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# Providing older adults with real-time passenger information via SMS

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## Abstract

This paper describes a co-design activity with older adults exploring the use of SMS as a mechanism for providing real-time passenger information (RTPI). This activity consisted of a series of design workshops that utilised an experience prototype to help understand the issues such a system might encounter. The workshops highlighted barriers caused by the mobile phone platform (sending and receiving SMS messages), how RTPI can be used by older adults and its effect on emotion and perceptions of privacy.

## Author Keywords

Older adults, mobile interface design, real-time passenger information, experience prototyping

## ACM Classification Keywords

H.5.2 User Interfaces.

## Background and motivation

The activity undertaken was part of the Informed Rural Passenger (IRP) project[1], which developed a mobility information ecosystem to support real-time passenger information (RTPI) systems in rural areas. RTPI systems provide public transport users with details such as timetables, estimated time of vehicle arrival, and

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[1] http://www.dotrural.ac.uk/irp

real-time vehicle locations. Although useful for passengers, few RTPI systems exist outside of urban areas, which could be due to lack of supporting infrastructure or fewer passengers resulting in reduced operator incentive to provide RTPI [2]. The IRP ecosystem uses Semantic Web technologies to integrate mobility information from open data providers with information from the public transport users [2]. This information can then be used by applications to provide RTPI via multiple channels. For example, the GetThere smartphone app[2] allows users to view bus timetables and locations (both timetabled and real-time) for part of the Scottish Borders, UK. The SMS interface described here forms an additional channel that can be used to access the RTPI via mobile devices. Others have sought to address the travel information needs of people with cognitive impairments such as dyslexia [4]. We chose older adults as our previous observations of bus users in rural areas found a large proportion were older adults who did not own smartphones. The constraint of using SMS was driven by a lack of older smartphone users in this rural setting.

## Design Workshop

An initial piece of work for the SMS design activities was to create a set of user stories that determined the necessary steps for obtaining RTPI via SMS whilst at a bus stop. Although there was no direct involvement of users in the creation of these stories, the role of the stories was to help sensitise the designer and developers to the user experience of a SMS interface for an RTPI system. From these stories, BusM8 an SMS experience prototype [1] was created using the

TextItIn platform[3]. This form of prototyping provides project team members and users with a first-hand understanding of a current or future situation by actively engaging with a prototype. BusM8 guides users through the necessary steps to obtain RTPI using SMS text messages (see sidebar for an example dialogue). To evaluate the prototype and gather further material for the project, three co-design workshops [5] were organized to engage with a total of 8 older bus users (aged over 60) in Aberdeenshire, UK. Each workshop involved a journey mapping activity, a demo and usage of the BusM8 prototype, and discussion of design related. Audio was recorded for all discussions, and the generated assets were collected and photographed.

*Journey Mapping*
The aim here was to encourage the participants to think about, and reflect upon existing ways they use travel information. The participants used sticky-notes and sheets of paper to create a visual representation mapping out how they use travel information from journey planning stages to arriving at their destination.

*Prototype Usage*
The aim here was to show the participants how a SMS system providing RTPI would behave. This involved the participants using their own phones to interact with the BusM8 prototype to seek information about when the next bus would arrive. The participants were provided with a photograph of a bus stop flag which showed the bus stop identifier code to be sent to BusM8 to start the dialogue. This activity highlighted any difficulties the participants experienced when using such a system.

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[2] http://www.gettherebus.com

[3] http://textit.in/

*Topic Cards*

The motivation for the topic cards was to elicit feedback on the usage of the BusM8 system and explore the issues it provoked. Six topics were written onto individual cards covering subjects such as getting real-time travel information, mobile phone interaction with BusM8, and the perceived reliability of information provided via this channel. The participants were asked to write responses to each topic, which they arranged to show how they thought the topics were related.

*Follow-up Interviews*

After the workshop, go-along interviews [3] were conducted with two participants. This is a data collection technique where the researcher moves along with their informants. In this instance, it involved taking the same bus journey with the participant. This provided insights into their lived experience of topics that emerged during the workshop activities.

## Results

The qualitative data from the design workshops and go-along interviews were analysed using an open coding thematic analysis [6]. A brief discussion of the issues identified is presented below.

### MOBILE PHONE AS A PLATFORM BARRIER

Two participants were uncomfortable using SMS on a mobile phone. Although they owned a mobile phone it was only used for emergency purposes. A curious detail was that they both had phone numbers stuck on the case of their phone (see Figure 1).  Those who were comfortable using their phone acknowledged they were slow with it but felt able to get to grips with the use of SMS. Only one participant had a smartphone and said that a lot of people in their age group do not have a mobile phone.



**Figure 1.** Label of phone numbers attached to back of mobile.

### SMS COMPOSITION ISSUES

The participants demonstrated some difficulties when sending a message to BusM8. The main difficulty related to identifying the bus stop code, which is not a piece of information people are familiar with, and so was frequently confused with the bus route numbers also displayed on the flag. There were also minor issues with punctuation and spacing in the text entered. The users less familiar with using SMS had trouble switching between letters and numbers or were unable to switch off predictive text mode. Also, there is a requirement at one stage in the process to remember instructions from a previous screen, which cannot be directly seen in compose mode of non-smartphones. This has the potential to make a solution such as BusM8 difficult to use if too many onscreen instructions must be remembered.

### MOBILE PHONE AS A DELIVERY MECHANISM

Using SMS to receive travel information was well perceived and the value of using text over calling was recognised. Participants were already familiar with doctors and dentists providing appointment information via text message, so this was not seen as anything out of the

ordinary. There were concerns about cost, which means the service would have to be provided at the standard SMS rate to not be seen as an added expense. There were also concerns that a subscription service that routinely provided texts about their journeys has the potential to become a nuisance, especially if messages were received at inappropriate times. Similarly, voice calling non-text users would also be annoying so is not a valid alternative to SMS for those unfamiliar/uncomfortable using SMS.

*EFFECTS OF REAL-TIME INFORMATION*
Participants welcomed the principle of receiving RTPI through their mobile phone. Accessing this via SMS was particularly useful as the participants would be able to plan other activities when not at the stop based on the information provided, such as continue shopping or going for a coffee. When waiting for a bus, it was seen as good way to find out if the bus is actually coming with the advantage of being able to adjust their plans accordingly. However, one participant was weary the bus could still be subject to further delay since the time they requested information.

*IMPACT OF RTPI ON EMOTION*
The participants said that the service has the potential to decrease the anxiety and agitation experienced when waiting for a bus to arrive. They felt it could also offer a sense of safety when using the bus in rural areas at night. However, they stressed that if the system does not reply instantly this could compound the feelings of frustration, as they would be waiting for a reply and for the bus.

## Conclusion
This paper has described a co-design activity exploring the use of SMS as a delivery mechanism for older adults seeking real-time passenger information. The results highlighted a set of important issues regarding the design of systems for use in this context. All the issues described related to the use of mobile phones for receiving RTPI have potential to impact the uptake and continued use of this, and similar services.

## Acknowledgements

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