Location Aware Multimedia Narratives

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DECLARATION

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DEDICATION

To my family and dear friends who have inspired me and sustained throughout these years.
Without your warmth this work would not have been accomplished.

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ABSTRACT

During the 1980s and the early 1990s, a considerable number of technology and application trends were concerned with location transparency and virtual spaces, overcoming the limitations of the physical space. Artists and technologists imagination was stimulated by the potential and the possibilities of Networked, Online, Virtual Reality (VR) technologies developed around ideas of connecting people and sharing information, beyond the restraints of their physical locations. Through the World Wide Web, information was made available to people regardless of their physical location. VR technologies and simulations were used to create immersive experiences for people to move around computer-generated spaces such as 3D museums or archaeological sites reproductions, making the real space were the people were actually based, transparent.

The last half of the 1990s and the first years of the succeeding decade has seen a different trend in technology: the development and popular uptake of mobile media and wireless networks technologies. Mobile technologies such as phones and handheld computers distinguish themselves from their predecessors by their ability to deliver and extract data from the physical space at different times and locations. The increasing popularity of these technologies brings to the foreground the importance of physical space. Real space combined with mobile, wireless, location-aware technology becomes a primary platform for mobile media applications. Because of the difference in the use of space between mobile technologies and their static predecessors, new design principles are defining the poetic and the potential for cultural and narrative augmentation of space. This thesis contributes to the exploration of mobile media identifying a specific kind of applications: Location Aware Multimedia Stories (LAMS) and outlining aesthetic principles and guidelines for mobile narrative production end evaluation.

Narrative is a structure of the human mind for organizing events in time and space. It goes back millennia and it has used different media across times and cultures. In contrast with stories delivered through linear media, such as books or films, often, in interactive narratives the story experience progresses through the readers' choices, and the immersive paradigm is disrupted. In fact, the moment in which a choice is made is also a moment, in which the

audience interrupts their suspension of disbelief and makes their choices as external observers. For those narrative experiences that require constant immersion as a necessary characteristic of the engagement of the reader with the interactive the story, the experience can be weakened by the switch between the *immersive state and the awareness of process*.
The approach to interactive narrative described in this thesis is intended to alleviate this problem. LAMS foster the audience's active engagement in the story by letting them physically explore the real space in order to progress the narrative experience. The audience's active exploration of the story world will provide them with a sense of agency without disrupting the immersive feeling. The resonance between the narrated events and the real place, created by overlapping the real world with the story space, reduces the dichotomy between immersive and interactive experiences.

Furthermore, beyond its architectural layout, a place is a complex space, made of colors, smells, temperature, sounds as well as history, personal and shared memories and anecdotes. The work described in the thesis is based on the idea that access to memories and stories relating to a place can be used to transform and complete our perception of it, enhancing the poetic potential of the place and enriching the experience of the person traversing it. The story's emotional impact is tied to the real place surrounding the viewer. The place is merged with the story in the audience's mind. Furthermore LAMS can also function as memories catalysts providing an incentive for people to retrieve memories and stories that relate to the place where the experience is set. To achieve this result, we identify and focus on a particular branch of locative media: Location-Aware Multimedia Stories (LAMS), where the place, its stories and the people that use the space are central to the investigation. The spatial distribution of the story in the relevant locations is considered a design element and expressive tool for the author. Two LAMS systems were produced and analysed to identify a set of guidelines for the design of LAMS. One system, the Hopstory narrative, investigates how buildings can be used as containers of stories. A multiple point of view narrative structure unfolds through the audience's exploration of an enclosed architectural space. The audience maintains engagement and immersion in the narrative through the exploration of the real space, merging it with the story experience. The other system, the Media Portrait of the Liberties (MPL), captures local community anecdotes and memories in the form of multimedia fragments and redistributes them through the real space of the neighbourhood.

Local residents and more transient visitors, roam the neighbourhood streets and access stories and memories of the place. A user study was specifically researched, designed and conducted to examine the audience reactions to the location-aware narrative. The study shows that, as a result of the experience, locals feel stimulated to recall anecdotes, engage in storytelling activity among themselves as well as with people not familiar with the area. People external to the local community, engage in a treasure hunt for stories through the physical exploration of the area and end up with a deeper awareness of space perceived as a place. The findings resulting from the detailed MPL evaluation are described in details in the discussion chapter. From the discussion, a set of design principles for authors of Location-Aware Multimedia Stories is distilled. These principles form the main contribution of this thesis to the field of Location-Aware Multimedia Stories.

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1 CHAPTER *INTRODUCTION*

1.1 Introduction

This thesis deals with the general area of location-aware multimedia applications. It stems from the idea of using space and place as design elements in the construction and production of audiovisual narrative artefacts. Fictional and real stories can be conceived, set and produced and subsequently embedded in the actual locations to which they relate. These narratives can be experienced by its audiences as they walk through the real space where the stories are set, through mobile digital technologies. Experiencing the stories in the locations they relate to strengthen the audience's immersion in the narrative and contributes to creating a sense of place in the audience's mind by adding history and atmosphere to the space. This chapter introduces the concept of Location-Aware Multimedia Stories (LAMS) as cinematically rendered stories that are related to specific locations and embedded in real space through location-aware mobile technologies. LAMS combine the mobility of the audience with spatial distribution of the story content, challenging the immersive paradigm in interactive multi-treaded narratives and creating a sense of place out of the surrounding space. The next section of this chapter positions LAMS within the broader area of Locative Media. Subsequently, the chapter considers the concepts of space and place and the ways in which LAMS can build on these concepts by being spatially distributed in the real world.

1.2 Introducing Locative Media

The term "Locative Media" refers to media applications that make use of mobile location tracking technologies to combine content with location. Mark Tuters, head of the "Networked publics" research group at the Annenberg Centre for Communication, University of Southern California, writes: "Locative media refers to a mobile media movement in which location and time are considered essential to the work" (Tuters 2005).

Researchers and artists in this domain have experimented with how the context in which the user is situated can be incorporated in the user experience. The term was coined at the Locative Media Workshop (RIXC 2003) organised by the Center for New Media Culture RIXC (RIXC) held in Latvia in 2003. The term was subsequently used by the Pervasive and

Locative Art Network (PLAN) consortium in 2004 (Steve Benford, Drew Hemment et al. 2004), to describe the shift that is taking place in digital media as mobile and portable technologies have become mainstream. Essentially, this shift relates to the fact that a users' context and their movements through space need to be taken into consideration and incorporated in the design process for a mobile system. Locative media encompasses a number of different fields and applications: from games to art projects and academic research. Authoring tools as well as games and narrative experiences are crafted to explore the potential of locative media as a platform for expression and communication. To map the territory of locative media in relation to this thesis, we distinguish between the following areas:

- Location-aware tour guides (Abowd 1997)
- Authoring tools for annotating space (Lane 2003)
- Location based games (Steve Benford and 2006), (Steve Benford and Nick Tandavanitj 2005)
- Location-aware narrative-driven projects (Pan 2001), (Teri 2005)

This last category is of particular relevance for this thesis. For this reason we subdivide it further in:

1) Mobile distributed narratives, which deliver a narrative experience to a mobile audience independently of where the story occurred or was initially conceived, produced and demonstrated (David Crow 2003)
2) Site-specific narrative experiences: narratives that tell stories of particular places through mobile technologies (Knowlton 2002), ([murmur] 2003-ongoing)

This latter type of narrative possesses a unique relationship to specific locations, and it is within this category that the work described in this thesis belongs.

1.2.1 From Space to Place: a Location-Aware Approach.

The difference between space and place is hard to define. It seems to us that while space holds more concrete and identifiable qualities, such as coordinates and position, the characteristics of place are more subtle. When we become familiar with a space it becomes a place in our minds. Dean and Miller (Dean Tacita 2005) highlight this fact in their catalogue *Place*. Scottish writer Samuel Smiles, who wrote about a "sense of place: something we rather feel than understand, an indistinct region of awareness." (Smiles 1859). Stories are one element that can transform spaces into places. As also note, Thomas Hardy also notes as he writes in the Woodlanders (Hardy 2005) to belong in a place is:

> To know all about those invisible ones of the days gone by, whose feet have traversed the fields. What bygone domestic dramas of love, jealousy, revenge or disappointment have been enacted in the cottages, the mansion, the street or on the green.

Location-aware applications, and Location-aware Multimedia Stories in particular, address the point raised by Hardy. They offer a way to present new information to people who do not know the space as well as to those who are familiar with the place, often surprising them with stories and anecdotes they were not aware of. Embedding meaningful content about a place in the related location transforms the perception of that place in many ways: it can make the space seem more familiar, or conversely, by presenting content that is at odds with a person's perceptions, it can lead to a process of de-familiarization. Smiles suggests that we all should maintain an active engagement with a place, rather than relying on feelings of familiarity about it. On a similar note, Proust argues that we should keep seeing a place, the same place, with new eyes (Proust 1981). Locative media in general, has the potential to highlight, to make us aware of, aspects of a place that we usually do not notice, that slip silently beneath our perceptual radar. LAMS, in particular have the potential to stimulate a new view of familiar places and hence to encourage a new kind of "sightseeing" among local residents, or to draw visitors from other areas of the locale as well as tourists to locations that they would not normally visit. Coupling stories with real locations gives the place the opportunity to

express its history and personality, and stimulates the audience by augmenting the perception of the space with stories, memories and a palpable atmosphere. Tourists as well as residents see the space from a broader point of view, which can challenge their preconceptions or lead them to form an entirely new vision of the space, transforming it into a familiar place. As Dean and Miller (Dean Tacita 2005) state:

> If a place is seen simply as a site, it is easily sacrificed for the national good, its necessities and the global market. If the 'secondary' qualities of the place are denied it becomes easier to destroy it. In a society that operates on a principle of economic utility, the benefits presented by developers, investors or corporations are easier to grasp than a more intangible sense of place, with its related notions of authenticity, character and identity.

Any place can be considered a process of historical and narrative interpretations, a continuous merging and superimposing of stories and locations. Combining location-aware applications and cinematic mobile stories together we have the opportunity to bring these "secondary and intangible qualities" of places to the foreground, allowing stories and spaces to enhance each other and offering a new way of experiencing the significant but intangible sense of a place.

1.2.2 The Potential of Stories in the Context of Places

The idea of "place" has always been a critical matter to human thought in various disciplines. Aristotele, in book IV of Physics, tells us that the question of what place is presents many difficulties, and that an examination of all the relevant facts seems to lead to different conclusions . Are space and place interchangable synonymous? Geographer Yu Fu Tuan remarked: " When space feels familiar to us, it has become a place" (Tuan 2001). Reflecting on the nature of place and how we construct it, has been the concern in almost every area of human activity from philosophy to geography. But this is hardly surprising — places, in the form of a conjunction of the space through which we move and the time that we spend there, are where we live. But these two dimensions (space and time) are woven together in a complex relationship. How can we phrase and contextualise such a complex and dynamic construct? Narrative is one way of achieving this.

Sequential, multi-branch, multiple point of view, non-linear story structures, all deal with content in terms of spatial and chronological organization. Furthermore, it is arguable that narrative, when viewed as a cognitive model, is a mechanism for making sense of human existence through time and space: a simplification and distillation of the enormous quantities of information that make up our world into more manageable, meaningful and understandable chunks. Furthermore, space and time have strong organizational properties: we naturally order things either chronologically, through calendars and history books, or spatially. Architectural forms have, in fact, served to structure knowledge since the time of the Greek philosophers, and philosophy is the discipline that eventually led to the mnemonic techniques developed during the Renaissance (Yates 1966). Moreover, Mark Meadows in his book on the Art of interactive narratives, reminds us that:

> Narrative and architecture have been woven together for millennia. Religious architecture contains processional passages that tell us about events that have passed or will come to pass (Meadows 2003)

Space is also a driving metaphor in digital technologies and interface design. The desktop metaphor is an example of how we think about the entirely haphazard virtual contents of a computer, and this metaphor can be summed up in one word: spatially. The spatial metaphor is also a helpful interpretative scenario in interactive textuality (Ryan 2001a)

> In this mapping, the text as a whole is a territory, the links are roads, the textual units, destinations, the reader is a traveller or navigator, clicking is a mode of transportation and the itinerary selected by the traveller is a story

Through mobile technologies we are able to take this metaphor further and challenge the sedentary paradigm by bringing information into the real world, merging the physical space with the digital. Unlike Virtual Reality (VR) technologies such as the CAVE Virtual Reality System[1] or Augmented Reality (AR) systems with head-mounted displays, portable devices

[1] The CAVE is a virtual reality environment with computer-generated stereoscopic images projected onto the three walls and floor of a room.

such as Personal Digital Assistants (PDAs) and smart phones do not try to mimic the real world; instead they let you inhabit it. They enable the coupling of audio-visual content with location in a different way: by allowing a person to experience virtual information and a real place simultaneously. With the recent and rapid developments in the area of mobile digital devices, the time is now ripe to use such devices to experiment with a new form of narrative experience: Location-Aware Multimedia Stories. The mobile wireless and eminently portable technologies available today provide new possibilities to creatively combine narrative with real locations.

In the narrative domain, there is a long tradition of technological development leading to new forms of story architecture and experience. From the ancient oral storytelling traditions, through the development of pictograms, alphabets and printed media, not to mention moving image technologies such as film and video, story authors can be seen to adopt and adapt technology to produce new types of narrative. With linear media technologies, such as most print and film, the author has the responsibility to order the content into a fixed time sequence. Viewers can choose to respect this or not (by arriving late at the cinema, switching off television, or jumping between the pages of a book), but are unable to fundamentally alter it. For these narrative forms, the order of the presentation of the material represents an important part of the process of authorship. However, this is not true of new, digitally mediated types of narrative. From hypertext to interactive films, recent technologies have encouraged a range of experiments that attempt to change the relationship between author, content and audience. When considering locative media narratives there is yet another element to take into account: the context, or place, in which a story can be experienced.

1.3 The Immersion Challenge

In an interactive narrative (where the reader or viewer makes choices that affect the progression of the story), the moment in which a choice is made is also a moment in which the audience must interrupt their suspension of disbelief, their involvement and immersion in the story, and make a choice as external observers of the story (Ryan 1999). In narratives where suspension of disbelief is required in order to enjoy the story fully, this phenomenon

disrupts the story experience and can cause frustration (Bizzocchi 2003). A starting point of the research being presented here has been how to alleviate this conflict.

However The definition of immersion as an outcome from mediated experiences can lead to confusion. Bizzocchi, in his essay on games and narratives (Bizzocchi 2007) states that the concept of immersion can have at least two distinct forms. These two distinct immersive states, "suspension of disbelief" and "flow", both emerging out of engaging with mediated experiences, are fundamentally different. "Suspension of disbelief" is the oldest from, best expressed by Coleridge as the willing surrender to the pleasure of the story (Coleridge, 1906, Ch. XIV). Flow on the other hand, as defined by Csikszentmihalty, is the immersion of active engagements with dynamic process (Csikszentmihalyi 1990)

Jim Bizzocchi in his paper *Ceremony of Innocence and the subversion of Interface: A case study in Interactive narrative (Bizzocchi 2003),* refers to a series of discussions among filmmakers (Bizzocchi 1994) on the creative possibilities emerging from interactive media. He reports that the filmmakers themselves, after playing with a number of story based CD Roms mentioned that they felt a basic contradiction between a state of narrative immersion, intended as the classic suspension of disbelief defined by Coleridge (Coleridge 1952, c1906) and the process of interaction. Bizzocchi later in the paper summarizes that eight years after the experiment took place, although interactive narrative craft has progressed considerably, the relationship between interaction and narrative immersion is still problematic. Later in the paper Bizzocchi continues:

> If we accept that the exercise of overt interaction has the capacity to disrupt some types of narrative experience, what are the implications? And in particular what are the implications for the creator of interactive narrative? Can we identify some strategies for interactive narrative design that help to suture any potential disjuncture?

Accepting the above implications Bizzocchi continues:

> There is a potential inconsistency between the experience of story and the process of interaction. Many interactive narratives ask the interactor to switch between an immersive state of immediacy and a hypermediated awareness of process. This

oscillation has the potential to disrupt the narrative experience.

Bizzocchi's wording of the above paragraph, and in particular the use of *potential* before *inconsistency and disruption* implies that the *inconsistency or disruption* does not occur for every reader or player and not in all the interactive narrative experiences. Only those narrative experiences that require constant immersion as a necessary characteristic in the engagement of the reader with the interactive work will be weakened by the switch between the *immersive state of immediacy and a hypermediated awareness of process*.

Stories available to their audiences only in specific locations of a real space require their audiences to physically explore the space in search of story fragments. This active exploration fosters the audience's engagement with the story and provides motivation for them to continue with the narrative experience. Furthermore, because of the synergy exerted on the narrative by being present in the real world, that is, in the very same places that appear in the story, the audience's feelings of immersion in the story world are strengthened. The key issue being addressed in this thesis is how we can bring stories outside. The immersion as well as the transformation of spaces into places are motivations of this thesis drawn from the theory of and the experience with interactive narratives. Chapter 2 of this thesis examines in further detail the problem of maintaining immersion in interactive narratives and the possibility of addressing interactive narrative's immersion issues through the use of space as a design element.

1.4 The Thesis

By addressing challenges pertaining to different disciplines, this research explores how LAMS can enhance spaces, transforming them into places: how to reduce the dichotomy between immersion and interaction, and how to stimulate, and eventually incorporate, audience feedback into the creative process of crafting interactive stories.

