



# **Human Computer Interaction 4**

## **Assessed Exercise**

*December 2009*

*Optimising Message Interfaces on a Mobile Device*

**Lauren Norrie**  
*0603112*

## **1 Aim**

The aim of the system was to improve user interaction with common messaging protocols on a mobile device. The protocols chosen were Instant Messaging (IM) and text messaging (SMS). The system aimed to optimise the use of these protocols by providing a shared interface, and deciding which protocol to use based on circumstance and user preference. The system aimed to understand how users currently use these services to communicate, specifically on desktop PCs and mobile devices, and whether communication could be improved using these techniques.

## **2 Purpose**

Information is being shared all around us. Communication is constantly being established through voice, gestures, text; messages are even being exchanged between computers. In order for computers to exchange messages, they require common protocols or rules that define how information is sent and received. The message protocols we will concentrate on are IM and SMS as these share a similar message structure - short, text-based messages.

SMS services are commonly found on mobile phone devices, allowing users to send sort text messages (texts) to other mobile devices using the mobile phone's network operator. IM messages are sent over IP packets, and require an Internet connection to be sent and received. Desktop PCs usually have IM clients pre-installed. However, with the current rise in 'smart phones' - mobile phones providing similar functionalities as a PC - it is becoming increasingly popular to use mobile IM clients. The purpose of the system is to understand how each service is used in different situations and whether the advantages of both could be combined.

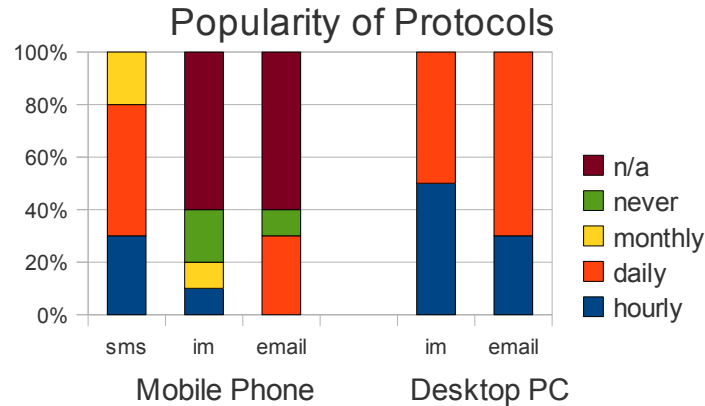
'Smart phones' require a network signal in order to exchange SMS messages, and they require an Internet connection to exchange IM messages. Where one is not available, the other may be. 'Wireless hotspots' provide capable mobile devices with an Internet connection, some that allow users to use the service for free. Using IM in place of SMS is also advantageous in case where a recipient is more likely to respond through IM than by text. Therefore, the need to separate SMS and IM is becoming less of a requirement.

### **2.1 Survey**

To understand how users currently use these services, a survey [Appendix 1] was carried out on 10 participants. The questionnaire asked participants to prioritise message protocols they would choose in different scenarios.

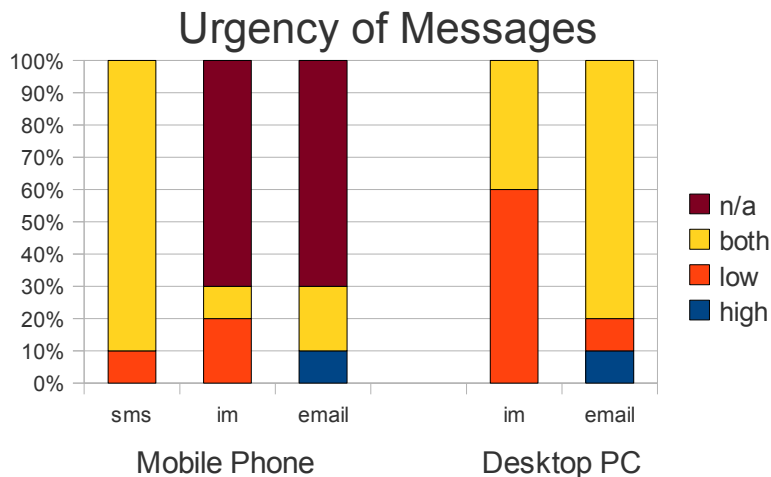
## 2.1.1 Participants

Participants varied in age, though all belonged to a Computing related field. There was a mix of those with 'smart phones' and those without, labelled as 'n/a' in *Illustration 1 (below)*. All participants were current users of SMS and IM.



