people I know best, I tend to use a combination of phone and text.

What are the advantages and disadvantages for you?
I think its impersonal and it can work out expensive if you get caught up in text conversations. It's also expensive for when you just need to say two words. It can also be hard trying to express feelings and can lead to misinterpretation. Sometimes its good to be impersonal because you can avoid talking to people and don't get caught up in long conversations. It's also good when corresponding over a couple of days; it stores the messages on the phone so you have a record of what has been said.

You mentioned text conversations, how do they come about for you?
If someone asks you a question by text, then you reply to that and then they send another back etc etc. I will normally reply by text when receiving one unless it is really urgent.

Being a student, you will naturally use email and text messaging, do you have a preference for either one?
Text messaging. It is far more convenient. You can't just email someone when you are walking around somewhere.

Do you feel you can text things to people that you would not say in conversation?
Sometimes, it can be easier because you are not in direct contact with the person. For example, if someone asks you in the day if you fancy going out that evening, but later on you don't fancy it, then it is far easier just to text back a rejection, and avoid having them try to persuade you.

Interviewee D
Age: 11 Gender: Male
06/01/02

How often do you use text messaging?
I use it quite a lot for quick messages to my friends.

Why do you use it? What do you like about it?
I use text messages because they are cheap and fast. I like it because I can text things that I wouldn't say in conversation.

Who do you use text messaging with?
I use it with my friends, but particularly with my sister. We go to different schools now and so it is nice to stay in contact with each other throughout the day.

Do you find it exciting when you receive a message?
Yes, I like it. It can be quite a surprise sometimes.

Are you interested in ringtones and logos on your phone?
Definitely. I love looking on the Internet for new ringtones.

Interviewee E
Age: 11 Gender: Female
11/01/02

How much do you use text messaging?
I use it quite often for staying in touch with my school friends and my mum.

Why do you use text messaging?
It's cheaper than calling. I find it easy too.

Can you tell me what you mean by easy?
Sometimes it's easier than phoning someone because they are not always there, but you know they are going to get your message and then call you back when it's convenient for them.

When receiving a text, do you often reply by text?
Sometimes friends ask me questions and so I normally will reply by text then.

Do most of your friends use text messaging?
Some of them do, but not all of them have got mobile phones. We all send texts to each other at school.

Do you ever receive jokes in a text message?
Yes, occasionally. When I receive them, I normally send them on to other people.

Do you find it exciting when you receive a message?
Yes, because it makes me wonder who it is from.

Interviewee F
Age: 36 Gender: Male
08/01/02

What contract do you have?
Vodafone contract costing £15 a month, where I get 100 minutes of free anytime calls.

How long have you been using SMS?
A couple of years now. I find it really useful.

Who do you use text messaging with?
I tend to send a lot of text messages during the day to keep in touch with my other half. Just short notes really, to say hello when you wouldn't normally make a call.

What are the advantages and disadvantages for you?
I think it can be a lot more expensive than you actually think. You don't really think about it when you are sending the messages though. I had a look at my bill at the end of one month and was quite shocked. It's good because it means I am contactable all the time even when I am in meetings, and so if something urgent comes up, I can still know about it. It's also useful for sending phone numbers and addresses to people as it means you don't have to write them down.

What do you think of text messaging compared with e-mail?
I use e-mail a lot at work and it is far easier to compose a message with e-mail, but I like the portability of SMS. Also, I tend to find that people always have their phones on them, but don't always check their emails. Both have their benefits with each being more applicable in different situations.

Do you send texts from the Internet?
Yes, I do actually. It combines the best of both worlds. You can type them in easily and know that the receiver will be reading it almost instantly.

Interviewee G
Age: 38 Gender: Female
15/01/02

What contract do you have?
I have got a Vodafone contract, which costs me £16 a month, and I get 50 free text messages a month. I always use my free quota.

Who do you mainly text?
I text lots of people. I text my husband during the day when he is at work and the kids sometimes text me when they are at school, so I reply to them. I sometimes use text messaging between friends too when we are arranging to go out for an evening. My husband will often text me when he is coming home on the train from London, so I know what time to pick him up from the station.

What do you like about text messaging?
It's convenient for me because I don't really have the time to keep phoning people all the time, yet I can still stay in contact. It is also good when I'm in a noisy atmosphere like a pub or shopping centre.

Is there anything you do not like about it?
Not really, no. For me, it seems to only have its advantages. The only problem I have ever had with it was when a couple of messages took longer than normal to be delivered.

Interviewee H
Age: 55 Gender: Male
18/01/02

How often do you use text messaging?
I am not a particularly avid user of text messaging. I only use it very occasionally.

Who do you send text messages to?
Members of my family really. I used SMS to contact daughter when she was on a placement abroad and we were on the move too. It did prove to be very effective then. Normally, if I want to contact someone I will just pick up the phone.

What are the advantages and disadvantages for you?
On the few occasions when I have used it, I have found inputting the messages extremely fiddly. I am not the fastest typer on a conventional keyboard, and so using those tiny keys takes me forever. The main advantage I would say is the convenience and in the case of contacting my daughter abroad, the cost. It would have been far more expensive making international calls all the time.