In the emerging genre of LAMS, many disciplines come together. The process involves various stages of authoring, capturing, designing and production. Not only must stories be researched, written and dramatically rendered, but they must also be translated into visual media and then produced. Furthermore, the interaction and interface that supports their

viewing must be carefully constructed. Through an interdisciplinary approach, two location-based story projects were implemented and analysed for the research presented here. This thesis focuses on the multiple processes involved, describes the design and production and discusses in detail two locative story systems: HopStory and the Media Portrait of the Liberties (MPL). Both of these systems were created taking into account the poetics of both narrative and place. Each project takes a different approach to LAMS.

The HopStory (Figure 1.1) investigates how buildings can be used as containers of stories. A multiple-point-of-view narrative unfolds through the audience's exploration of an enclosed architectural space. The audience maintains engagement and immersion in the narrative through the exploration of the real space, merging it with the story experience.

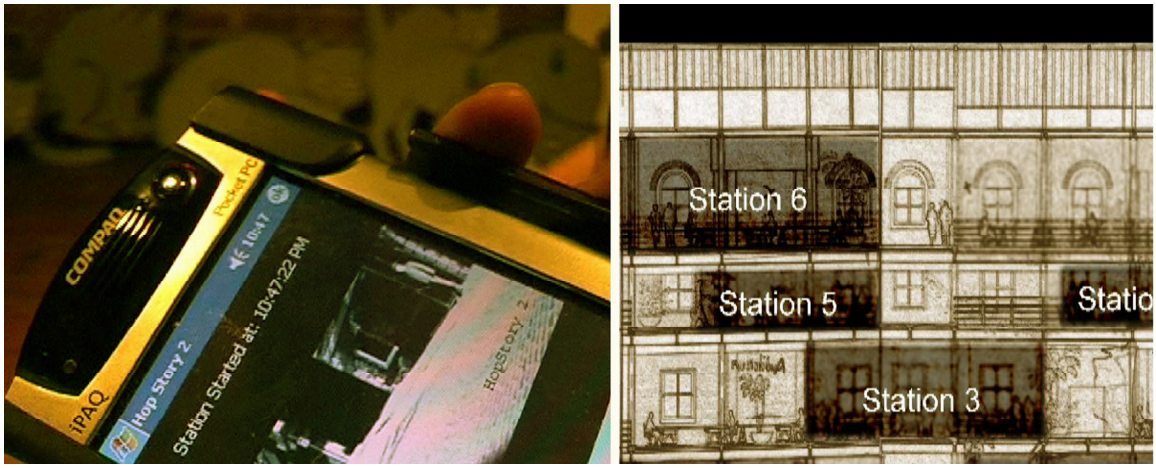

Figure 1.1 Hopstory II. Right side of the image: Hopstory II hardware consisting in a Bluetooth enabled PDA. To the left of the image: screenshot detail of the graphical interface representing the building where the story takes place and the position of the cat shaped Bluetooth stations where the story information can be retrieved.

The Media Portrait of the Liberties (MPL) (Figure1.2) captures local community anecdotes and memories in the form of multimedia fragments and embeds them in the real space of the neighbourhood of Dublin's Liberties. Local residents and transient visitors roam the neighbourhood streets and access stories and memories of the place using mobile location-aware devices. A user study was conducted to examine the audience reactions to the location-aware narrative experience. By capturing and reporting the audience members' reactions to these locative story systems, the current research uncovers valuable insights into the application of narrative in locative media systems. This practical, hands-on approach to locative narratives led to the development of guidelines and heuristics for their design and

production, and of a methodology for gauging audience reactions.

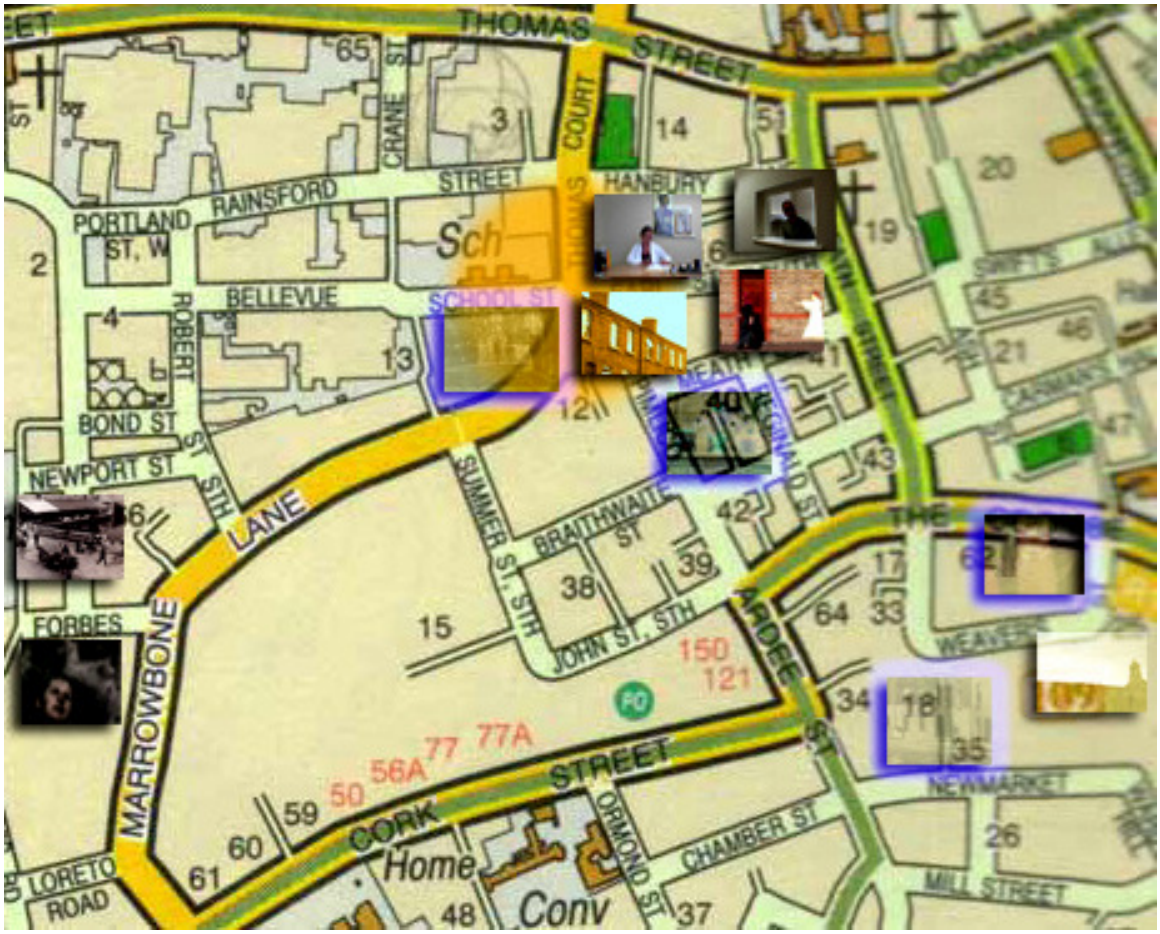

Figure 1.1 Early sketch for the Media Portrait of the Liberties graphical interface. Square icons representing different states of the available content are superimposed to a map of the area where the content is distributed. The icons are depicting a representative frame selected from the audiovisual story they stand for. Semi-transparent icons with a blue Halo represent stories yet to be seen by the viewer while fully colored ones have already been viewed.

1.5 Contributions

New media formats call for narrative architectures that take into consideration their flexible and dynamic capabilities, hence the necessity to design and tell stories in new ways, taking into account these new media characteristics. In doing so we have to pay particular attention to the immersive feeling generated by traditional narrative experiences and analyse how this feeling can be transposed to dynamically delivered content in interactive narratives. In order to achieve positive results in building interactive and immersive narrative experiences, we need to design stories that include the user choice as an aesthetic pleasure of an interactive narrative experience. We need to experiment, build and test interactive mobile story experiences, taking the audience feedback into account in the design practice. During the process of building and evaluating our LAMS systems we have uncovered insights on many aspects of locative media and narrative, from the design to production, to gauging and recording audience reactions. These insights can be summarised as follows:

1) An interdisciplinary approach to LAMS and in the concrete experience it contains in its descriptions of the design, production and evaluation of locative story systems identifies design guidelines for future locative stories systems set in urban environments. Through a detailed evaluation of one such system, MPL, we also make concrete suggestions regarding software and information architecture, and user-interface design, for location-aware story systems. In this way, this thesis provides an experiential handbook from which others can learn about real prototypes and audience reactions to them.

2) By embedding stories in physical space we challenge the immersive paradigm in interactive stories. The physical browsing of real space in order to progress the narrative experience alleviates the disruption of suspension of disbelief caused by the act of choice and enhances the sense of agency and participation in the story world. Furthermore we envisage LAMS functioning as place enhancers for it's audiences in general and memory and story catalyst for people already familiar with the place.

3) The development of the two location-aware cinematic stories is an aesthetic contribution to the interactive, distributed-narrative domain and a key element for determining our main contributions.

From these insights we derived our contributions to the field of locative media design, highlighting the potential of LAMS applications. The contributions distilled from these experiences involve:

- LAMS can help in *relieving the disruption of immersion* (suspension of disbelief) in narratives that request user interaction in order to be experienced. We alleviate the disruption of the immersive feeling in the interactive narrative experience by co-locating the viewer and the narrative experience in the same locale where the story took place, letting the viewer physically browse the real space in order to progress the story experience.

- LAMS can function as *place enhancers*; they enhance spaces, transforming them into places. Geographical co-ordinates and historical records do not give us the feeling of a place but instead provide information about the space. Annotating a space with its stories and anecdotes transforms the architectural and geographical space into a place.

- LAMS can provide incentives for the physical exploration of our urban landscapes, with particular emphasis on forgotten or disadvantaged neighbourhoods. Audiences composed of local residents as well as occasional visitors and tourists are enriched by the experience and are left with a changed perception of the space and of the place. People inhabiting the areas targeted by LAMS are stimulated in *recalling and revisiting memories and stories* of their place. As a consequence to this they develop a dialogue not only with the authors but also, and more importantly, among themselves and their own memories, stories and histories. Such initiatives, if adopted and sustained by communities, become growing repositories of local stories and culture, providing a new kind of forum for recalling and celebrating the past and reflecting on the present.

1.6 Thesis Roadmap

Having introduced the research topic of location-based stories this thesis continues with six further chapters. Chapter 2 describes the background on which this research is based, describing the field of interactive narrative and defining terms and paradigms. Chapter 3 presents a state-of-the-art review of LAMS. Chapters 4 and 5 describe in detail the two location-based story projects, the HopStory and the Media Portrait of the Liberties. Each of these chapters presents sections on the design and production of its respective project and on the reactions that each project engendered in its audience. Chapter 6 presents a detailed evaluation of the MPL project, which was designed to capture the reactions of members of a diverse audience to the work. Tourists, residents from the area in which the system was set, and visitors from other neighbourhoods were accompanied on tours of the Liberties area while experiencing the MPL system. The results of this process are catalogued and documented and, through qualitative methods, subsequently analysed. The findings from this evaluation are described in detail. Chapter 7 concludes with a reflection on location-based stories, generalizing the findings from the detailed study of the MPL project and pointing to directions for future work in location-based narratives.

2 CHAPTER *BACKGROUND*

2.1 Narrative, Interactivity and Immersion

The purpose of this chapter is to give sufficient background information in order to make the remainder of this thesis understandable. The chapter first provides an overview of narrative theory and the different methods for structuring narrative content. It then introduces the concept of interactivity and explains how it can be applied to narrative content. Next, it presents a discussion of immersion in both literary and interactive texts, introducing the incompatibility between interactive narrative and the feeling of immersion, a concept known in literary theory as *suspension of disbelief* (Ryan 1999). Finally, the chapter examines how stories related to and delivered in real space can enhance the feeling of immersion in interactive narrative experiences and how LAMS represent a promising field for experimentation and possibly for significant discoveries that will influence the future of storytelling.

2.2 Narrative and Structure

Narrative is a way for humans to make sense of their lives and position themselves in the world. Wallace argues that if the structures at the basis of fictional narrative are the same as those underlying history, biographies and the sense of the pattern of our lives, then narrative structures are how we rebuild what happens and what matters to us as humans into stories (Wallace 1986). In literary terms, narrative structure is referred to as *plot*, a term derived from Aristotle's poetics. Plot in Aristotelian terms, is a combination of temporal succession and causality, whereby events move from a stable point to complication to another equilibrium point. We can visualize it as an inverted V (Wallace 1986).

The Aristotelian model, however, is only one type of structure that exists in narrative. Other structures exist, for example, for poems, epic tales, collections of anecdotes regarding specific themes, traditional folktales and oral storytelling, where the narrated events do not necessarily follow a chronological (sequential), causal or a dramatic structure (Ryan 2001a).

Authors have been using classic narrative structures (deriving from the Aristotelian view of narrative) for thousands of years. By doing so, they have accumulated knowledge and practices in creating compelling and immersive narrative experiences within this framework. Since the advent of digital media and hypertext, authors have started experimenting with these technologies for narrative purposes. Following Ryan's classification, classical narrative structures have been adopted for interactive narrative purposes:

- The *sequential narrative* form (for example a diary or chronicle), is a list of events written down in chronological order. Its interactive correspondent is a hypertext system, in which each reading of the interlinked collection of *lexias* (the unit used to describe the smallest story fragment in hypertext) would generate a different sequence of life events for the same character.

- The *causal narrative*, or problem-solving scheme, is conceived retrospectively: the narrator links together events in a causal chain. In interactive systems, adventure games, for example, would usually adopt causal narrative structures. The player is assigned a task and she progresses towards her goal by solving a series of problems such as breaking free from a dungeon or overcoming a series of obstacles.

- In *dramatic narrative*, the author designs the path of the audience or readers through the sequence of events that compose the narrative. The need to steer the user towards a certain goal without revealing this purpose (in order not to spoil its effect) makes dramatic structure the fullest and most immersive form of narrative, and at the same time the most problematic for interactive design. I

Through the above classifications, Ryan shows us that we can indeed adapt the classical linear narrative structures derived from Aristotle's model to interactive stories (Ryan 2001a) . Ryan illustrates how the sequential model can be transformed in a multiple path sequence of events narrating a character's life from different perspectives, and she demonstrates that causal narrative structures lend themselves well to adventure games, for example. However, the flexibility of computational media in storing, arranging, retrieving and presenting content makes it possible to consider more elastic structures for narrative: structure that are non-

linear, or non-sequential, modular, multi-branching and inclusive of multiple points of view. A detailed discussion about the meaning of the terms linear, non-linear and non-sequential in relation to electronic texts is given by Aarseth (Aarseth 1997). An overview of the numerous possibilities of the electronic medium in structuring content is offered in the taxonomy of interactive structures, set out by Ryan (Ryan 2001a). She lists the different types of networked structures underlying interactive texts and describes how the story fragments (lexias) can be connected together to form particular kind of structures. She enumerates structures such as the graph, the vector and the flow chart and describes the different mechanisms for linking these structures: unidirectional, bi-directional and circular paths. She makes the following distinctions:

- The complete graph, where paths are bi-directional. All the story fragments or lexias are connected. The links can be used in both directions, to move from fragment A to B and from fragment B to A.

- The network, a hypertext style decision map allowing circuits. Lexias are linked to each other through decision points, where the reader can choose to follow one or another path through the story. Not all lexias are connected to each other, however, and only certain paths are possible. Circuits or circular paths are also possible with this structure, with the resulting possibility that the reader might end up on an already experienced lexia.

- The tree branching, where paths through the story resemble an inverse tree structure. Starting from the first option (root), the reader is progressively presented with story nodes and has to choose in which direction to progress the story (branches). All the paths are unidirectional, from top to bottom, and every traversal of the tree story structure produces a well-formed plot.

- The vector with side branches. The story has a main plot direction that follows the direction of the vector. From this main flow of events, some side paths lead to additional information that enriches the main story plot. The side-branches format

offers to the viewer the opportunity to explore side events that add to the main plot but do not fundamentally change it. All the side branches return to the main vector.

- The maze, or the adventure game structure. Viewers are challenged to explore a space that has the characteristics of a maze. They have to find their way through it and reach the exit.

- The directed network or flow chart. In a manner similar to that of the multi-branching structure, the flowchart allows the reader to progress through the story by choosing one path over another, in order to reach one or more conclusions. The links are unidirectional, but there can be circular paths that result in readers looping around the same lexias until they change their choices.

- The hidden story. This interactive story model consists of two layers. One is the set of events to be reconstructed, in a fixed, chronologically ordered sequence. The second layer consists of the network of choices presented to the reader in order to discover the facts of the story of the first layer. An interactive murder mystery, for example, or a computer game such as "Myst" (Myst website 2006) would make use of this structure.

- The braided plot: the house of many windows. Multiple storylines run in parallel. Each storyline offers different events and points of view of different characters on the same main story plot.

- The action space or epic wandering and story world. A story world is authored and the participant is free to explore it at the macro level. When the participant reaches a particular site of the story world, the system takes control and guides him or her into a self-contained adventure where the participant is manly a spectator of the events.