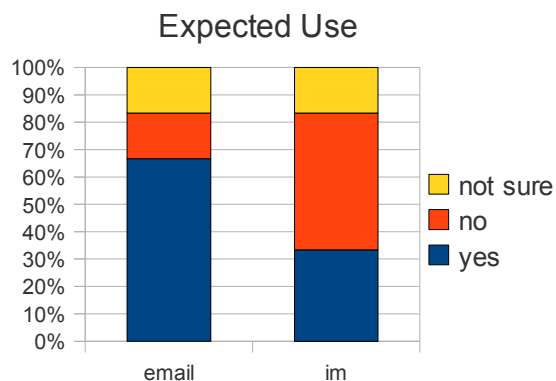
*Illustration 1: Average use of protocols*

The messaging client that people choose depends highly on the circumstance, including the urgency of message they wish to communicate. Participants were asked to state which protocols they would consider for messages of high and low urgencies. *Illustration 2 (below)* shows that the majority of users consider both high and low messages for SMS messages, though most considered IM to be used for messages of low priority.



*Illustration 2: Urgencies of messages shared over each protocol*

60% of participants were not 'smart phone' owners. Of these participants, 66% expected that they would use email if their device supported it, while only 33% said that they may also use IM. This difference, shown in *Illustration 3 (right)*, implies that users feel differently about sending IM messages on a mobile device.



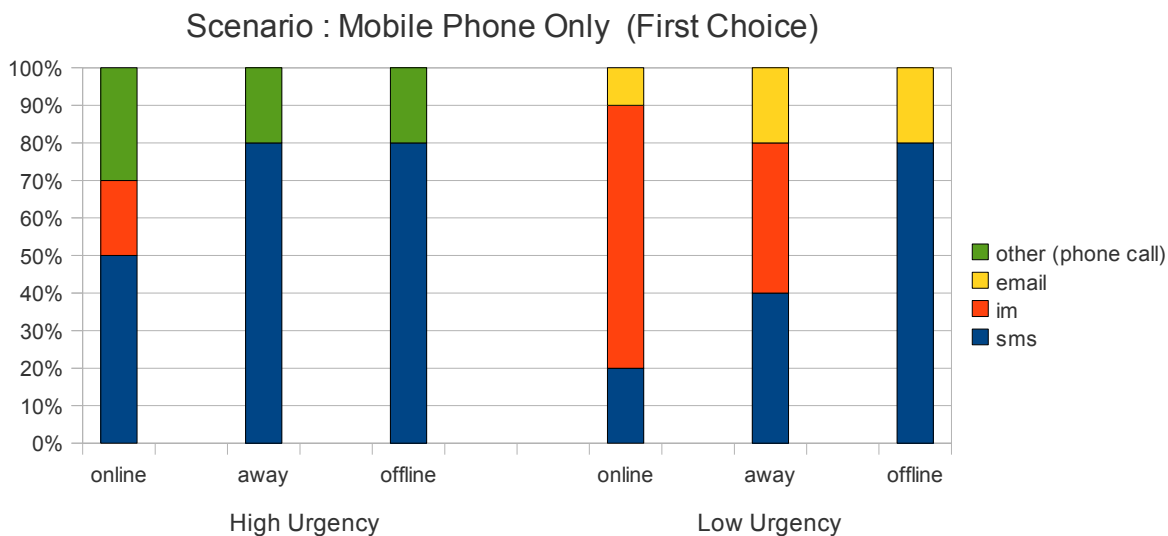
*Illustration 3: Expected use of protocols on mobile devices, had it been supported*

