

Chapter 13

Exploring Personal Mobile Phones and Digital Display Systems to Support Indoor Navigation by Formative Study Methods

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ABSTRACT

A significant difference exists between wayfinding support services available in outdoor and indoor locations. Users in outdoor locations can access services like Google Maps via a mobile phone and in-car GPS, which allows them to examine unknown locations before arrival as well as receive assistance en-route. In contrast, there is relatively little digital wayfinding support for users in indoor locations, where users are limited to using in-building signage or asking for directions. However, advances in pervasive digital technology allow new possibilities and make this topic increasingly subject to research study. This paper describes three separate formative studies involving 24 participants using personal mobile phones, a situated display deployment and a Person Locator Kiosk. The authors present their findings by gaining feedback and insights from users to develop useful and usable wayfinding support for visitors in an in-building environment.

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INTRODUCTION

Recent advances in wayfinding support technology have allowed users in outdoor locations to access several location-aware services such as Google Maps and Nokia Maps via a mobile device “on the go”. Similarly, users can access satellite navigation systems and view roadside digital signage whilst driving. Indoor locations, unlike outdoor environments, lack this form of digital wayfinding support and a user is generally limited to viewing in-building signage (e.g., see Figure 3a), on-the-wall maps and asking the receptionist for directions. However, advances in hand-held and pervasive digital display technology are changing the way users receive wayfinding support in indoor locations and are making this topic increasingly subject to study.

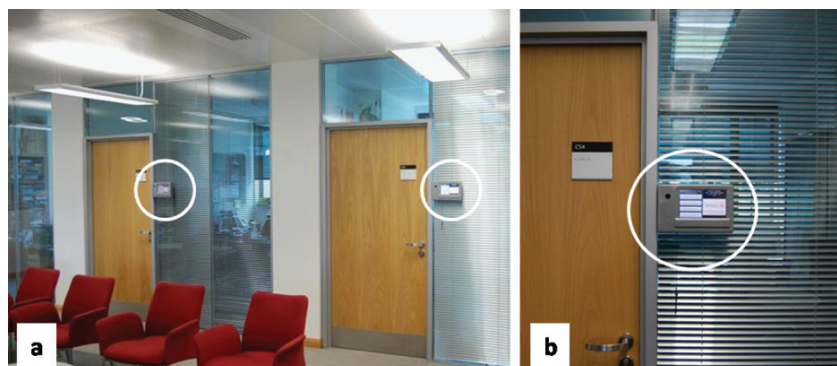
In this article we address this indoor navigation issue and describe our investigations toward the use of personal mobile phones and digital display systems in providing useful and usable wayfinding support to visitors of the Infolab21 building in Lancaster University. We describe the insights and findings gained from three formative studies with 24 users in total (see *Approach* and *Results* for details). The studies have involved the use of technologies such as personal mobile phones and an experimental set-up consisting of the Hermes2 digital display deployment (see Figure 1) and the Hermes2 Person Locator Kiosk (see *Experimental*

Set-up for details). Furthermore, the studies have involved wayfinding content such as digital 2D maps, 3D fly-throughs, graphical directional arrows and Hermes2 door display messages. *The Experimental Set-up* describes the wayfinding technology and content used in more detail.

The formative studies investigated user attitudes toward the use of 2D and 3D wayfinding content, whether users found it useful to download this content to a mobile phone to view along a route (similar to receiving support from an in-car GPS) and receive additional wayfinding support from the Hermes2 system. For instance, we explored whether users found it useful to view a graphical directional arrow on the Hermes2 door displays along their route and whether messages left by display owners (e.g., “Gone for lunch”) on their display were relevant and useful in providing wayfinding assistance to users. In addition, to further inform the development of wayfinding support, we interviewed the Infolab21 receptionist regarding her experiences in receiving and directing visitors within the building.

During the user studies, participants were able to view and download wayfinding content (i.e., the digital 2D map and 3D fly-through) by using the Hermes2 Person Locator graphical user interface presented on a touch screen display (as a Kiosk) at the start of their wayfinding task, which consisted of locating a lecturer’s office in the Computing Department from the foyer area

Figure 1. (a) The Hermes2 deployment environment (b) a typical Hermes2 digital display



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