After outlining this classification, Ryan concludes that the potential of networks and non-linear structures to generate a well-formed story is inversely proportional to their degree of connectivity (Ryan 2001a). She also argues that even if the reader's path through the

narrative is rigorously controlled by limiting decision points in the text, storytelling is not the fundamental strength of the works based on these interactive structures (Ryan 2001a). Instead, the key strengths lie in focusing on the local level of small and self-contained lexias and the multimedia capabilities of the electronic medium, rather than its literary qualities. Systems of links create flexible, customisable experiences through a collection of semi-autonomous fragments, providing the satisfaction of an immediate experience of pictures, sounds and short video. This leaves the user free to roam the collection of fragments without feeling disrupted or constrained to retrieve the whole collection of lexias to complete the experience (Ryan 2001a). In this perspective, LAMS follow the shift of digital narrative towards smaller stories as opposed to grand narrative schemes. They provide their audience with instant gratification in the form of video and sound at the moment of interaction, and while physically navigating the story space. Increased enjoyment, or "magic moments" (Reid Josephine 2005), is elicited as the audience members recognise and merge the story they are experiencing through the digital medium with the real environment that they are traversing.

2.3 Digital Narratives and Interactivity

The Concise Oxford Dictionary defines:

Interact: (verb, intransitive) act reciprocally; act on each other.
Interaction: (noun) reciprocal action or influence.
Interactive: (adjective) 1. reciprocally active; acting upon or influencing each other. 2. (of a computer or other electronic device) allowing a two-way flow of information between it and a user, responding to the user's input. (Oxford Dictionary 1995)

A system is said to be interactive when the user's input modifies the system's output. Murray identifies interactivity and immersion as two key aesthetic elements of interactive narrative, and she derives these elements from the combinations of the four main characteristics of digital environments (Murray 1997). Murray argues that digital environments comprise the following qualities:

- Procedural: their behaviour is based on programming rules.

- Participatory: they request the user's participation in performing a task, for example clicking on an icon to open a document.
- Spatial: they arrange data in a spatial way. The user can therefore use a spatial metaphor to browse the content of the digital environment.
- Encyclopaedic: their capacity for storing information is superior to any other medium ever invented.

Thus, procedural and participatory characteristics of digital media give the user the feeling of interacting with the system, while immersion, or suspension of disbelief, is invoked by the encyclopaedic and spatial qualities of the digital medium. The feeling of immersion in a computer-mediated narrative is facilitated by the possibility of navigating a vast amount of information.

In the case of narratives distributed in real space, a great part of the interactivity resides in the physical navigation of the story structure. This action combines the sense of agency gained by exploring a real place with *selective interactivity* (Ryan 2001a) where the user is encouraged to choose which link (or path) to follow in order to progress the story experience. With this type of interactivity the audience input does not modify or influence the content itself, but selects the order in which it is presented (p. 205) Furthermore Brenda Laurel, points out that the sense of agency generated by the task of exploring a real space functions as a highly interactive element in the user experience (Laurel 1991). Laurel adds that there are other feelings besides the ability to change the course of events in a story that come into play in the experience of an interactive narrative work. One of the most significant of these is the feeling of being free to wander and explore a space. In addition, Laurel recognises that beside the quantitative measures of interactivity, such as frequency (how often the user can interact), range (how many choices are presented to the user), significance (how much the user input affects the system), there is another factor that contributes to the experience: the degree to which the users feel engaged and motivated to participate in the action. Successful orchestration of these variables helps in creating a feeling of participation or agency in the story and encourages sensory immersion. The coupling of kinesthetic input and visual response greatly contributes to the generation of a feeling of interactivity.

Successfully combining narrative and interactivity is a complex challenge for authors of interactive stories. Immersion is an important aspect of a narrative experience, but it is a difficult one to combine with interactivity (Ryan 2001a). Ryan, when analysing Virtual Reality (VR) systems, claims that: "For interactivity to be reconciled with immersion, narrative must be stripped of any self-reflective dimension" (p. 284). Self-reflexivity within a text occurs when the text requires the reader to participate actively in the construction of the story itself. Semiologist Roland Barthes describes this phenomenon in what he calls writerly as opposed to readerly texts. Translated from the French lisible and scriptible, the terms readerly and writerly distinguish between traditional literary works, such as the classical novel, and those twentieth century works that go against the conventions of realism. Writerly texts prompt the reader to produce a meaning that is other than that finalised by the author (Barthes 1977). The Electronic Labyrinth's web entry summarises Barthes opinion on readerly and writerly text as follows:

> Readerly texts locate the reader as the receiver of a fixed, pre-determined, reading. Barthes on the other hand sees writerly text usefully challenging traditional literary conventions such as the omniscient narrator through the method of self-reflexivity. For Barthes, the readerly text, disguises its status as a fiction, as a literary product, and presents itself as a transparent window onto 'reality'. The writerly text, however, self-consciously acknowledges its artifice by calling attention to the various rhetorical techniques, which produce the illusion of realism. In accord with his proclamation of The Death of the Author, Barthes insists, 'the goal of literary work (of literature as work) is to make the reader no longer a consumer, but a producer of the text' (Barthes 1977) (Keep 1995).

The participation of the reader as a producer of the text introduces distance from the story world and leads readers to consider literary procedures more closely (self-reflexivity of the text), which disrupts the immersive feeling. One way in which this disruption might be lessened is by making the navigation of the narrative database equivalent to walking from one physical place to another, a process which allows the viewer to remain inside the story world at all times.

2.4 The Immersion Challenge

The terms immersion and suspension of disbelief are often used interchangeably in the new media theory and discussions (Bizzocchi 2001). The origin of the term suspension of disbelief goes back to Coleridge's definition "willing suspension of disbelief" in relation to the reader of a fiction. "Such a reader knows that the world displayed by the text is virtual, a product of the author's imagination, but he pretends that it is an independently existing reality serving as a referent to the narrator's declarations." (Ryan 1999). In this thesis we are going to use the two terms immersion and suspension of disbelief interchangeably.

Immersion is desirable for any narrative form. In interactive narrative, the question is whether interactivity can be reconciled with immersion (Ryan 2001a). To explore this issue, we begin by describing the three types of immersion that characterise narrative experience (Ryan 2001a).

1. Emotional immersion or response to the characters. The reader empathises with the characters of the story and feels hope and fear for their lives and dramas. At the end of the story, the audience members have experienced emotions generated by following the characters through the events of the story—a potentially cathartic experience.

2. Spatial immersion or response to the settings. While reading the text, the reader creates in her/his mind a space or a world where the story unfolds. This story world, if well constructed, is the location where the viewer is situated while experiencing the story.

3. Temporal immersion or response to the plot. The plot is the succession of events that carry the reader along the highs and lows of tension in the story, through the climax and to the final conclusion of the story.

In contrast with stories delivered through linear media, such as books or films, the immersive feeling is often disrupted in interactive narratives where the story experience progresses through the readers' choices. In fact, the moment in which a choice is made is also a moment

in which the audience must interrupt its immersion or suspension of disbelief and make its choices as external observers. As both Ryan and Bizzocchi agree, by its very nature, this requirement disrupts the story experience and can cause frustration (Ryan 2001a), (Bizzocchi 2001). The approach to interactive narrative presented in this thesis is intended to alleviate this problem.

2.5 LAMS: A Practical Approach to the Immersive Challenge

A way to reconcile interactivity and immersion is "to turn language into a dramatic performance, into expression of bodily mode of being in the world" (Ryan 1999). While Ryan's theoretical view is based on the use of VR systems, it can also be applied to LAMS. In LAMS, the act of exploring the real space coincides with full physical participation in the system without the need for head-mounted displays and data gloves. In this way, LAMS eschew text, instead using locations in the world as means to navigate the story. This approach avoids the self-reflectivity of the text and the corresponding inhibition of immersion in the narrative. LAMS foster the audience's active engagement with the story by letting them physically explore the real space in order to progress the narrative experience. As opposed to the dark cinema theatre, or the enclosed fixed space where the audience watches television programs, mobile digital technologies offer the possibility of presenting audio-visual content in real spaces that function as the settings for the story. Mobile technologies can take the story experience out into real space, thus providing an opportunity to address the immersion problem in interactive narratives by overlapping the story experience with the exploration of a real space. Matching the film set of the story with the place where the audience is standing stimulates curiosity and agency in the viewers and prompts them to physically explore and get to know a real location. Choices in the narrative are made by physically moving within the story world, as would happen in a VR system, but without the cumbersome head-mounted display and with the advantage of having all the senses involved in the experience, sense of smell included.

The fact that the story is both set and experienced in the place where it actually occurred is intended to generate a resonance in the viewers between the story that is being told and the real place that they are traversing. This resonance encompasses the past, when the story is set,

and the present realities of the actual place, and the resonance can be strengthened if the narrative includes the anecdotes that relate to the place and the audience's own memories. The fact that audiences can compare the real space in which they are standing to the space featured in the visual representation of the story, strengthens the spatial immersion described by Ryan as a response to the setting (see section 2.3 above). Or, to express this more simply: the co-location of narrative and real space makes the audience feel more immersed in the story world. Furthermore, Ryan argues that spatial-temporal immersion in a story takes place when the distance between the position of the narrator and his/her audience, and the time and place of the narrated events are reduced to near zero (Ryan 2001a). By placing the story fragments in the location where the events they describe actually happened, and by allowing the audience to experience them there, we intend to reduce that distance and so increase spatial-temporal immersion.

The physical navigation of the story is intended to alleviate the disruption of immersion by making the audience's choices blend in with their physical actions. Physically walking to the locations of different stories brings the audience through the real world where the stories once occurred, without asking them to interrupt their immersion experience; instead they can just walk right through it.

With LAMS, we suggest the use of the audience's body and its physical presence in the space to freely explore, to choose which direction to follow and to decide how long to spend in the story experience. We suggest these as enabling factors towards a reconciliation of immersion and interactivity.

2.6 Conclusions: Location-Based Narratives

As writers and film-makers move towards digital formats and alternative story structures, the audience becomes more active in the story exploration. The boundaries between stories, games and films, broadcast and archived media are weakening. To be able to understand these new structures and genres we have to look beyond the formats inherited from traditional media and let the new forms emerge through experimentation. Drawing from narrative theory, interactivity and immersion, this thesis challenges and experiments with new media

formats for stories, in an attempt to push them away from traditional linear structures towards mobile, distributed, location-based formats. Ryan states:

> So far, most of the emphasis about digital narrative has been theoretical rather than practical. Most people read George Landow before experiencing a hypertext. And metaphors and narrative concepts have been formulated to advertise future products like the myths of the hypertext as an infinite story generator and of the Holodeck as VR environment to re-live stories. (Ryan 2001b).

This thesis concurs with this statement, and extends it with the perception that there is a need to experiment and develop practice in parallel with theory, and to produce examples of work that incarnate the theoretical investigation. Such work has the potential not only to validate the theory, but also to advance it through the contribution of valuable, experientially grounded insights. The research described in this thesis was carried out with this objective in mind.

2.7 Summary

In this chapter, we have presented an overview of narrative structures in traditional and digital media. We have defined the term *interactivity* and explained how it applies to narrative, the structures that it requires and the problems that arise when we challenge traditional narrative structures through the addition of interactivity. One of the biggest challenges that arises with interactive narratives is the disruption of immersion that occurs at the moment when a viewer makes a choice relating to the progression of a story. To overcome this problem, interactive narrative needs new ways to develop and organise its content. By rejecting the Aristotelian classical narrative structures, interactive narratives can embrace new forms of stories enabled by the digital media. LAMS constitute a new story form that reflects the shift of narrative forms from traditional to more flexible and customisable structures. Through placing stories in real places and letting the audience merge the story experience with the real setting of the story by navigating the actual location, this thesis contends that it is possible to alleviate the disruption of immersion (or suspension of disbelief) in the interactive narrative experience.

3 CHAPTER *STATE OF THE ART*

3.1 Introduction

The field of locative media spans many types of installations, projects, applications and performance pieces. This chapter presents a review of the state of the art in location-based narrative projects that make use of site-specific story content, spatialised or distributed in urban spaces, and accessed through mobile devices. By *site-specific*, we refer to content that relates to specific, real locations: stories that possess a unique relationship to a particular site because the content or characters are intrinsically connected to that place. Site-specific stories cannot easily be moved to other sites without major changes. By *mobile* we refer to the fact that the audience is experiencing the media content while on the move. Finally, the *distributed* or *spatialised* quality indicates that the content is available in fragments distributed in physical space, making progression of the narrative experience dependent on exploration of the real space. This chapter first draws a map of the field of locative media in order to position LAMS within it and subsequently reviews a selected range of other locative media projects that best demonstrate the state of the art.

3.2 Selection Criteria

The following section presents descriptions and critiques of projects that have been influential in the design and production of LAMS. While a considerable body of work in the general area of locative media applications exists, the scope of this review has been restricted to the particular sub-set of locative media applications that are directly relevant to the topic of the thesis: author-mediated, site-specific, urban narratives for a mobile audience. Mobile games, digital tour guides, mobile-authoring and space-annotating tools are examples of locative media applications that fall outside the focus of this review because they do not consider the narrative conventions that apply to mobile stories. It has been widely noted that such conventions and dramatic tools (for instance, cinematic language or use of dramatic story arc, where the author conducts the audience through a narrative climax and resolution without revealing its end goal (Ryan 2001a)) do not apply to mobile games (Aarseth 1997; Juul 2001), digital tour guides (Brown 2003) and mobile-authoring and space-annotating

tools (Proboscis 2005) to the same extent as they apply to mobile narratives. In particular, we have selected narrative projects developed for urban spaces in contrast to those developed for wilder, rural areas. An urban space presents radically different characteristics from a rural space. Their architectural styles, population densities and landscape, all differ substantially. Since all locative media take into account the physical space as a design element, the kind of space considered exerts a powerful effect on the characteristics of a locative media application. For example, urban settings, such as in European capital cities, are generally quite populated and the application can rely on networks of people who will inhabit the same neighbourhood and use it as a socially networked structure to link the story contents. In a rural setting, on the other hand, the population can be sparser. Locative applications for rural areas can instead make use of countryside features, such as the trails left by animals, to structure their content. We can then argue that rural and urban settings offer very divergent design and content possibilities and are in fact suitable for very different types of locative media applications. Within the domain of mobile narratives for urban spaces, we have chosen to review both academic research and art projects, bearing in mind that these two disciplines possess different characteristics and aim at different goals. Academic research aims to progress the state of the art and disseminate findings through peer-reviewed documentation. Although exploratory in nature, art projects tend to challenge culture and beliefs in a less scientific way, through adopting aesthetic and political standpoints, provoking their audiences rather than measuring findings and reporting results. However, we believe that both types of project contribute to the design and development of LAMS applications. The selected projects for this review include the audio-based art projects of a number of Canadian artists: Janet Cardiff, Teri Rueb and the [murmur] art collective, and the academic research of Pengkai Pan and the Mobile Bristol team. We also review Jeremy Hight *et al.*'s *34 North, 118 West* project, as an early example of a GPS-driven narrative application, which dramatises and re-enacts stories of a neighbourhood and makes them available to the public through location-aware technology. Finally, we review the Rimini Protokoll's art project, Call Cutta, as a successful site-specific narrative, combining stories, improvisation and digital mobile media technologies.

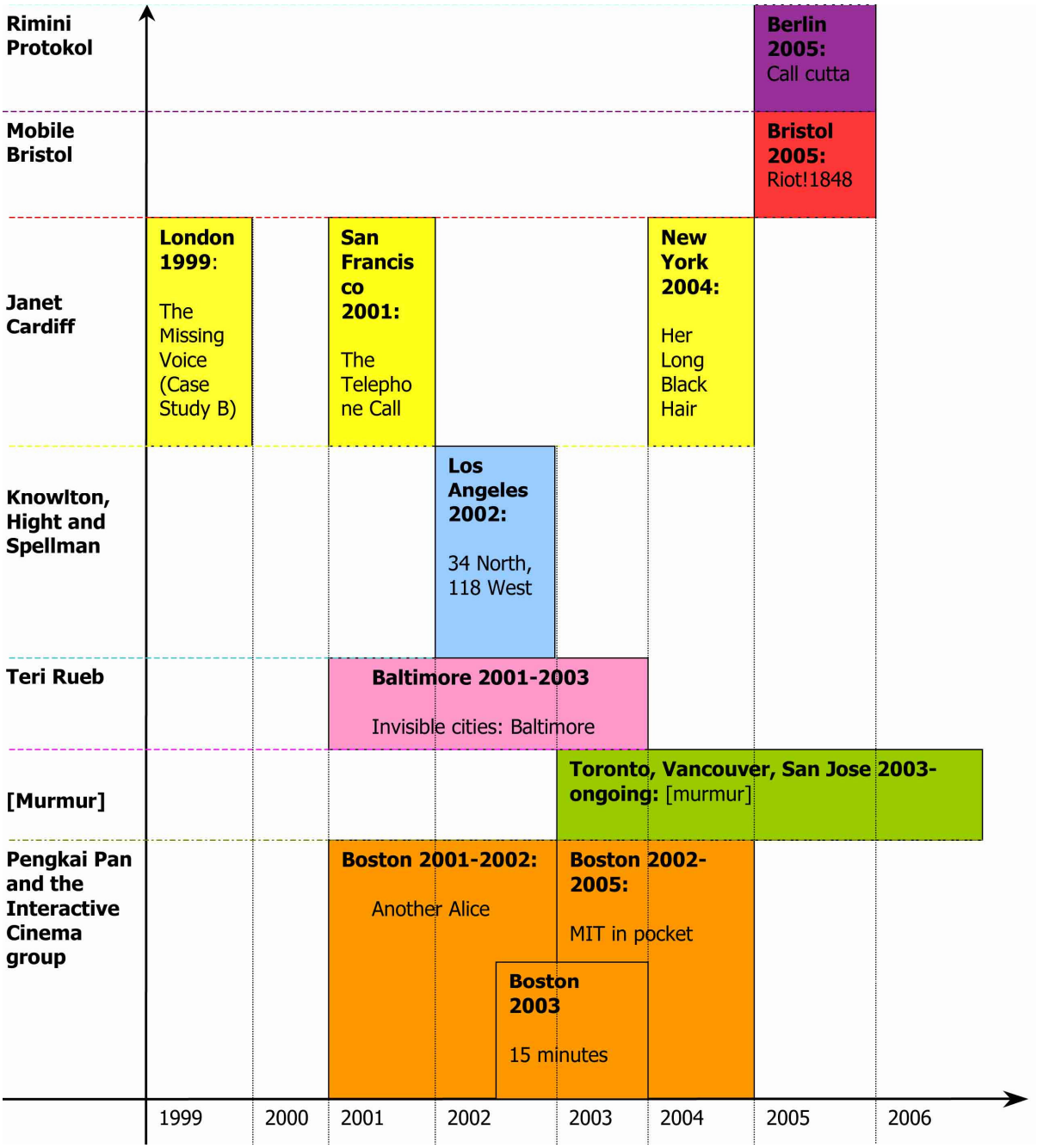

Figure 3.1 Projects reviewed in the state of the art chapter grouped by authors and in chronological

3.3 Review Strategy

In the following sections of this chapter, the projects reviewed are grouped by author. For each author we discuss their rationale and research questions and then list the relevant projects chronologically, examining them in detail. Where possible, we give first-hand accounts of the projects, but in some cases we will have to depend on other sources, such as critics or the artists themselves describing their own projects. The review of each project consists of a general description and analysis that focuses on issues that are pertinent to the design and the development of LAMS. From the analysis of these issues, insights are gained on how other artists and researchers have dealt with the issues that we encountered while designing and producing LAMS. The points analysed for each project are the following:

1. The technological approach. We examine the technology used to implement the project, the interaction and interface design.