## 2.1.2 Scenarios

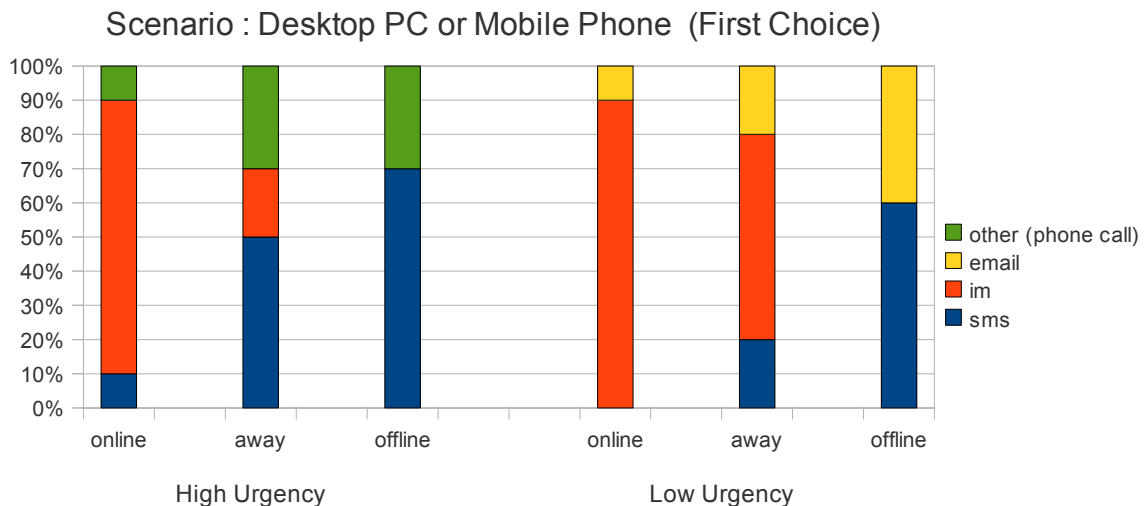
As mentioned above, the preferred messaging client depends on the situation. The scenarios were provided to allow participants to think about which protocol they would use when there was a difference in message urgency; in situations where they had a PC or a mobile phone available; and additionally they were asked to consider if the user status of their friend would affect their decision.

User status informs users of how likely it is that the recipient will respond to a message. If a user status is set to 'away' then the person might not respond as instantly as they would had they been 'online'. A user status that is 'offline' implies that the user would not receive an IM message at all. User status must be known before making a decision of which service to use.

I was interested in finding out how participants considered services on different platforms, and how user status affected their choice. The results are shown in *Illustration 4 and Illustration 5 (below)*.



*Illustration 4: First choice of service on a mobile device*



*Illustration 5: First choice of service when both mobile phone and PC are available*

It was interesting to find the difference between using IM and SMS with a PC available compared to a mobile phone. If we look at the case where a message has 'high urgency' and user status is 'online', we see that 80% of PC users chose IM as their first choice, while only 20% chose IM if they were on a mobile device. In the case of messages of 'low urgency' and user status is 'online', 20% of participants would still choose SMS as their first preference from a mobile device when they would rather send the message as an IM if a PC was available.

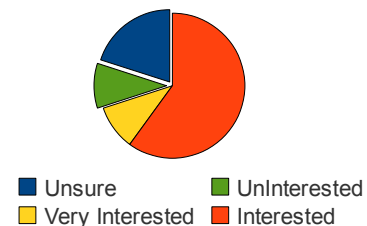
It is clear that users view IM on a mobile device differently than at a PC. As the vast majority preferred IM when they had their PC, then one would expect that for the same reasons they would have chosen IM even with only their mobile device available. As the sending device does not affect how a message is received - sending an IM message from a PC is no different from sending from a mobile - this difference implies a problem with the user interface of IM clients on mobile devices.

The results also revealed that SMS is preferred when the user status is 'away'. Overall, the results show that IM and SMS messaging are popular services for communication and that users feel differently towards IM depending on their device.

### 2.1.2 User Interest

The questionnaire asked participants if they would be interested in an application that took their preferences and adjusted their communication method accordingly. The results, shown in *Illustration 6 (right)*, show that the majority of participants were interested in such an application. The questionnaire also asked participants if they had used

User Interest



*Illustration 6: Proportion of users interested in a combined application*

in such an application. The questionnaire also asked participants if they had used

or heard of a system like this before, to which all participants responded that they had not.

The purpose of this application was to provide an interface that would allow users to use IM as they would on a PC, and convenience users by keeping communication in one place, and subtly switching the protocol used according to situational preferences.

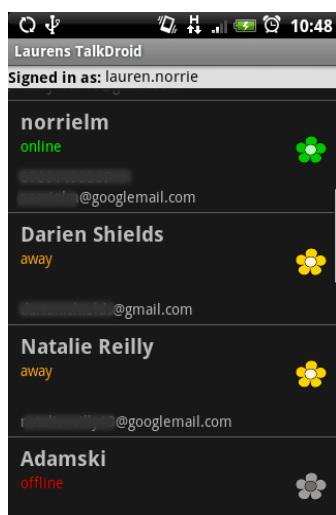
### 3 Related Systems

The survey revealed that participants had not encountered any application that combined SMS and IM. However, there have been attempts to connect communication methods in existing systems. The HTC Hero combines updates through SMS, email, Facebook and Flickr, allowing these to be viewed from a contact's entry in the mobile phone's address book. Vodafone 360[1] builds on this by gathering options to send an SMS, email or IM message to the user and providing these in the contact's entry in the address book. Extensions have been added to desktop IM clients, allowing users to set up their client to allow IM messages to be sent as an SMS message on their mobile phone[2][3] and some clients can be set up to send messages as SMS[3]. Little work has been done to combine SMS and IM on mobile clients, or in allowing user preferences to decide which modality to be used when.