Interviewee I
Age: 62 Gender: Female
20/01/02

What type of contract do you have?
I have got a pay as you go contract on Orange. I don't tend to make that much use of the phone really.

Tell me about your experiences with text messaging?
I only use text messaging to send the occasional one to my son at university. It was my son who introduced me to them. It's nice because it makes him seem less distant, and I know that I can send one and usually get a reply within a few minutes.

What do you like about it?
Like I said, its really quick and I think it is cheap too.

You say it's cheap, can you elaborate on this at all?
Well, 10p a message seems cheap to me. I don't send that many and so for me, I wouldn't say it was expensive.

Do you find it hard inputting the messages?
Not really, it can take a while to do sometimes, but I soon got the hang of it.

Why don't you use text messaging with anyone else?
I would normally just rather call people. I suppose it is different with your generation, everybody of the same age texts each other. I don't know anyone else my age that uses text messaging.

APPENDIX E – SUMMARY OF RESULTS

Section A

1. What gender are you?

Male	Female	Total
193	124	317

2. What age group do you belong to?

<16	17-18	19-21	22-25	26-35	36-50	51-65	65+	Total
13	17	80	63	90	43	10	0	316

3. Do you use a mobile phone?

Yes	No	Total
306	10	316

4. What type of account do you have?

Contract	Pay as you go	Total
157	146	303

5. What network are you with?

Vodafone	Orange	Cellnet	One2One	Other	Total
70	99	56	47	31	303

6. Do you or have you ever used SMS to send and receive messages?

Yes	No	Total
304	10	314

7. On average how many texts do you send from your phone?

Few a month	Few a week	1-2 per day	3-5 per day	6-10 per day	11-15 per day	16-20 per day	20+ per day	Total
53	69	56	68	37	5	1	6	295

8. On average how many texts do you receive on your phone?

Few a month	Few a week	1-2 per day	3-5 per day	6-10 per day	11-15 per day	16-20 per day	20+ per day	Total
49	58	68	68	34	16	1	7	301

9. Do you send text messages from the Internet?

Frequently	Occasionally	Rarely	Never	Total
47	95	78	88	308

10. How do you send your text messages?

Internet	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Total
	94	103	17	15	15	10	5	9	5	9	11	293
Mobile	**100%**	**90%**	**80%**	**70%**	**60%**	**50%**	**40%**	**30%**	**20%**	**10%**	**0%**	

11. Does your mobile phone support predictive text messaging input?

Yes	No	Don't know	Total
186	99	18	303

12. If YES, do you use this facility?

Yes	No	Total
144	42	186

13. Do you use SMS for sending jokes to friends?

Yes	No	Total
89	217	306

14. Do you use SMS for sending ringtones and/or operator logos to friends?

Yes	No	Total
42	265	307

Section B

	Strongly agree	Agree	Unsure	Disagree	Strongly Disagree	Total
15. I text things that I would not say in conversation	32	71	42	104	58	307
16. I use text messaging so that I don't have to spend time talking to people	41	126	31	68	42	308
17. I text people when I wish to communicate at unsociable hours	72	148	24	46	18	308
18. I use SMS when I am in a bad reception area	34	81	63	86	40	304
19. When I receive a text, I will often reply by text	139	119	26	14	8	306
20. SMS is a faster and more efficient communication method than e-mail	78	62	72	66	29	307
21. I use text messaging when I do not want others to hear what I am saying	59	86	38	91	33	307
22. I often send texts when waiting for things to kill time	55	94	33	74	51	307
23. I use SMS when I do not know the person very well	33	38	43	116	76	306
24. I text when contacting people on other networks in order to save money	75	111	41	38	40	305
25. I send texts when contacting people during peak call periods	68	72	49	80	36	305
26. I text when I do not want to interrupt people	72	144	32	42	16	306
27. I use text messaging to flirt with people	34	73	43	73	83	306
28. Text messaging is a cheap form of communication	98	93	32	55	30	308
29. Text messaging is impersonal	20	50	33	132	72	307
30. I would rather text than call due to safety issues with radiation	9	18	48	95	136	306
31. Most of my friends use text messaging as a form of communication	96	121	37	36	17	307

Section C

	Telephone	SMS	Total
32. You have arranged to go out with a friend for the evening, but haven't decided on a time or place	206	98	304
33. You have decided to meet a group of friends for the evening, but haven't decided on a time or place	184	118	302
34. Contacting someone when you are short of time	168	135	303
35. Informing your partner/parents you are going to be late home	214	88	302
36. When needing to ask someone a quick question	97	206	303
37. Communicating with people back home when abroad	91	202	293
38. Contacting someone whilst you are sitting on a crowded train	38	262	300
39. Wishing a friend happy birthday	191	110	301
40. You want to give someone your address	88	212	300
41. Contacting an old friend you haven't spoken to for a while	221	80	301
42. Asking someone out on a first date	226	61	287
43. You have had an argument with a friend and want to apologise	213	83	296

44. Did you deliberately send someone a text message greeting on either Valentine's Day or New Year?

Valentine's Day	New Year	Both	Neither	Total
15	89	67	132	303