2. The narrative approach. We consider the lack or use of narrative conventions in mobile distributed narratives and we examine what types of narrative conventions, language and structures are used.

3. The locative approach. We present how space is used in each project, whether the content is site-specific and if it eventually transforms the space into a place.

4. The immersive approach. We discuss whether the project results in an immersive experience and if so what tools and techniques are used to achieve this.

5. Evaluation. We consider if the project has been evaluated and if so how the evaluation took place.

Furthermore, at the end of each project review, we provide a perspective section in which we identify and list the project's weaknesses and strengths.

3.4 Janet Cardiff's Audio and Video Walks

Canadian artist Janet Cardiff has worked in a variety of media, from video installations to interactive audio-visual works. Her audio and video walks in particular, often scripted and recorded in collaboration with Georges Bures Miller, have gained her international recognition. Cardiff's walks are site-specific projects in which the audience follows the artist's directions through a site by listening to a pre recorded CD-ROM or video tape:

> Visitors, while listening to a portable CD player or watching the screen of a camcorder, follow her directions through a chosen site, and become participants in her stories […] Voices, footsteps, music, sounds of cars and gunshots make up a fictional soundtrack to an actual walk through real indoor and outdoor spaces. (Fleming 2006)

By means of her narration, ambient sounds and effects recorded in a "binaural technique"**,** Cardiff binds fiction and reality together, affecting the participants' state of mind and creating cohesive experiences of space, place and narrative. The binaural technique consists of two microphones positioned at 180 degrees to each other recording three-dimensional sounds. When played back, these sounds create a mysterious uncertainty between the "fiction" and the "reality" of the narrative experience. The artist asks visitors to walk with her, to match her footsteps and merge their thoughts with hers. The participant listens as Cardiff reinvents a place, creating virtual spaces anchored in reality. Fictional characters tell the audience about particular events that happened in the exact places where the audience is situated, taking participants to a crossroads between fiction and reality. Her walks take place in gardens (*Her Long Black Hair,* 2004), over a few city blocks (*The Missing Voice (Case Study B),* 1999), or in museums (*The Telephone Call,* 2001) and involve one participant at the time.

We have selected three of Cardiff's main walks that best illustrate her location-based narrative work. *The Missing Voice (Case Study B)* is her first internationally known audio walk. *The Telephone Call* is an example of Cardiff's use of video in her site-specific walk projects. *Her Long Black Hair* is her latest audio walk, in which Cardiff makes very effective use of visual language through still photographs.

3.4.1 The Missing Voice (Case Study B) (1999)

The Missing Voice (Case Study B) was commission by the London art gallery Artangel and developed over a period of two years. The project was exhibited at the Artangel gallery in June 1999. The audio walk, scripted to suite a specific location in East London, takes the listener on a physical and psychological journey around the Whitechapel area. Making use of film noir and thriller narrative conventions, the audio walk combines perspectives on everyday surroundings with narrative flashbacks. The walk starts with the narrator telling the audience to leave the Whitechapel art gallery, to enter the nearby public library and go to the crime section. Footsteps, noises and voices fill the sonic space. The narrator starts to talk to the participant in a dramatic and mysterious tone, ordering him or her: "There's a man signing out a book right now. I'm going to follow him. Put the book back to where you found it. Let's go. You are in the Whitechapel Library". The narrative arc of *The Missing Voice (Case Study B)* reaches a resolution in Commercial Street, near Liverpool Street, reliving the dramatic tension created during the tour. The walk lasts 40 minutes, during which the participant is absorbed in the 18th-century atmosphere of the streets and histories of London's East End and in the memories and paranoia of a stranger, interpreted and represented by the artist herself.

3.4.2 The Telephone Call (2001)

In August 2006 I experienced Cardiff's video walk *The Telephone Call* at the San Francisco Museum of Modern Art (SFMOMA). When a participant arrives at the museum, a video camera is available at the desk. Members of the audience are asked to position themselves in front of the souvenir shop and start to play the pre-recorded tape. Cardiff's voice tells the participant where to point the camera. The video played back in the camera shows footage of the location taken at some point in the past. The result is an immediate comparison between the space as it is in the present and as it was when it was filmed. Then Cardiff tells the participant to move on. The audience continuously watches and compares the video in the camera's small screen with the surrounding space. Cardiff reassures the viewer not to be scared by the fact that the people that feature on the tape are not present anymore. She weaves stories of past visitors into the present of the walk. As the audience moves through the space, the voice of the author points out architectural features, paintings and people

moving through the museum space as it is shown in the tape. The effect is a complete distortion of time and place. The space is the same, but there is a continuous question regarding what is present and what is past. On one occasion the audience is taken out of a back exit of one the museum floors, onto the emergency stairs. The participant hears someone's steps, but no one is there, it is a product of the fiction that Cardiff has weaved into the narrative. The result is a complete immersion in the fictional world that the artist has created, but with a sense of alertness to the real world. The viewer is no longer sure of what is real and what is not. At one point, Cardiff tells the participant to point the camera in a specific direction down the main stairs of the museum. The viewer can see in the screen two people talking to each other. Cardiff tells the viewer about their conversation as the camera zooms in on to them. The participant has the feeling of spying, eavesdropping on these people's private moment. Cardiff narrates and mimics their dialogues. The result is that the participant thinks he or she knows the topics of discussion and believes Cardiff's commentaries on the speakers' conversation. The participant is then taken all the way up to the museum's top floor. A woman is shown on the videotape singing on one of the walkways. She is not there while the audience is, but the recorded audio and video powerfully overlap with the present in the viewer's mind. The experience ends as Cardiff takes the participant to a window in the top floor of the museum. She requests that the camera is pointed outside, towards the hills on the horizon of San Francisco. The video zooms in on the hills. The narrator tells participants to imagine that they are there. Viewers feel pulled outside the museum, into the hills: the two spaces, the interior of the museum and the hills outside merge in the present. The participants experience a magic moment of being transported outside, travelling through space at the speed of light, so that they feel like they are outdoors in the open air of the San Francisco hills.

3.4.3 Her Long Black Hair (2004)

The third of Cardiff's projects that we examine, *Her Long Black Hair,* is a 35-minute journey that begins at Central Park South in New York and transforms a stroll in the park into a psychological and physical journey. Cardiff takes each listener through Central Park's 19th-century pathways, retracing the footsteps of an enigmatic dark-haired woman. Each person receives an audio kit that contains a CD player with headphones as well as a packet of photographs. As Cardiff's voice guides listeners through the park, the participant is occasionally prompted to pull out and view one of the photographs. Each time, the picture portrays a black-haired woman standing in the same spot as the audience. These images link the speaker and the listener within their shared physical surroundings of Central Park. Through the use of narrative style, *Her Long Black Hair* investigates the links between location, time, sound and physicality, The story is told in the first person and continuously refers to the space surrounding the viewer, challenging the participant to shift between the present and the past: the narrative space shown in the story and the current space of the present, immediate surroundings. According to Cardiff, her objective was "Interweaving stream-of-consciousness observations with fact, fiction, local history, and other atmospheric and cultural elements." (Cardiff 2004)

Figure 3.2 Image illustrating the use of photographs in Janet Cardiff project: Her Long Black Hair. Picture retrieved from the Artcritical.com website

3.4.4 Analysis of Cardiff's Walks

3.4.4.1 Technological Approach

These three projects do not make use of location-aware technologies but achieve a strong site-specific result through the use of mobile devices that can play back Cardiff's narratives. By following the pre-recorded instructions of the narrator through devices such as a CD player or a video camera used in playback mode, the audience is able to combine the surrounding space with specific audio and visual media content. Since the medium used is linear—a pre-recorded CD or videotape—interaction occurs by following Cardiff's instructions to navigate through the real space. The interfaces are the playback devices used by the audience to listen to the narrative—CD players or video cameras.

3.4.4.2 Narrative Approach

Cardiff makes use of narrative conventions to dramatise her fictions. Her narrative style references literary and cinematic genres, such as stream of consciousness novels and film noir. Although most of her walks are audio-based, the language the artist uses in her walks evokes the language of cinema. She directs the participant through the space, moving him or her like a camera; the participant's eyes are the lenses through which the narrative is constructed. The participants are literally inside the film screen shot. Vicktoria Ludwin describes *Her Long Black Hair* as follows: "Despite the fact that Cardiff provides the audio and a few snapshots, the overall effect she invokes is filmic, our eyes become the camera" (Ludwin 2004). Her characters tell the audience about themselves, their fears and desires in the first person. The tone of the narrative is dreamy, evocative, often mysterious. At times these characters address the audience directly by ordering them with imperatives such as "follow me" or "let's leave this place" that have the effect of pulling the audience right into the story. Furthermore, Cardiff also borrows and mixes styles from urban guides and historical archives creating multilayered experiences where the audience moves from following a character stream of consciousness to the archives of a library, such as in *The Missing Voice (case study B)* project.

The narrative structure used by Cardiff is linear. It can only be listened to in the order recorded by the author, as the devices used (CD Players and video cameras) play back content in a linear way. However, "Every person has a different experience depending on what happens to them and their state of mind" (Fleming 2006) while experiencing the narrative constructed by the artist.

3.4.4.3 Locative Approach

In an interview with Cardiff, Canadian film director Atom Egoyan describes her situated installations as the outgrowth of film and television screens, taking dramatic narratives out into streets and gardens (Egoyan 2002). Cardiff's characters occupy physical space. Cardiff, replying to Egoyan, affirms that she does push the narrative format, she wants to create immersive experiences where the audience can feel inside the film, having the physical world as constantly changing visuals around them. Cardiff's artefacts do support a strong feeling of immersion through the use of space. The relationship between the surrounding space and Cardiff's fictions links past to present, connecting fantasies to desires and knitting together space and story to generate strongly immersive experiences. Pan describes these experiences in his thesis (Pan 2004): "Her creative art works confirmed that the explicit and continuous spatial connection between the real and the virtual (spaces) is able to effectively engage the audience." Furthermore, in Cardiff's work, the narrated space influences the real space generating curiosity and novelty even in people who are familiar with the installation sites: "One of the delights to see New York in the movies is to see how someone takes the landscape we see everyday and transforms into something new and different." (Ludwin 2004).

3.4.4.4 Immersion Approach

Janet Cardiff's walks engage their audience in a narrative that moves through time and space. The result is an immersive experience created with audio recordings and dramatic narration. At times, the feeling of immersion generated by the use of narrative conventions is very strong. At other times, the dramatic and fictional tools used are very obvious and make the viewer conscious of the artist's manipulation of reality. The audience continuously moves between fiction and reality but always maintains engagement with the narrative experience.

Cardiff's imperatives to lead the participant through an exploration of the space— "Turn right", "Down the steps", "Follow me"—engage the participants and pull them into story, effectively integrating the map of the space with the captured memory of the place and the current thoughts of the audience. This cohesion results in a strong immersive feeling.

3.4.4.5 Evaluation

Cardiff's work has not been formally evaluated. As Pan notes in his thesis dissertation (Pan 2004), although Cardiff's work contributes to the field of digital media as a media art project through the aesthetic and immersive value of her work, it does not build up a formal platform on which further academic research can easily be based.

3.4.4.6 Perspective

Despite the lack of formal evaluation of Cardiff's work, it does represent a substantial contribution to the field of locative media. By analysing Cardiff's walks we have extracted a number of techniques that successfully engage the audience in her installations and enhance the immersive experience in her narratives.

- Cardiff's use of narrative conventions, such as relying on a first person narrator and protagonist to tell the audience what to do, is a very effective means of drawing the audience into the experience. The character addresses the participants by directly ordering them to perform certain actions. The users feel compelled to obey the "orders", and by doing so they have to suspend their disbelief and live the story from the inside, as if they were characters themselves. The reference to the same space at different times, the present when the installation is experienced, and the past when the narrated events took place, is also an effective way to shape perceptions of the space. This technique creates a complex experience in the audience's mind. The participant merges the past and present space together with his or her memories and thoughts, creating something new and unique.

- The use of real footsteps, that Cardiff asks the viewer to match, also works as an immersive technique. Cardiff records her footsteps and other background noises as

she walks over the same paths that she asks the audience to follow. She invites the audience members to match the noise made by her footsteps as she recorded her walk. She asks the participants to follow her not only by telling them where to turn left, right, up or down but also as she walks over various surfaces—cement, grass, a stone walkway, a wood-chip path—leading them through the site and helping them to navigate the story. The sounds of these textured surfaces dramatise the interrelationship between the inner and outer self and also make apparent physical and mental actions. The "binaural" technique used to record Cardiff's audio creates a feeling of total immersion in the recreated soundscapes.

- Another immersive technique is the ability to create a resonance between the narrative and the real place. A sense of wonder arises in the audience when sounds or events recorded on the CD echo the real space. Cardiff carefully scripts her narratives so the events in the story reflect what happens in the real space. These moments are powerful sources of immersion because they overlap the story world with the real one. Similar moments are also identified by the Mobile Bristol research team in the evaluation of their interactive audio play *Riot! 1831* and are referred to as "Magic Moments". (Reid 2005)

- A successful immersive technique used by Cardiff is the binding of the narrated events with the participant's experience. For example, such a binding happens in *Her Long Black Hair* when the audience members are asked to pull out a photograph from the packet they have been given at the beginning of the walk and hold it against the surrounding landscape. The picture portrays a black haired woman standing in the same spot as the audience member. Matching the photo with the real space surrounding the audience diminishes the distance between the fictional and real worlds.

We have engaged with and learned from Cardiff's works both by directly experiencing her pieces and by reading about her projects. We have extracted the key aesthetic and immersive qualities of her work and considered how they might be reproduced in a research context.

3.5 Jeremy Hight, Jeff Knowlton and Naomi Spellman Narrative Archaeology

3.5.1 34 North 118 West (2002)

In their project *34 North 118 West,* Jeffrey Knowlton, Naomi Spellman, and Jeremy Hight have users take Tablet PCs with Global Positioning Devices and headphones to a vacant lot in downtown Los Angeles adjacent to an old railroad depot which is now used as an architecture school. The laptop displays a map of the area with a cursor indicating the user's position. As participants walk around the site, they hear fictional statements recounting the history of the place. The stories embedded in the city are based on recollections of the past in the form of audio fragments, narrated and interpreted by actors. The project website hosts this description:

> The setting is the Freight Depot in downtown Los Angeles. At the turn of the century, railroads were synonymous with power, speed and modernization. Telegraphs and railroads were our first cross-country infrastructures, preceding the Internet. From the history and myth of the railroad to the present day, sounds and voices drift in and out as you walk. (Knowlton 2002)

The aim of the project is to create the sense of a space inhabited by the old characters that used to live in those places and to tell the stories that happened in that location. In his article "Narrative Archaeology", Jeremy Hight explains:

> Similarly, in adopting the mapping-while-wandering tactics of the dérive[2] tracing-based locative media suggest that we can re-embody ourselves in the world, thereby escaping the prevailing sense that our experience of place is disappearing in late capitalist society. (Hight 2002)

Furthermore, Marc Tuters, research fellow at the University of Southern California's Annenberg Centre in Los Angeles, describes the project as:

[2] Dérive [literally: "drifting"] is a technique of rapid passage through places invented by the Situationist movement Debord, G.-E. (1958). "Theory of the Dérive." Internationale Situationniste **2**..