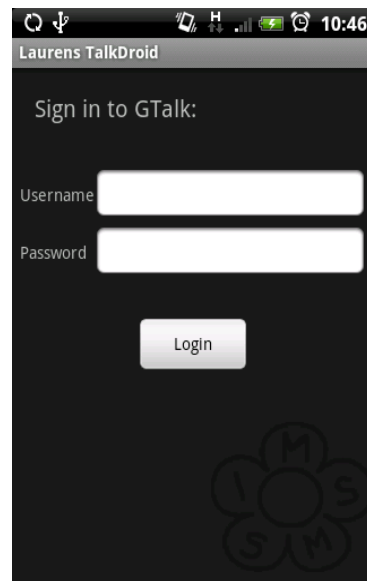
### 4 Application

The system builds on other systems by providing SMS and IM services from a single interface. The application was developed for Android OS using Java and was tested on an HTC Hero 'smart phone'. The application

provided an interface that allowed users to sign in to 'GTalk' (Google's IM protocol) as shown in *Illustration 7 (right)*, and it used the phone's own SMS services to send texts.



*Illustration 8: Contact list, displaying: user status, email and mobile number*



*Illustration 7: Log in screen*

Users could select contacts to chat to by selecting them from a list of 'GTalk' contacts, as shown in *Illustration 8 (left)*.

The decision of which service to use was automatic, and so users were informed of the current setting through labeling of the Send button, as shown in *Illustration 9* and *10* (below).



*Illustration 10: Chat window: User 'offline'. Messages sent as SMS*



*Illustration 9: Chat window: User 'online'. Messages sent as IM*

Users could distinguish between IM and SMS messages through use of italics and bold. Sent and received messages were highlighted in red and blue.

An advantage of the single interface was that users could deal with real-time events that might affect their preferences. While typing a message, it is possible for their friend's user status to switch to 'away'. Assuming that the user's preference in this situation would be to send an SMS instead, then they would have to discard the IM and send the message in an SMS client instead. It is also possible for the friend to come back 'online' as the user types the SMS message. The combined interface conveniences the user by displaying this behaviour in one place.

## 5 Testing

As discussed, the use of IM and SMS depends highly on the given circumstance and so it was difficult to test the system without an ethnographic study. As an extended trial was not possible, the system was tested mainly by using it myself in place of the mobile IM client provided by the HTC Hero. I used the application to chat to friends through IM and SMS, and set up a 'GTalk' account to test the system as the user of a desktop IM client. By sending messages to the device I was testing with, I could test that messages were being sent and received correctly without disturbing friends unnecessarily. The Android emulators allow

sending of SMS messages to the emulator numbers, which was useful in testing the application as though 2 phones had the application installed.

Recipients without the application installed were the ones affected by the choice of protocol. I asked friends if they noticed a difference in my behaviour. Some commented that when I disconnected from the Internet during conversation, they found it strange that I replied through SMS before reappearing online. I used this feedback to I changed how the phone reacted to being disconnected from the Internet. If a message is sent as the sending device loses connectivity, the user must click the send button again to confirm the change in protocol. This gives users the option of waiting to reconnect before sending their reply, or discarding the message completely.

## **6 Achievements**

The system achieved a common interface for SMS and IM messages, and the ability to send these messages using a mobile device running Android OS. The application showed that it is highly possible to exchange IM and SMS messages through the one interface with minimal confusion. The issues involved with connectivity were revealed, showing that users without a combined interface may become confused when messages appear to them in separate interfaces, and the requirement that users still need to be involved in the decision process. However, the application would require an evaluation with multiple users before concluding the effectiveness of a combined interface.

## **6 Future Work**

The application requires a user to sign in to a 'GTalk' account before displaying contacts for them to talk to, which is oriented around the design of an IM client. Therefore, an Internet connection is required before the application will start up, even though offline facilities are provided by the application. To improve this, contacts could be pulled from an address book. Phone numbers are hard coded in the system, which would also be improved with an phone book.

The option to create a 'blank message' similar to an SMS client may also improve the system by bridging the gap between SMS and IM clients. This could be extended to allow multiple recipients of a message.

The survey revealed a desire to send messages through email in particular circumstances. Additional protocols could be introduced to the application to cater for different such requirements. The IM protocol used could also be extended to other types, including MSN Messenger or Facebook Chat.