> The investigation of marginal areas of the city and abandoned industrial zones in which layers of time and story are unveiled to the wandering user. As the audience walks around the GPS triggers audio fragments resulting in a dynamic fictional experience that follows the user's unique path. (Tuters 2006)

Some examples of such audio narratives fragments are documented as transcripts on the project website (Hight 2002). We report on one of them to give a feel of the text and the stories used in the project.

> 35 years I cleared the tracks. Those men, along the rails, tired. Death by train we called it. They waited and wandered. Hoped....for the sound that comes too late To take them from this life. It was my job to assist.....to help.....kind words.....or help clear the tracks after the impact...Such failures. My failures. Such small horrors. And it is not the most dramatic: an eye open tomato red with blood, a nose with ice covered nostril hairs that looked like a crab emerging from a shell, an ear lying by a man's feet like some dead wingless bird, a cheek punctured with teeth exposed, a wound open steaming in the snow. Those are so few, so specific, so clearly cut from men with faces I cannot help but still see. It is what never comes clear, not faces, not expressions, not the dignity of person, something that had a name. There is a sort of mutant slot machine, it comes to me at night: an odd collection, ever shifting, not bells and lemons but eyes, scars, blood, mouths, wounds, meat, an eye hanging alone gleaming wet and alien yet from some lost moment in 35 years, a nostril disconnected a failing island of memory from some dead man's face like an odd little lost cave. Those are the ones I truly failed. (1946). (Hight 2002)

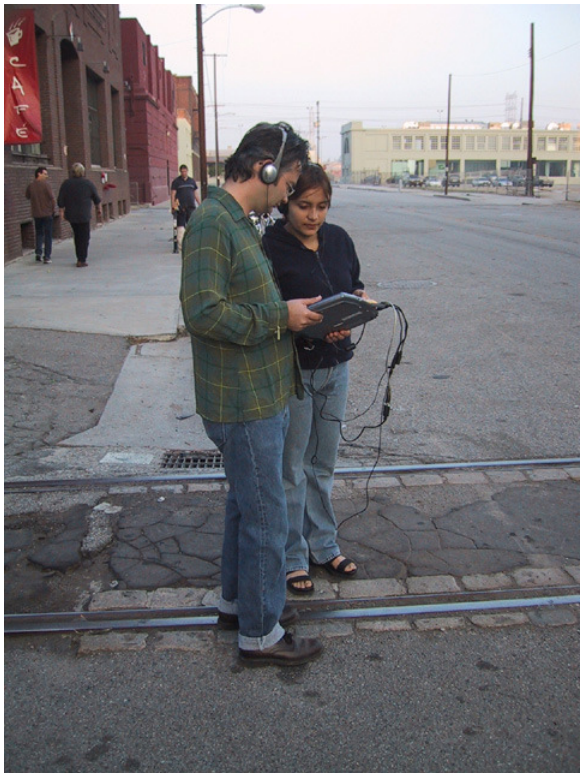

Figure 3.3 Photograph illustrating users experiencing the 34 North 118 West project downtown Los Angeles, near the rail tracks where one of the stories takes place. Photograph from Jeremy Hight's article "Narrative Archaeology", on Streetnotes magazine website

3.5.2 Analysis

3.5.2.1 Technological Approach

The project makes use of location-aware technology in the form of GPS. The participants walk the streets of Los Angeles with a GPS unit attached to a laptop computer with up to 5 headphones attached at once. On the laptop there is a map with a marker that identifies the participants' location. The marker moves along the map tracking location and movement through the city grid. Data triggers are set along points in the physical city by latitude and longitude. Some triggers or "hot spots" are marked as squares on the map while others are left to be discovered. The only visual is the map that tracks the participants' movement and shows hot spots and the distance readings from the GPS unit.

3.5.2.2 The Narrative Approach

The project makes use of narrative conventions to shape its content. The authors have carefully crafted the stories with particular attention to the creation of a site-specific story

world. The authors first analysed the city from architecture to ethnography and history to extract the narratives that inform the experience. The narrative content is composed of historically informed fragments that are intended to augment the place with layers of its own anecdotal history. The creative and critical voices are fused. Many of *34 North 118 West*'s narratives were composed in final revisions by working with a physical map and notes from multiple walks through the space. The authors guide their audience through a fused experience of critical analysis and creative writing: the participant is navigating at the same time both the fictional and present world.

> A story world is constructed with attention to selection of detail and level of its description (setting and its establishment of tone, subtext and above all, physical place). The traditional role of the author has been to carefully use these tools to create the other world. … The narrative is embedded in the city itself as well as the city is read. The story world becomes one of juxtaposition, of overlap, of layers appearing and falling away. (Hight 2002)

In constructing the narrative, the authors use both "traditional" and "experimental" tools and combine small and larger texts together. They use diagetic and mimetic narrative conventions to craft the story fragments: in fact, professional actors were hired to read the narrative fragments, reinterpreting them with the effect of retelling them to the public in diagetic form. The authors use physical landmarks to anchor the stories to real places, such as the railway tracks that are still visible on the street. The structure of the narrative is non linear. The experience of the participant depends entirely on the path he or she chooses through the city blocks, but it will be coherent no matter which path is chosen.

The project is audio based. All written narratives are read by voice actors to create an overlapping sensation of experiencing two places at once. The fact that the written narratives are interpreted by actors enhances characterisation and tone through speech pattern, cadence and inflection. The city is read to its audience. The city is seen as a collection of data and sub-texts expressing aspects of ethnography, history, semiotics, architectural patterns and forms, land-usage shifts and other forms of interpretation and analysis. The city patterns can

be equated with the patterns within literature: repetition, sub-text shift, metaphor, cumulative resonances and emergence of layers, decay and growth.

3.5.2.3 Locative Approach

The location where the story is accessible is tightly connected to the content of the stories. Hight describes how the content and the surrounding areas work together to form the audience's experience of the place:

> This story fragment is available at the end of a vast empty lot. Train tracks appear at the end of the lot along with a section of asphalt split to reveal a turn of the century cobblestone street. The tracks suddenly stop and it is at this stark end that the story is triggered by satellite. The physical placement is highly metaphorical on several levels. The vast empty lot resonates with a sort of melancholy in its dust and debris akin to the man's mind and his dark forgetting and shards of memory. It also is where the rails suddenly stop that is physically jarring and stark in itself in the physical city and this is akin to the narrative in the dead men at their end of life and the narrator looking back at ill formed phantoms in his memory. It is also where a homeless tent city once stood in the 1980s that was well documented at the time in the press and of which there is no physical trace as well as where a building identical to the mile and a half long former turn of the century freight depot now used as Sci-Arc (an architecture college) once stood and again there is no trace, as though it is spatially forgotten and thus failed. (Hight 2002)

A city is constructed in layers of space and time: infrastructures, streets, population, buildings, as well as shifts in decay and gentrification. Layers of differing architecture and layout echo certain eras and design trends, materials and use of space. What is no longer physically present is available through recollections of the past. In this work, place becomes a multi-threaded and flexible concept. The effect is a feeling of being in more than one place at once with eyes wide open. The elements of space and place play an important role in the narrative experience of *34 North 118 West*. Using the physical space as an element in the experience of fiction increases the audience's sense of agency by further opening the

narrative space. The story becomes linked to the real and the imaginary, where the user must merge impressions of the present and the past in real time into a new synthetic experience. The city becomes an interface through which the work is experienced.

3.5.2.4 Immersive Approach

The interface for the project consists of a portable tablet PC equipped with headphones. The interaction involved navigating the real space of downtown Los Angeles, a technique adopted to facilitate immersion in the experience. When an area with a related story fragment is approached, the narration seamlessly starts playing through the headphones. This process of seamlessly discovering content through location aware technology while walking around the city expands the way the audience is engaged in the work. They are pulled into the physical space, which coincides with that of the story world, and away from the screen, improving immersion in the story, similarly to Janet Cardiff's walks. Experiences of both Cardiff's walks and the *34 North 118 West* project blend fictional stories with the real world, positioning the audience in between the two.

The evocative stories, narrated by voice actors, are reported by the authors to have a dramatic and immersive effect on their audience, revealing and enlivening the past and the hidden stories that relate to the space surrounding the audience. The space becomes an archaeological site of intangible memories and past events that are audible through the location-aware device. The audience is absorbed in the re-enacted stories and feels more immersed in the experience of the space. We agree with Kate Armostrong's stating that:

Using physical space as an element in the experience of fiction increases the active agency of the reader by further opening the unfinished narrative space. The readers may interpolate themselves intellectually, augmenting the manner in which they participate in the construction of the narrative. (Armstrong 2003)

The presence of the audience in the real space where the story once occurred encourages comparisons between the present space and the settings where the narrative took place. Furthermore, the fact of being in the same physical location where these stories once took place strongly connects the audience to the story character, events and settings. The mental

operation of overlapping real space and the settings of the narrated stories in real time yields a different experience than visiting a location portrayed by a film after having seen the film.

3.5.2.5 Evaluation

This project has not been formally evaluated. We report below new media expert Lev Manovich's opinion on the work, which we quote from the project website:

34 North 118 West goes beyond the previous artistic experiments in location-based media by combining the inventive use of GPS technology and rich cultural content. The project lets the user uncover samples of Los Angeles's hidden history as s/he navigates through the multi-layered depths of downtown's most poetic and surreal space. The result is a new kind of 'scripted space'...which is emotionally moving. (Knowlton 2002)

3.5.2.6 Perspective

One of the strengths of *34 North 118 West* is in its multilayered physical and thematic interfaces. The city layout is used as the interface to navigate stories that belong to the city itself, similarly to the *[murmur]* project and Rueb's project set in Baltimore city. Whereas Rueb does not make use of narrative conventions at all, *[murmur]* on the other hand has a narrative style more akin to that of *34 North 118 West*—the interviews with the local people to collect stories that relate to specifics locations are not mixed in with sounds from the city and spoken words. The use of space matches the spatial metaphor used to navigate data inside the virtual space of a computer. On this point, Armstrong observes:

> *34 North 118 West* as well as *[murmur]* create an experience in which the user/reader/walker encounters different versions of the same space simultaneously, so that the stories become linked to both the real and imagined city, where the user must merge impressions in real time into a third synthetic experience. In this sense, the city becomes an interface through which the work is experienced. (Armstrong 2003)

Myriads of possibilities for movement exist in a city considered as a layered collaborative space. The city space can be seen as a hypertext with nodes but without explicit links – any

node can be linked to any other. The author's determination of the paths is erased and the audience has total agency in an uncontrollable, unpredictable way. Writers can use this new form as inspiration to generate new narrative structures. We believe that the use of the city as a linking system and the involvement of voice actors to read and interpret the narrative fragments are the major strengths of the project. The reinterpretation of the stories by professional actors strengthens the story's impact on the audience in terms of immersion and engagement with the characters and the story settings.

3.6 Teri Rueb's Sound Specific Installations

Canadian artist Teri Rueb has been designing and producing GPS-driven sound installations since 1996. "I approach sound from a sculptor's point of view," says Rueb, "exploring its spatial aspects, while also probing themes of time, memory, identity—and technology" (Rueb 2006). With the environmental sound installation "Trace" (Rueb 1999), begun in 1996 and completed in the summer of 1999, Rueb enabled hikers in British Columbia to listen to site-specific poems and songs through headphones attached to a small GPS-equipped computer that they would carry in their backpack. Later, she took the started concept from the Yoho National Park to the urban landscape of Washington, D.C. In her Open City installation in Washington, D.C., Rueb explored the idea of public space and civic identity. Open City is a site-specific telephone installation, where the public can dial a specific number and listen to recorded messages about public space, technology and civic identity (Rueb 1999). Rueb's large-scale responsive spaces and location-aware installations explore issues of architecture and urbanism, landscape and the body, and sonic and acoustic space. For the purpose of this review, we have selected and examined the project that extends the Open City installation and that specifically deals with site-specific stories in urban settings: *Invisible Cities/Sounding Baltimore.*

3.6.1 Invisible Cities/Sounding Baltimore (2001)

In 2001, Rueb started working on *Invisible Cities/Sounding Baltimore* by collecting oral histories from residents of Baltimore's neighbourhoods and combining them with sound from the city to create a kind of multi-layered, interactive city tour. Rueb describes her

methodology as follows: "I'll go to parts of the city that I find sonically interesting, take samplings of the soundscape, and manipulate them, taking artistic license". Rueb explains further: “Using a wireless, handheld device combining palm pilot, GPS, and MP3 technologies, listeners will wander through the city and listen to the tales the streets, and walls, can tell” (Rueb 2001).

The project began in 2001 and continued until 2003. The artist stated she needed to get to know the people of the area of Baltimore that she wanted to portray in her soundscapes and build a relationship with them. They had to confide in her before they could start talking and relate to her their stories and feelings about the city. Rueb herself clarifies:

> This work has required a long, slow development process, partly because of the time it takes to establish connections with new communities and partly because of the sensitivity of the issues involved, which include issues of race, class, gender and the politics of urban planning and land use in an economically divided city. (Rueb 2004).

Rueb collects the interview material as she walks around the city with local people. The interviews are inter-cut with sounds from the area to reveal the different ways in which the diverse populations of the city live and work the city space into and around their daily routines. Two versions of the project were produced. One was a high-tech version where the audience was equipped with a GPS-enabled handheld palmtop computer. As participants wandered through the city, sounds and stories were triggered and played as audio recordings through headphones attached to the palm computer. The other was a low-tech version, consisting of a portable MP3 playback device and a map of the city. Participants orientated themselves on the map while walking through the city and listened to the recorded soundscapes that related to the areas they were passing.

3.6.2 Analysis

3.6.2.1 Technological Approach

The technology used by Rueb combines two approaches to generate a site-specific installation. Two versions of the experience exist for the public: one high-tech, the other low-tech. The low-tech version uses pre-recorded sounds and interviews played back through a portable MP3 player. The audience can follow the audio as it plays with the help of a map to situate themselves in the city in synch with the soundtrack.

For the high-tech version, GPS devices deliver the soundscape and interviews recorded by Rueb to the audience as they walk through the city. The appropriate audio tracks are triggered by GPS location-aware technology and played back through headphones attached to a palm computer (PDA).

3.6.2.2 Narrative Approach

Invisible Cities/Sounding Baltimore is an interesting work in interactive narrative terms , because it takes some of the formal concerns of hypertext, such as the reader's sense of agency in exploring the text, the non-linear narrative structure and open authorial models, and situates them in real space. By exploring these issues, Rueb indicates new creative practices for writers and the writing process. Rueb interviews local people who were asked to describe a space or an experience related to Baltimore, using sounds to evoke a sense of place. Rueb mixes the interviews with sounds she recorded from the city and occasional excerpts of single words and music. The audience may choose to contribute to the soundscapes by mailing their contributions to the author, opening up the authorial mode of the project to the general public.

The project uses a documentary style rather than specific narrative or dramatic conventions. In a stream of consciousness mode the artist records sounds and interviews of people walking and driving, as she explores the city of Baltimore. Rueb collects short stories from people describing experiences of the city and mixes them with the sound of the locations traversed. The overall structure of the project is multi-linear. In fact, each walk is linear, but multiple co-existing walks and repeated experiences of the project can give the participant a multi-linear experience. By multi-linear we mean that there is the possibility of multiple story lines co-existing at the same time but through different itineraries through the city. As a result, the participant can walk many different paths through the city, and for each path the participant experiences a different story. The intent is to portray the different ways in which the diverse local populations create and compose the city through their daily movements and stories. The delivery of the narratives to the audience is audio based, but the project also makes use of visual maps to locate the participants in Baltimore city (at least when the participants are experiencing the low-tech version of the project in which location-aware technology is not used). Rueb's narrative language focuses on the use of sound and interactive technologies to create installations that blend the real with the fictional, and incorporate linear and non-linear experiences of space and time. (Rueb 2002).

3.6.2.3 Locative Approach

The project's approach to space exists in two formats: a location-aware one, with a GPS-driven device, and another version that does not make use of location-aware technology, and instead asks the user to locate him or herself on a paper map of the city. In this version, the audience plays back a pre-recorded MP3 soundtrack and must keep up with the soundtrack's suggestions of how to move through the city. This latter technique is similar to the one used in Janet Cardiff's audio walks. The differences between Rueb's work and Cardiff's artefacts are two-fold. With Rueb's project, the users are given a map of the area that they are going to explore, something which is not provided in Cardiff's walks. It is up to the audience to make use of the map or not, but, possibly, making use of the map can be a source of playful interaction with the content and the city. Following the map becomes a challenge, and listening to the soundtrack allows the playful discovery of new elements of the urban landscape. The second difference between the projects relates to the lack of narrative conventions in Rueb's project, compared to Cardiff's work. The discussion of this aspect of the projects belongs to the narrative analysis section because it relates to the type of narrative content the project support; see sections 3.4.2 and 3.5.2 of this chapter for a detailed analysis of the narrative approach taken by Cardiff and Rueb.

The space in which *Invisible Cities/Sounding Baltimore* was created and experienced is the urban setting of Baltimore city. The project is framed by the author as a re-appropriation of the alienated urban spaces of the city through technology, and it addresses the question of how to use technology to make spaces look more familiar and personal. The project also touches on the issues of privacy that are raised when location-based information delivery systems merge data spaces with real spaces (Rueb 2004). For these reasons, Rueb took two years (the project was developed between 2001 and 2003) to get to know the areas and the people that feature in her soundtracks. Only when she had accumulated a thorough knowledge of the place and its people did she feel comfortable in asking Baltimore's inhabitants to talk about their experiences and stories. Baltimore city streets, layered and annotated with the memories, sounds and elements that the local residents find important about their environment and neighbourhood, is effectively transformed from a space into a place.

3.6.2.4 Immersive Approach

Rueb's immersion strategy is to combine audio data in the form of authored soundscapes with real landscapes. Invisible voices and sounds of the city populate the space. The audience experiences the surrounding space augmented by the voices, sounds and stories. Rueb relies on sound's properties to induce immersive feelings in her audiences. She explains: "We cannot clearly distinguish the edges of a sound. It bleeds, leaks out, and disappears. Sensually vibrant and immersive, sound is almost tangible, yet invisible" (Rueb 2002).

Sound carries a lot of information that we can perceive and filter with our ears. Rueb explains "Because sound is directional, relative measures of volumes, locations and speed can be detected with just our naked ears" and used to build concrete spatial relationships. She continues:

> The crying of a child from several block away enters my world and conjures a picture in my mind even if we are separated by walls and our lives will keep us from meeting ever and ever seeing one another. (Rueb 2002)

Rueb makes visible to us intangible aspects of a city and its inhabitants by using the subtle and mysterious qualities of sounds such as being invisible but at the same time very real. Rueb's soundscapes inform and evoke in the audience a sense of the city that they would not be able to capture just with their eyes.

3.6.2.5 Evaluation

There is no formal evaluation of *Invisible Cities/Sounding Baltimore*. The work was presented in interactive arts and media exhibitions and conferences such as "Consciousness reframed 2002" (Rueb 2002). It was published by Rueb as an article in the online Vodafone magazine *Receiver* (Vodafone 2006), but it has not been formally evaluated.

3.6.2.6 Perspective

Invisible Cities/Sounding Baltimore is a thought provoking step in the field of location-based stories and technology. It is an inspiring starting point for thinking about spaces, places, local communities and how stories can augment an area or neighbourhood. Referring to Walter J. Ong's definition of first and second orality (Ong 1988), Rueb recognised the use of communication technologies as facilitators for oral modes of communication in cultures that are highly literate. Such technologies re-introduce some aspects of primary orality, which happens when the culture makes no use of written records, with the critical difference that the technologies and the behaviours of the producers of the content exist in the context of highly literate society (Rueb 2002). A similar position is also sustained in the Nisi and Haahr article on the Weirdview community non-linear stories project. When analysing the effect of new digital media technology on Irish culture, Nisi and Haahr highlight the re-surfacing of oral traditions, such as the Irish oral storytellers known as *Seanchaí,* through the use of digital technologies (Nisi 2004a). Nisi and Haahr, like Rueb, support the arguments that digital technologies allow us to recuperate some of the flexibility of oral media, repositioning such media in the context of modern culture.

3.7 [murmur] Toronto based art collective

3.7.1 [murmur] *project (2003)*

[murmur] is a site-specific project created by the Toronto-based [Murmur] art collective. The *[murmur]* project is an example of politically charged locative-media practice. Sites in several Canadian cities were annotated or commented on. The targeted sites are important spots in the area for the community that lives there rather than important tourist targets. Adopting the convention of a 'commemorative plaque' or memorial, *[murmur]* records histories about specific locations in a city. The inhabitants themselves can volunteer to tell stories linked to specific locations in their cities. Anecdotes are collected from ordinary people using a documentary style, "intimate, neighbourhood-level voices that tell the day-to-day stories that make up a city" ([murmur] 2003-ongoing). The story is narrated by the storytellers from a first person point of view. A sign is positioned at each location, indicating the presence of a story or anecdote that relates to that location. A phone number is provided with a specific code for each story. The audience can call the specific phone number with their mobile phone, and a pre-recorded story from the point of view of the person that experienced it is played back ([murmur] 2003-ongoing). Some storytellers suggest walking around the area following a certain path, while others advise listeners to stand still in a certain spot and direct their gazes in specific directions. All the recorded stories are also collected and available on the *[murmur]* website.

The *[murmur]* project was started in Toronto's Kensington Market in 2003. The same year the project was implemented in Vancouver's Chinatown and St. Laurent Boulevard in Montreal. In August 2006 the project was also adapted for San Jose at ISEA 2006.

Figure 3.4 Image from the [murmur] website illustrating a user listening to a story from the phone interface of the [murmur] project. In the background is visible a green sign that indicates the presence of content related to that locations and the number the user has to dial in order to listen to it.

3.7.2 Analysis

3.7.2.1 Technological Approach

The *[murmur]* project is location-based in its concept and interaction strategy but does not make use of any location-tracking sensors or technology. In *[murmur]* there is no automated location or context-aware detection of the audience's position to mediate content delivery. *[murmur]*'s participants move around the city searching for special plaques marked with phone numbers, which they can dial in order to listen to the stories. The audience must actively dial the number provided on the plaque, situated in the specific location where the story is set, in order to receive the content. The participant then listens to the story in form of a pre-recorded audio message. Potential problems with this approach are that the audience may not posses mobile phones or (in the case of international travellers who commonly use phones issued in another country) that the cost of using them may be prohibitive. These comments aside, relying on mobile phones lowers the technological bar and no doubt

facilitates wide audience participation in the project. Mobile phones are a robust technology widely distributed among the general public, who by and large are comfortable with their use.

The project also has a web-based interface. The web interface presents a map of the cities that have been involved in the *[murmur]* projects, marked by clickable spots where the recorded stories are available for listening. The web interface encourages people to contribute to the story database. A recording session can be arranged to collect the story in audio and add it to the database. However, the web interface does not effectively leverage the power of the real locations when listening to the content, a fact that substantially reduces how compelling the material is.

3.7.2.2 Narrative Approach

The *[murmur]* project does not make use of narrative conventions such as Cardiff's and Pan's projects (presented later in this chapter, in section 3.7) but rather exemplifies the shift from old to new media in the narrative domain. Today in new media there is an increasing shift in interest from single to inclusive multiple point-of-view narratives. *[murmur]* provides its audience with stories from ordinary people. As the *[murmur]* stories database grows, it provides the opportunity to collect and listen to additional stories and different points of view on the same facts or places. The space becomes subjective and the history of the space is presented as a grassroots compilation of subjective stories coming from the people that live in the space. The narrative structure adopted by *[murmur]* is described by Lev Manovich as a new structure for cultural organisation: the database structure (Manovich 2001). Databases are collections of individual items, where every item has the same significance as any other. Manovich suggests that: "rather than exclusionary relationship, narrative and databases, as two methods of cultural expression, exist in productive tension" (Manovich 1999). In Manovich's terms *[murmur]* uses a database structure to organise its story data and to provide ordinary people with the opportunity to contribute their own material in the form of personal anecdotes. This type of narrative structure is non-linear, can be easily augmented with additional content and the media can be browsed in any order.

The project uses a documentary style. Interviews with ordinary people willing to share their stories are recorded and edited. The stories are delivered to the audience in audio format only. There is no use of dramaturgical tools such as scripting or adapting the content before releasing it to the audience. This production format captures the fresh and spontaneous contributions of local people.

3.7.2.3 Locative Approach

The *[murmur]* project approaches space and place by annotating everyday sites in several Canadian cities with stories from local people. Simon Pope, artist and researcher, describes *[murmur]*'s locative approach as a tactic to resist "official" histories (Galloway 2006). He states:

> In the case of an imposed structure of spaces – a mathematical description of all possible spaces – it appears that locative media operates at this level of resistance. It starts to take shape as a tactical media: the [murmur] project, for example, has annotated sites in several Canadian cities often overlooked in officially sanctioned histories. Adopting the convention of the 'commemorative plaque', spoken word recordings are delivered to mobile phones to provide a commentary on specific locations which are described and located within an established representation of physical space – these are known locations within the scope of street maps. (Pope 2005)

[murmur] successfully contributes to a transformation the everyday "unsanctioned" spaces that the project annotated into places. People always have anecdotes to share about the places they live in, for no matter how anonymous and ordinary they appear, something special and unique is added to a place when a local person shares his or her personal stories and histories about it. As a sign of its success, the project's methodology and concept has been of interest to cities beyond Toronto and to date exported to Montreal, Vancouver, San José, and from August 2006 in Europe, starting from the city of Edinburgh.

3.7.2.4 Immersive Approach

The project does not make use of specific narrative tools and conventions to enhance immersion in the experience. The use of audio annotation of the city with site-specific anecdotes works well as an immersive experience for its audience. The sight of architectural shapes, landmarks and streets where the narrated stories supposedly took place coupled with relevant anecdotes about the space supports immersion in the experience.

3.7.2.5 Evaluation

The project has not been formally evaluated, but its success as an art work aiming at "bringing uncommon knowledge to common space, and bringing people closer to the real histories that make up their world" ([murmur] 2003-ongoing) is demonstrated by its having been adopted by different cities.

3.7.2.6 Perspective

Although the project does not have a formal evaluation, the fact that it has been implemented in a number of cities after its initial Toronto installation shows the popularity it attained with locals, visitors and art institutions willing to adopt it and sponsor it. The fresh documentary and interview style connects the users with the real lives of the people sharing their stories, and the fact that each story is coupled with a real location visible to the audience as they listen to the story is a strong engaging and immersive factor for the narratives. Furthermore, the choice of an audio format can enhance the feeling of immersion. The audience is positioned in the location the story relates to, and can wander and look around freely, focusing on the architecture and peculiarities of the real place. On the other hand, when the audience has to actively look for a plaque and then dial a specific number to listen to a story, the process of immersion can be disrupted.

Due to people's familiarity with mobile phones, the interface used to experience the project can be considered almost transparent. This means that the audience is unlikely to be distracted by operating the interface while experiencing the stories. This feature of the interface eases immersion in the narrative experience. On the other hand, the very same use

of mobile phones as interfaces for the project bring up a second issue related to immersion. For example, projects like Janet Cardiff's audio walks require their audiences to decide in advance to invest a certain amount of time in the project and then go and retrieve an enabling device from a gallery or a specific location. As a consequence of the explicit act, the overall experience of the project tends to be extremely in-depth and focused. This level of involvement is unlikely to be achieved in a more casually experienced project like *[murmur]*. Finally, one potential problem with the use of mobile phones is that while local people have easy access to the project, travellers with international phones may be effectively excluded, simply because they are reluctant to shoulder the substantial costs of multiple international calls.

3.8 MIT Media Lab Interactive Cinema Research Group and Mobile Cinema

A significant portion of the research of the former Interactive Cinema group, now Media Fabrics, at the MIT MediaLab revolved around the question: How can entertainment relate to the user environment? Every person creates and receives stories, through messages, e-mails, pictures, etc., and these stories are often communicated through handheld context-aware devices. Pengkai Pan and a team of researchers, under Glorianna Davenport's supervision, worked from 2000 until 2005 on developing a mobile content platform called M-Views. The goal was to build a system for development, deployment and use of mobile context-aware applications, specifically cinematic location-based stories. The platform consists of a client/server architecture, an authoring application and a location-aware engine. Figure 5 below shows the authoring application and the mobile device part of the M-Views platform. The M-views platform allows applications to be built that let users roam the physical world to collect story fragments in the form of media clips. The selection, ordering and timing of these clips are all unique; each person will experience the story in a different way, because the path and timing used to traverse the space affects its outcome. This interactive experience is referred to as *mobile cinema* (Crow 2003).

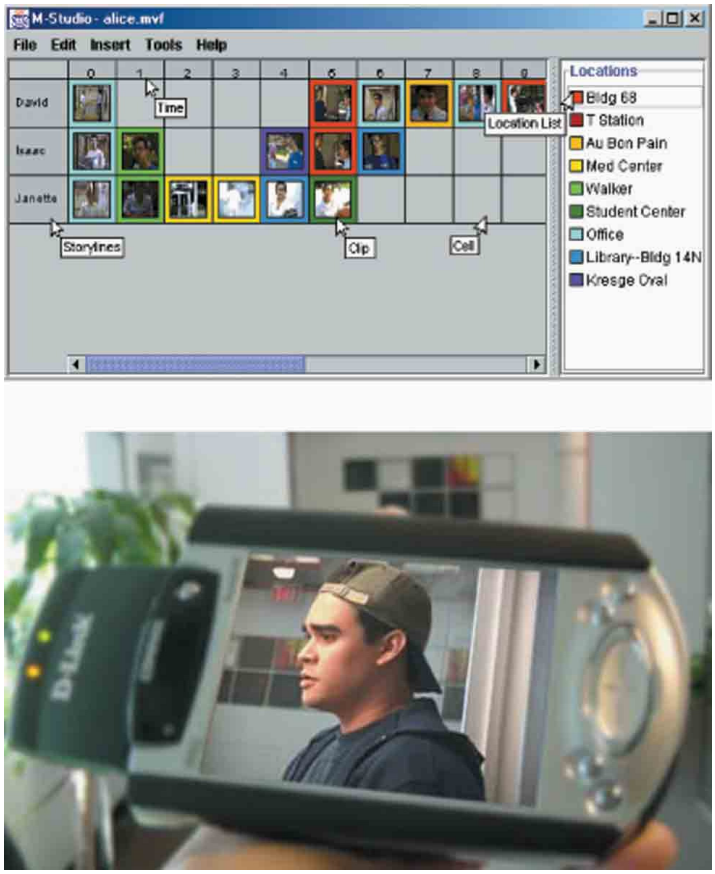

Figure 3.5 Authoring application screenshot (upper part of the picture) and mobile device (bottom part of the picture) showing a video clip from the 15 minutes project. The authoring tools as well as the mobile display are part of the M-Views platform. The illustration is a screenshot from Pengkai Pan's PhD thesis

Mobile cinema is augmented by physical surroundings and social engagement. As the participants navigate physical space, they trigger distinct media elements that often depict events at the location where they appear. The participants also have the opportunity to use an instant messaging application to communicate with each other and exchange information about the story. Users can also meet in person while exploring the space for story fragments and exchange their comments live. The individual media segments are acquired at discrete times and places, with allowance for serendipitous augmentation of the whole experience through instant messaging (done with the M-views client). During the development of M-Views, Pengkai Pan and the interactive cinema group produced three mobile cinema stories in order to experiment with the platform: *Another Alice*, *MIT in Pocket* and *15 minutes* (Pan 2002) (Crow 2003). For the purpose of this thesis we will review the three projects.

3.8.1 Another Alice *(2000-2002)*

Another Alice is a fiction detective story designed to make use of the M-views media platform. The production of *Another Alice* explores three main ideas:

- How can a location-based piece of fiction be designed and produced?
- What kind of impact does the M-Views platform have on both storytelling /making/ and viewing?
- What forms of storytelling are suitable for mobile systems such as M-views? (Pan 2001)

In the story, the viewer is assigned the role of investigator. The story always starts with the participant receiving an e-mail telling her to go to the same location: the office of Professor Eugene. Depending on what time the participant arrives at the location, she meets one of the following characters: a student, the professor's secretary David or another pre–medical student. The character tells her that the professor is dead and prompts her to go to another place to find out more about the professor's death. The participant starts to roam different places where the story is distributed in order to solve the murder mystery. The story has multiple threads built around the activities of the four different main characters: Alice, the professor's daughter, two of the professor's pre medical students, and David, the professor's secretary. As the viewer moves around, she encounters the different characters. They tell her different bits of information depending on their own point of view of the story events and also suggest where to go next. The story happens on the MIT campus at nine different locations. Seven locations are on the east side of the campus, which makes it quite easy to walk from one to the other. The story has three possible endings depending on the audience's walking paths. One ending lets the student escape and leaves the audience with the mystery of the professor's death still to solve. The second ending lets the user catch the student and extract the confession that he killed the professor. With the third ending, the viewer witnesses a meeting between David and one of the students who confesses he had forgotten to fill a medical prescription that might have caused the professor's death. The viewer can reiterate the story experience different times following a different character each time (Pan 2004). Figure 6 shows different possible story paths through the *Another Alice* mobile story.