The application could also be extended to allow users to change their preferred method in the event that the assumed protocol is unsuitable.



## 7 References

1. Vodaphone360: <http://info.vodafone360.com/en/features/index#feature2>
2. AOL IMtoMobile: <http://mobile.aol.com/aolproducts/imtomobile>
3. Yahoo SMS IM: <http://mobile.yahoo.com/messenger/sms>
4. MSN SMS : [http://www.sabafon.com/msn/msn\\_mob\\_msgr.htm#PC2phone](http://www.sabafon.com/msn/msn_mob_msgr.htm#PC2phone)

## Appendix 1:

### HCI4 : IM/SMS Evaluation

Participant no \_\_\_\_\_

#### Section 1 : How do you communicate – using your mobile phone?

Q1. On average, how often do you use your mobile phone to communicate with people?

SMS	Hourly	Daily	Monthly	Never	N/A
Instant Messenger (IM)	Hourly	Daily	Monthly	Never	N/A
Email	Hourly	Daily	Monthly	Never	N/A

If your phone does not support any of the above services, do you think that you would use them if it did?

---

---

Q2. How urgent are messages that you send via:

SMS	High	Low	Both	N/A
Instant Messenger (IM)	High	Low	Both	N/A
Email	High	Low	Both	N/A

#### Section 2 : How do you communicate – using a desktop PC?

Q1. On average, how often do you use your computer to communicate with people?

Instant Messenger (IM)	Hourly	Daily	Monthly	Never	N/A
Email	Hourly	Daily	Monthly	Never	N/A

Q2. How urgent are messages that you send via:

Instant Messenger (IM)	High	Low	Both	N/A
Email	High	Low	Both	N/A

### **Section 3 : Message Preferences – how would you like to communicate?**

You are given 4 scenarios to consider. You will then be asked to fill in a table for each scenario, labeling the ways you would like to talk to a friend in order of preference.

Information on filling out the table :

1. Locate each scenario by urgency and then by user environment.
2. For each scenario, treat the cases where your friend is online and offline separately.
3. When choosing preferences, assume that you have all options available to you.
4. Label preferences from 1 to n, 1 being your first choice and n being your last choice.
5. Score out options that you would not be interested in using.
6. If you would prefer another option over those provided, add this beside 'Other'.

#### **Scenarios**

##### **High urgency – Mobile Phone only:**

*You are on a bus and you need to tell a friend that you will be late in meeting them.*

*How would you like to send this message if you only had a mobile phone?*

Please enter your preference in the table provided.

##### **Low urgency – Mobile Phone only:**

*The bus you are on is stuck in traffic and would like someone to talk to.*

*How would you message a friend if you only had a mobile phone?*

Please enter your preference in the table provided.

##### **High urgency – Desktop PC or Mobile Phone:**

*You are at home and you want to find out what your plans are for the evening.*

*How would you message a friend if you had the option of both a PC or mobile phone?*

Please enter your preference in the table provided.

##### **Low urgency – Desktop PC or Mobile Phone:**

*You are bored at home and want to make idle chat.*

*How would you message a friend if you had the option of a PC or mobile phone?*

Please enter your preference in the table provided.

		User Environment					
Message Urgency	Friend's status	Mobile Phone only:			Desktop PC or Mobile Phone:		
High Urgency	online	SMS [ ] Other [ ]:	IM [ ]	Email [ ]	SMS [ ] Other [ ]:	IM [ ]	Email [ ]
	away	SMS [ ] Other [ ]:	IM [ ]	Email [ ]	SMS [ ] Other [ ]:	IM [ ]	Email [ ]
	offline	SMS [ ] Other [ ]:		Email [ ]	SMS [ ] Other [ ]:		Email [ ]
Low Urgency	online	SMS [ ] Other [ ]:	IM [ ]	Email [ ]	SMS [ ] Other [ ]:	IM [ ]	Email [ ]
	away	SMS [ ] Other [ ]:	IM [ ]	Email [ ]	SMS [ ] Other [ ]:	IM [ ]	Email [ ]
	offline	SMS [ ] Other [ ]:		Email [ ]	SMS [ ] Other [ ]:		Email [ ]

#### Section 4 - Other thoughts

Q1. How interested are you in a system that chooses how to send your messages based on your preferences above? *Please circle:*

Not Interested                      Interested                      Very Interested                      Not Sure

Q2. Have you used an application that uses both IM and SMS before?

*Please circle:*    Yes / No

If so, please specify:

---



---

Q3. Do you have any other comments?

---



---



---

Thank you for taking time to fill out this questionnaire ^\_^