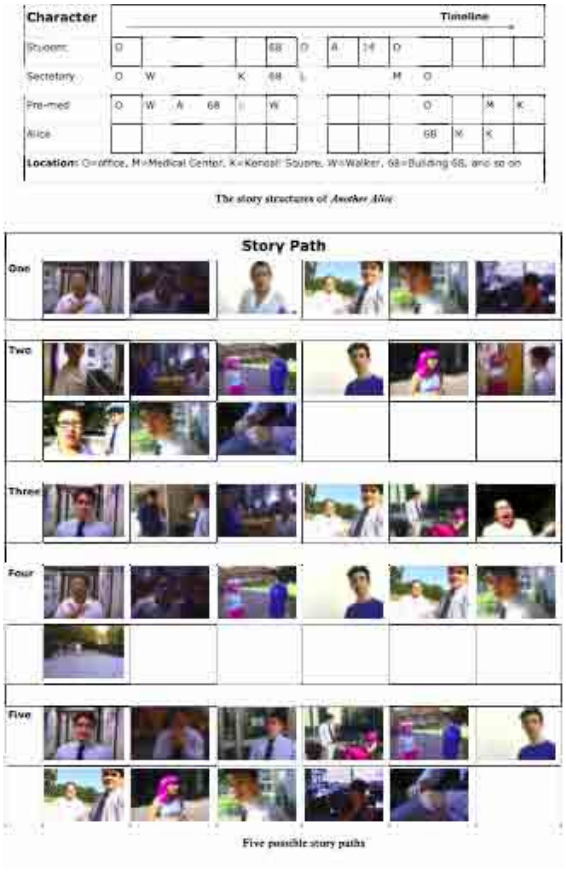

Figure 3.6 Screenshot of the M-Views authoring platform. The picture in particular illustrates different possible story paths in the Another Alice mobile story. The illustration is a screen shot from Pengkai Pan's PhD thesis

3.8.2 MIT in Pocket *(2002 2005)*

MIT in Pocket adopts "a day in the life" structure and was created to reflect the atmosphere of the life of the students of the MIT campus. The project was kick-started with a workshop at the MIT Media Lab, where participants started brainstorming about the story and the characters (Pan 2004). Adopting Glorianna Davenport's methodology (Pan 2004), four main characters and their profiles were created and these four together with a number of supporting characters such as students, tourists, professors, and staff members populate the scenes and interact with each other. A few documentary scenes are interwoven into the larger multithreaded narrative about life on the MIT campus. Four main threads told in over fifty story events in soap-opera style were produced to be stored in the story database. A team of five students worked on the production for the summer of 2002, creating the four main characters and their stories, scripting, storyboarding and filming the story clips. The team spent five months filming, editing and composing the soundtracks. Two ways of experiencing the project were prepared. One version is a three-hour experience where one day of life on the campus is mapped to three hours of real time: the first hour contains all the clips that happen in campus in the morning, the second hour reflects the early afternoon and the third hour the rest of the afternoon. The other version is in absolute time, where the story events unfold during the real time of the day (Pan 2004). The story can start from any of the chosen campus locations and provides a more casual viewing experience compared to *Another Alice*. As the viewer walks around campus, she receives location-based messages prompting her to view the video clips associated with the time and locations she is in. Figure 7 shows the different locations of the MIT campus where story content is available to the participants.

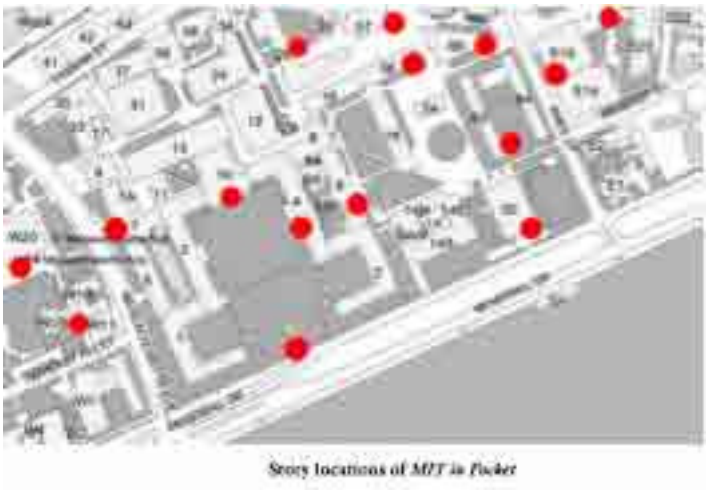

Figure 3.7 Screenshot of the Authoring tools of M-Views. The picture illustrates in particular different story locations on the MIT campus. Through this interface the authors can place a nd move content to be available at different locations of the campus. Illustration from Pengkai Pan's PhD thesis

The viewer can follow one or many different story threads to see how all characters meet and interact with each other. The story events are context-aware in the sense that they are sensitive to the location and the time they have been mapped to. For example, if the viewer is rushing through the MIT courtyard at 10.00am he or she will be sent a clip of a student rushing to class at the same time of the day in the same location.

3.8.3 15 Minutes *(2003 2004)*

15 Minutes is a mobile cinematic thriller, created by David Crow, and produced by a small crew of MIT students with the purpose of using and experimenting with the M-View Platform (Crow 2003). The story takes place around three different locations of a fictitious corporate building, InfoSafe: a conference room, which is the CEO's office, an elevator and a photocopier as shown in Figure 8 below. Government data is secretly stored in the building. Rumours are spread about a possible robbery about to happen. The story unfolds over a 15 minutes time frame. The viewer/player has to investigate the rumours about the leakage of secret information in the office by encountering characters and receiving information from them. There are three main characters: David the elevator repairman, Michael the CEO and Eve the attractive secretary; and three supporting characters: Chi a professional hit man, and two policemen. The three main characters proactively talk to the participants, asking them to

do certain tasks or go to certain locations. Believing them or not, following their instructions or requests, will lead the viewer/player to different endings of the story.

Figure 3.8 screenshot from M-Views authoring tool. Above, a map of the locations where the story content is retrievable. Below are three screenshots of main characters of 15 Minutes. Picture from Pengkai Pan's PhD thesis

There are 18 possible ways of experiencing the story. The story will be coherent no matter what path the user takes through it. Unlike another *Another Alice* where all users start from the same location, or *MIT in Pocket* where users can start from any location, participants can choose to start from any of the three locations. The place where the experience is made available to the public may or may not be the same locations where the story was filmed and conceived. *15 Minutes* can be set up in any building equipped with an 802.11 wireless network.

3.8.4 Analysis

3.8.4.1 Technological Approach

Another Alice was designed for GPS-enabled handheld devices. An initial version worked with both GPS for outdoors and radio beacons for the indoor spaces. For *Mit in pocket* and *15 minutes*, the technology used to make the content location-aware is based on triangulation of wireless node signal. Wifi triangulation, compared to GPS, has the advantage of working indoors while GPS can not. On the other hand, Wifi triangulation requires to have been set up in advance indoors and outdoors, which is not always possible.

For all three projects, the interaction with the story happens through location-aware handheld computers. Videos are played transversally on the small screen, taking into consideration the aesthetics of a small mobile screen in the way that the story characters directly address the viewer, and exploiting the feeling of intimacy that such a small screen can stimulate. This factor adds to the thriller and mysterious atmosphere of *Another Alice* and *15 Minutes*, while it enhances the feeling of being let into students' lives within the *MIT in Pocket* day-in-the-life narrative. From the evaluations of the projects, it has been reported that the interface was overly complex (Pan 2004). The presence of video content advertised by a text message, which had to be opened before viewing the video-clip, made people impatient. The problem was acknowledged after the evaluation of *MIT in Pocket* and the interface was simplified with the second version of that project.

3.8.4.2 Narrative Approach

All the three projects blend fiction and reality through the use of narrative conventions. *MIT in pocket* adopts a soap-opera style to tell the stories of the day in the lives of four MIT students, while *Another Alice* and *15 Minutes* use thriller and murder mystery conventions to involve the viewer in a first-person investigation of some obscure situation. They all make use of cinematic language to convey their stories to the viewer. To produce cinematic media for small portable device screens it is necessary to think in terms of carefully constructing simple but visually interesting scenes. While on one hand the small screen of the PDA is not suitable for wide shots of landscapes or visually complex scenes, on the other hand it is useful for leveraging the intimacy of the viewer/image/screen relationship. The narrating character addresses the viewer in first person and directs her towards specific locations in the real space. Extreme close ups on the characters' expressions give the small screen the possibility of conveying a personal relationship between the viewer and the character. In all the Interactive Cinema projects reviewed here, the narrator addressed the viewer in first person, pulling her into the story events, asking her to do things and to go to determinate locations.

> A viewer of the work must depend on the character in order to experience the work: [The spectator] can literally do nothing without the help of the virtual character. Virtual characters are free in their world while visitors need help to walk in and explore. (Cho 2004)

The story structures of the three projects contain differences and similarities. In all three projects the plot development is time dependent, hence chronologically ordered: as the story unfolds, the time progresses and cannot be rewound.

In *Another Alice* the viewer must get to the specified locations within a certain time to be able to meet certain characters and receive important information in order to solve the murder case. If the viewer does not make the location in time, the story results in a different ending. In fact, the plot of the story is unique and it unfolds over a certain timeframe. The events do not change, regardless of the path the user takes through it. But the viewer learns different things depending on the time she arrives at the different locations.

The *MIT in Pocket* structure is looser than the other two projects. The modular structure of the story database allows audience members to start the experience from any point of the campus. The stories can be viewed in different orders but the events progress linearly over time, framed by the day-in-the-life story structure. The difference from the other projects is the open database structure holding the story fragments. The database is extensible. The reasons for this choice are twofold. First, the mobile cinema experience requires a certain density of content to be enjoyable. The cost and production times can be very long and it might need reiteration of the process to be able to reach enough density for the experience to be enjoyable. For this reason, production would often happen in two or three stages. The second reason is to allow contributions from the campus inhabitants to the database at later stages of the process (Pan 2004). The extensible story pocket database has been developed by expanding the work of Davenport and Murthaugh from the *Evolving Documentary* project (Davenport 1995). The idea at the basis of the *Evolving Documentary* project is to separate the content from its description and presentation and divide it into interconnected pieces in order to redefine the relationship between the story, the author and the viewer (Davenport 1997).

The structure of *15 Minutes* recalls the structure of *Another Alice*. The viewer is more akin to a player of a game. She assumes the role of the investigator and has to make choices in order to find the truth in relation to the rumours of the robbery about to happen in the building. The story experience is more flexible than that of *Another Alice* or *MIT in Pocket*. This means that the participant can start the story from any of the three locations where the story is set and the story will be coherent, no matter how she walks through the story. The events of the story develop over a finished period of 15 minutes, after which the story is over. Different paths through the story are possible during that time. *Another Alice* and *15 Minutes* stories have a closed structure. The design of these story structures implies that the author scripts and designs the whole story and closes the structure before productions starts. No more story fragments can be added subsequently.

3.8.4.3 Locative Approach

In mobile cinema, the surrounding space is used as a design element in the story design, production and interaction. For Another Alice and 15 Minutes, the stories are distributed in real space and are viewed in the locations where the media was shot, although the fictional story content does not relate specifically to the site where it is filmed in the same way as in MIT in Pocket. Both Another Alice and 15 Minutes can be set anywhere, as long as the timing between the story clips is preserved. However, the demonstration of 15 minutes both at the UbiComp 03 conference in Seattle and subsequently at the MIT campus in Boston, where it was originally filmed, showed how participants appreciated recognising the locations around them as the setting of the story. The participants reported that recognising the locations in the story as identical to the surroundings where they are experiencing the mobile cinema narrative helped them to engage with the plot and stimulated immersive feelings in the narrative. For MIT in Pocket on the other hand, which aims to portray a day in the life of campus students, content is site-specific and can be experienced only on the MIT campus in order to work to its full extent. For the MIT in Pocket experience, fifteen indoor and outdoor locations were carefully chosen. The criteria for choosing these locations were twofold: firstly because of some notorious activities that happened in those sites, e.g. the robot competition, or secondly because of architectural landmarks positioned in the site (Pan

2004). The stories will then reference those landmarks or activities and the surrounding space, stimulating connections in the viewer's mind between the story and the surrounding location.

3.8.4.4 Immersive Approach

The dialogue addressing the viewer in the first person is a powerful immersive tool. It connects the participants directly with the story events and characters, stimulating immersion into the narrative. The fact that the story is deployed in real space and time enhances the explorative atmosphere of the story, engaging people to investigate the mysteries for both stories: *Another Alice* and *15 Minutes*. The investigator has to physically reach and explore certain places in a certain time in order to be able to solve the mystery. As we mentioned earlier, at the UbiComp 2003 demonstration of *15 Minutes*, the fact that the story locations did not match the real locations diminished the feeling of immersion of the viewer into the story (Pan 2004). In all three projects, the viewer's experience is close to a player experience. The story has to be completed by the participant in order to explain the murder mystery, the robbery rumours, or to get the flavour of the day in the life of the MIT students. Being a player as well as a spectator improves immersion in the narrative, as Ryan explains in a note to the review of her book on *Narrative as Virtual Reality*:

> In hypertexts and hypermedia the reader becomes a player. In most cases, this importance is theorized by means of the concepts of immersion and interactivity. Precisely because of his active involvement, the reader/player loses himself in the computer game he is playing, or in the digital text he is writing with the help of all kinds of computer techniques. (Herman 2006)

3.8.4.5 Evaluation

Another Alice was tested in 2001 by 12 participants trying the experience in the MIT campus and commenting on it. The M-Views post production tools were completed only after the story had been conceived, scripted and produced. The collected comments were mixed. People did get a feel of the story and its form and the characters. Participants expressed the

preference to have a more interactive messaging happening and stated that they would rather have messages relating to the story delivered through e-mails rather than instant messages (Pan 2001).

The *MIT in Pocket* project was evaluated during the first few months of 2003, using a sample size of ten students from MIT who were invited to try the project. The audience was helped only if they asked. In this way the evaluation was made as objective as possible. In general, the results showed that people felt the connection with the place was very powerful. They enjoyed the fictional stories about the students and some whished there were more clips available. In details, the evaluation showed that:

- The project is high maintenance, because of the short battery life span; the battery had to be changed twice during a three-hour experience. Due to a sub network configuration issue, a server laptop had to be carried with the viewer at all times, but because the M-Views system was not completed by the time of the evaluation (Pan 2002), the location detection was incompatible with the MIT campus wireless network.

- The author's expectations on to the project were too high. The time and costs of production were more than twice what were expected. After filming major actions, it took two team members a whole semester to do the post-production and create the story scripts with M-studio tools.

- The interface was too complex. It involved three steps of receiving the message, reading it and clicking a button to launch the video. In the next version of the project, the interface was simplified so that the video would play automatically when received.

- The extensibility of the story database worked well with the new content added and filmed after the summer of 2002. The new content has not been tested in the framework of the overall user experience after the new clips were added.

15 Minutes was evaluated twice: at UbiComp in 2003 with 14 valid sets of questionnaire and at the MIT Media Lab in 2004, where 18 people tried the experience and completed questionnaires. The comparison of the two evaluations resulted in the following insights:

- Matching story presentation and story production location matters and intensifies the mobile cinema experience in general. First, it helps audience members navigate the real space; second, it reinforces the story atmosphere and participants are more likely to immerse themselves in the story.

- The content is critical to the experience. Although locations matters, the content is key to engage the participants.

- The way participants interacted among themselves is different from the authors' expectations. The interaction happened in a more ad hoc fashion, with participants preferring face-to-face communication rather than instant messaging.

- Agency is needed for the users to feel engaged in the story. The users have to be aware whether they are affecting the plot and how, otherwise they feel confused or frustrated, and that prevents them from engaging fully in the experience.

3.8.4.6 Perspective

The lessons from the three mobile cinema productions are multi-fold. Drawing from Pan's dissertation (Pan 2004) and publications (Pan 2001), we summarise them as follows:

- Pan's projects highlight the importance of tightly constructed scenes where every text, word and visual cue enlightens the viewer on some story details, such as characters, plot, or which location the viewer should go to next.

- In Pan's work and in mobile cinema in general, the user is not only watching but is actively engaged in moving through the space and meeting the characters. This fact positions the viewer experience closer to that of a player participating in a game.

- Pan's mobile cinema stories unfold in time as well as space. The viewer can visit the same locations multiple times and retrieve different story contents, because the story plot is progressing in time. The effort of designing content for such structures is very costly in terms of story-content authoring and structure design, in order to maintain coherence in the story events and engagement by the viewers.

- The evaluations carried out on Pan's story projects highlight the importance of the connections of the story settings with the real space where the story is experienced. Displaying *15 Minutes* in two different situations demonstrated the importance of the connections of the story setting with the location where the story is experienced. This connection helps engage the users in the narrative experience and stimulates immersion.

3.9 Rimini Protokoll

3.9.1 Call Cutta (2005)

The project *Call Cutta* is a remotely guided tour through a city, defined by its authors, the artist collective Rimini Protokoll (Rimini Protokoll 2006), as the first mobile theatre performance. *Call Cutta* was funded by the German Federal Cultural Foundation Goethe-Institut, Max Mueller, Bhavan Kolkata, Hebbeltheater am Ufer Berlin and supported by Databazaar India. The project was launched for the first time on Saturday, 26 February 2005. Two parts of the project exist. The first one happens in Kolkata and the second one in Berlin. In the first part of the project, the participant is guided through the city of Kolkata through the voice of a remote person calling from an anonymous Kolkata call centre on a pre-arranged mobile phone. The conversation moves between small talk, intimacy and the biography of the people talking. It is up to the participant to decide how far he wants to get involved in the relationship with the person on the other end of the phone.

After a while some callers or actors may switch to a waiting call, or take over another tour. Sometimes the audience gets switched to a pre-recorded piece of music or is told

> to sit somewhere: I'll call you back later, have a coffee till then – and the assistant or guide is no longer online conversing to the user. The city returns an unknown place, with out the mediation of the caller. (Rimini Protokoll 2006)

The second part of the project takes place in Berlin. It started in April 2005 and ran for several weeks. The actor is situated in a call centre in Kolkata and the "walker" or participant is in Berlin. During the remotely guided tour they form a relationship.

> They help each other through places and spaces, spying on aspects of the city, sharing and trading confidences, and developing mutual trust which overcomes any loneliness the theatre-goer may feel. The relationship becomes an intimate conversation between two people from different cultural backgrounds, and the theatre-goer opens doors to a building which he had never dared to do before on his own, trusting his Indian guide increasingly, trusting the voice of a person who has never been to Berlin himself. (Rimini Protokoll 2006)

For the purpose of this thesis we will focus our attention on the Berlin version of the project, as it involves a story element narrated to the participant during the remotely guided tour of the city. The experience starts with the participant in Berlin buying a theatre ticket and getting a mobile telephone at the ticket counter with the request to call a specific number immediately. The piece begins with the call: a brief recorded announcement reveals that the call will be forwarded as soon as one of the customer service lines becomes free. The initial dialogue of acquaintance turns into a story that the actor/employee narrates to the theatregoer. The story is the adventure of Subahs Chandra Bose, known as Netaji, who was a member of the Indian independence movement at the same time as Ghandi. Netaji spent two years in Berlin (1941-43) trying to get some support from Hitler for the liberation of India from the British colonial power. The results were null and Netaji moved on to Japan. In Berlin remained his office, a radio station called "Free India" and a thousand Indian soldiers belonging to the "Free India" legion, who were subsequently incorporated in the German Wehrmacht. During the story, the voice on the telephone guides the participants through the streets of East Berlin to discover places and objects disseminated around the neighbourhood by the authors of the experience. The instructions are very precise and initially sound as if the

employee can see exactly what the theatregoer is seeing and can thus guide him from one house corner to the other. The participant is led into a courtyard, for example, to find a picture of Netaji exposed behind the glass of a first-floor window, or a sticker of a tiger, the symbol of the Free India movement, hidden behind a garbage bin. The Berlin theatregoer gets to trust his Indian 'pilot' more and more. The result is that the participant ends up following the caller instructions and exploring beyond what he would have dared to do on his own:

> He opens doors to buildings which he would never have dared to on his own, takes the lift in the SONY-Centre, lands up in the emptied out tower of the Postbank (postal bank) and looks over the rooftops of a city with a voice guiding him from another city more than 10 flight hours away. (Subhro Saha 2004; Rimini Protokoll 2006)

Figure 3.9 Screenshot from Rimini Protokol's website illustrating the Call Cutta project.

3.9.2 Analysis

3.9.2.1 Technological Approach

Although it does not make use of location-aware technology, the *Call Cutta* narration is very tightly linked to the locations targeted by the narrative. The content is only available at the specific location because the actor/caller makes sure the participant is in the right spot before relating the part of the story that refers to the exact location.

3.9.2.2 Narrative Approach

A highly dramatic narrative style is employed to tell part of the story of Netaji to the participant. The rest of the conversation between the participant and the actor-caller is partly a real dialogue between two persons with very different backgrounds, and partly directions to guide the caller to fictitious locations while he is very concretely passing through the real city. And when the participant reaches certain spots, the actor starts telling part of the Netaji story. The city is discovered, interpreted and reinterpreted by the caller, who is from a totally different city. At times, the actor performs sounds, music and explanations in real time, that are layered in the viewer's mind onto the traversed place. The experience is in this way a mixed theatre performance and mobile story.

3.9.2.3 Locative Approach

The place and the story are tightly related. The storyteller would link the story about the Indian independence movement to a specific place in Berlin. The participant's mind is transported back in time and his body to specific locations of Berlin, where the city still shows physical traces of the past. For example, the audience is taken through the back streets of Post-Dammer Platz to an abandoned green lot where the railway track of the former Berlin train station (before the Wall was built) is still visible in the grass. The voice of the caller tells the participant to imagine the noise and the colours of that place when it used to be the main railway station of the whole of Germany. During those times that now abandoned place was populated by hundreds of people getting on and off the trains. The result is a powerful

immersion in the story through the resonance of past and present happening in the same location.

3.9.2.4 Immersive Approach

The immersive power of the story relating to long gone history and places is powerful. The immersive power of the artwork relies on the strong relationship that is established between the participants and the narrator. The participant trusts the narrator and is willing to suspend disbelief and surrender to a vision of the city and of the place that is generated only by and during the experience by dialogue between the caller and the participant.

3.9.2.5 Evaluation

The art project received attention from media festivals and magazines, but this does not encompass a formal type of evaluation.

3.9.2.6 Perspective

The *Call Cutta* project sends the participant on a remotely controlled experience of a city, in search for traces of Calcutta in Berlin, and Berlin in Calcutta. The strength of the project is the combination of narrative with live performance by the narrator. The lack of sophisticated location-aware technologies used to deliver the content emphasises the importance and the versatility of human performances in narrative-related projects. At one level the project investigates the roles of call centres and the experience of the people who work in them. Traditionally, call-centre employees are subjected to strict limits in self-information. In *Call Cutta* too, the callers are informed about the weather, the news items in the press, and the football results from the other city where they are guiding the participant; but these small talk contents are important requisites in the call centre, itself an audio theatre, in which round the clock, thousands of people are given the inner assurance that they are speaking to someone from their own cultural domain. (Subhro Saha 2004)

3.10 Mobile Bristol Context Specific Location Aware Drama

In November 2002, the Mobile Bristol research team, funded by the Department of Trade and Industry, HP and local supplier Appliance Studio, started to research and develop mobile location-aware applications that would fulfil Mark Weiser's vision of "Developing machines that fit human environments rather than human having to fit machines, and using computers will be as refreshing as a walk in the woods". (Cater 2005)

A series of location-aware applications have been developed since 2002. For the purpose of this thesis, we review in detail the interactive play *Riot!1831,* which involves location-aware technology and dramatic narrative.

3.10.1 Riot!1831 (2005)

Riot!1831 is a mediascape (an application that runs on a mobile client which delivers digital media in response to contextual cues such as GPS location), in the form of an interactive location-based drama based on the real historical events that happened in a public square in Bristol. The project brings to life the riots of 1831 in the square where they happened. The experience is designed to make the audience feel as if they are walking through an invisible riot, eavesdropping on a parallel world, bringing history alive for people. A GPS-enabled device identifies the user location and triggers content, delivered to the participants through a pair of headphones as she walks through the square. As the audience member walks around the square, she triggers different audio content according to the design of the authors/creators. The application was open to the public and experienced by 700 people. Some of their comments were collected and these form the basis of the evaluation criteria for the work.

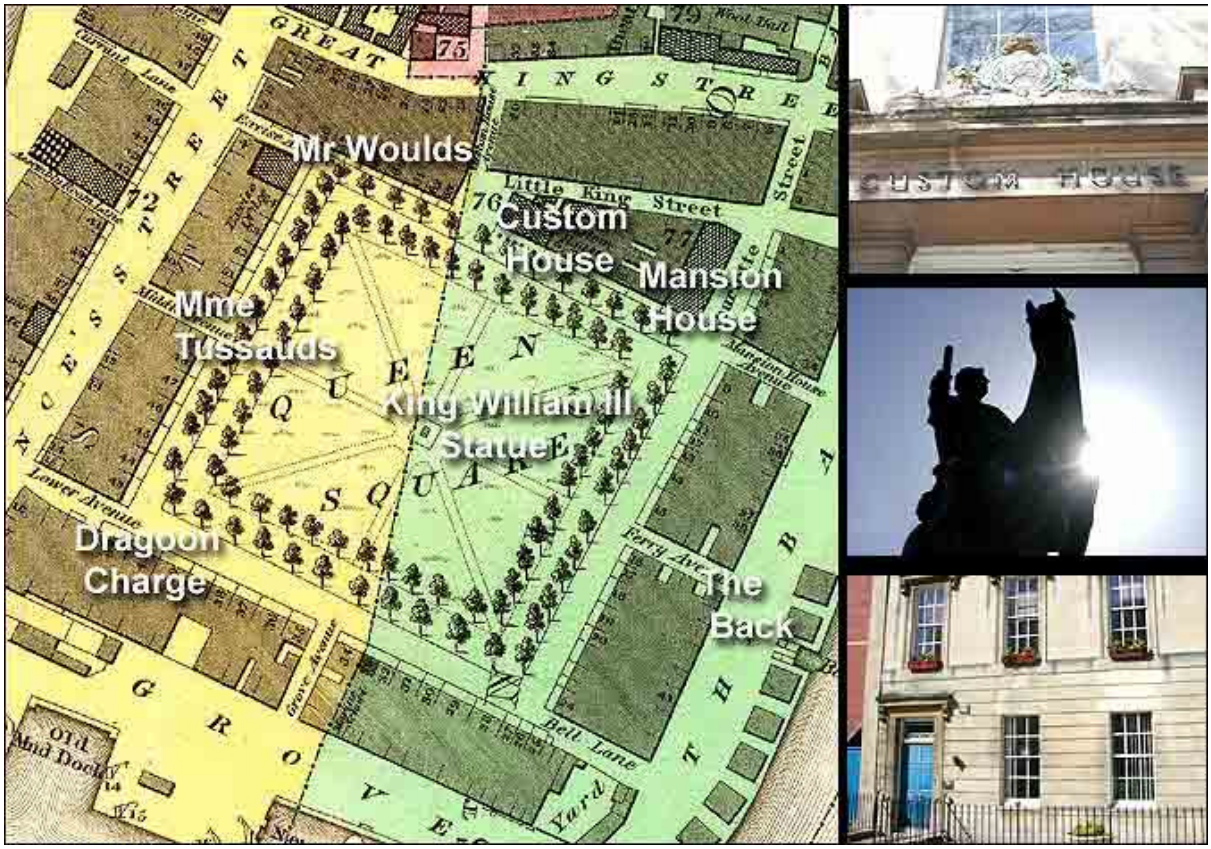

Figure 3.10 Map of Queen's Square where the Riot!1831 interactive play is located. On the side of the right-hand side of the map there are some photographs of the important landmarks of the square, from top to bottom: the custom house, the statue of King William and Mrs Would's house

3.10.2 Analysis

3.10.2.1 Technological Approach

The technology used by the project is a GPS-enabled PDA. GPS readings identify the user's location and trigger content, simplifying complex user interfaces where the users have to browse articulated databases of information. *Riot!1831* uses a mediascape that is controlled by user displacement through space. As the audience member walks around the outdoor environment with a GPS-enabled iPAQ and a pair of headphones, the device triggers different audio content linked to different regions marked in the square according to the design of the authors/creators (Cater 2005).

3.10.2.2 Narrative Approach

Riot!1831 was commissioned by the Mobile Bristol team and produced by professional authors and actors. The play was designed for the specific locations of Queen's Square in Bristol, England. Lack of description of the play itself makes it impossible to analyse from a narrative point of view. Having called the art work a "play", we assume it employs narrative convention belonging to drama and theatre, but no further information is available.

3.10.2.3 Locative Approach

The distinctive feature of mediascapes is their link to the physical environment. For *Riots!1831* a digital landscape, or mediascape, was created to overlay the physical world. A mediascape runs on mobile devices and captures digital media in response to contextual cues such as location. A specific trial was designed to evaluate the mediascape's effects on its audiences, highlighting factors that have led to "magic moments", i.e., moving and memorable moments that people really value.

3.10.2.4 Immersive Approach

Studying the phenomenon of immersion, Cater compares immersion as a measure of success in games and virtual reality experiences:

> Immersion is often used as a measure of success in games and virtual reality experiences. It has a strong affinity with the experience of flow, where the sense of time and self are lost, and attention is completely focused on the current activity.
> (Cater 2005)

Cater continues:

> Unlike computer games where the environment is simulated, in a situated experience the environment is a real public space where physical structures and social protocols are predefined. Elements like weather, other people, animals, noise and other events cannot

be controlled and will become part of the experience. Our research examined how these elements, combined with the physical aspects of movements, affect how immersed people can become in an experience. (Cater 2005)

The following considerations were made by the Mobile Bristol research team after evaluating their location-aware interactive work. Immersion is a transient state. It can end and start again later. A range of feelings from immersion, to euphoria, terror and confusion are generated by the experience. The circumstances that lead to these shifts are important for the design of immersive location-based story systems. Equally important are the designed pauses or unplanned events that lead to the interruption of the immersed state. If the structure and content of the narrative is not sufficiently engaging, the attention is lost more easily. The *Riot!1831* play is audio-based, and sometimes the participants reported that they needed to close their eyes to feel immersed. The blending of different audio tracks (pre-recorded noises of the location, the voices of the artists, steps to follow, other noises and sounds) makes the fictional and real, past and present blend together, stimulating feelings that range from fear to surprise, to wonder (Cater 2005).

3.10.2.5 Evaluation

The evaluation of the project was tailored to identify and describe the situations and factors that lead to satisfactory immersive, aesthetically satisfying experiences in mediascapes (magic moments) and how to design the experience of these moments without them appearing contrived (Reid 2005). The findings are primarily based on the analysis of public reaction to the interactive play *Riot!1831*. The interactive experience was available to the general public for 3 weeks, during which 700 people tried it. A total of 563 useable questionnaires were produced, 531 trace files were collected and 30 semi-structured interviews and 4 in-depth ethnographic case studies were conducted. The Mobile Bristol team examined in detail people's reactions to the projects and used quotes from the structured interviews to illustrate their study. We report below implications for future design that were extracted from the analysis of these questionnaires, interviews and case studies.

- Physical and virtual collision.

When an event in the virtual world resonates in the real world, e.g. a seagull mentioned in the narration flies in the sky, the audience experiences a collision between the physical and the virtual worlds. These collisions of physical and virtual do not impede immersion. On the other hand if the collision does not relate to the story nor the real world, e.g. a passer by asking for information, the result is jarring and does not facilitate re-immersion in the virtual world. The challenge for the future is how to design for these coincidences or design expressly for these collisions, creating events that happen synchronously in the real and virtual worlds. For example, if you know the area is likely to have seagulls around, you can incorporate one of these in the virtual world.

- Sensory confusion.

The feeling of confusion generated by not knowing if the sound was real or part of the soundscape was often mentioned. This fact generated confusion and disturbing feelings in the audience rather than a pleasant sensation, but it was a memorable effect, so the team counted it as a "magic moment". Good future design will have to build up awareness for the virtual environment and create receptiveness in the audience. Part of this effect can be achieved through the atmospheric quality of the sound, the skilful placement of the sound clips and the narrative structures.

- Looking at the world with new eyes.

The fact that the *Riot!1831* play was represented in the square where the original riot happened was important. This was especially so for local people who saw the square with different eyes from then on, as reported in the results of the project evaluation (Cater 2005).

- De-familiarisation is an important function of art.

A project such as *Riot!1831* makes us look again at what we take for granted. For non-locals, the experience brought history to life.

- Traversing the square.

There were four main patterns identified from the trace files: a random walk and three structured categories—circles, paths and police march.

- Social bonding.

Despite the use of headphones, the people participating in the project could identify each other by the back pack they had to carry; so there was a feeling of experiencing *Riot!1831* as part of a club. People who had the choice would rather experience the project in pairs, splitting the headphone audio channel. People experiencing the project in pairs were observed smiling and nodding when where hearing poignant content.

- Design implications.

Unlike classic HCI methodologies, design of mediascapes need not start with user studies. This is not to say that a user study is not valid, but according to the Mobile Bristol team it is not the starting point for mediascape types of applications. For mediascapes the start is the context, or environment that determines the content or subject matter, the application, and the interaction design.

3.10.2.6 Perspective

An important contribution of the project to the domain of location-based narrative applications was the identification of emotionally charged moments called “magic moments”. These moments were generated by the project in the audience’s minds by the process of walking through the real space and interacting with the digital media. Furthermore, a set of guidelines were identified by the evaluation of the project that we report from Cater’s paper (Cater 2005) :

1. Continuous sound through a loop helps immersion, but the loop can also be disturbingly repetitive.

2. Walking unencumbered is pleasurable.

3. Coincidences between virtual and real world create magic moments. How can we design for those moments especially if they are coincidences?

4. Design for immersion recognises the need of smoothly moving the user in and out of immersive states.

5. Sensory confusion can be a deliberate design choice.

6. History-based mediascape exposing authenticity can be powerful.

7. People will use the most obvious paths to move around

8. Opportunity exists for social bonding during the mediascape. Sharing a private moment in public space.

Although some of the above conclusions are obvious, such as points 1 and 7, for example, others are enlightening for the theory and practice of constructing mobile location-based stories. The framework of the project development is nonlinear and cyclical. This approach combines iterative development and testing with analysis and evaluation of the context, content, interaction and user study. As the models and design deepens, the designs and ideas are validated by testing prototypes. Mobile Bristol calls this methodology "Experience Design". (Reid 2005)

3.11 Analysis

On the basis of this review of work done in the area of location-based stories, we make the observation that the approaches to locative media narratives vary from project to project, combining different genres and technologies together in order to experiment and find aesthetic and artistic value, or principles and research insights. This is perhaps characteristic of a young and emerging field. Figure 12 below presents a summary of the projects reviewed in this chapter.

	Site-specific	Use of Narrative Conventions	Media Language	Location aware technology	Evaluation
The Missing Voice (Case Study B)	yes	yes	audio only	none	none
Telephone Call	yes	at times	audio and visual	none	none
Her Long Black Hair	yes	yes	audio and still pictures	none	none
Invisible Cities/Sounding Baltimore	yes	no	audio	GPS	none
[murmur]	yes	no	audio	none	none
34 North 118 West	yes	yes	audio	GPS	none
Call Cutta	yes	at times	audio	none	none
Another Alice	yes, but can be adapted to other places	yes	cinematic	WiFi triangulation	yes
MIT in Pocket	yes	yes	video	WiFi	yes
15 Minutes	no	yes	audio and visual	WiFi	yes
Riot!1831	yes	yes	audio	GPS	yes

Table 3.1 Location-based multimedia stories characteristics summary

In general, by transposing narratives to real spaces, location-aware narratives push the boundaries of interactive narrative in a way similar to the way in which hypertext pushed linear story structures. Hypertext and location-aware stories are both concerned with spatial and navigational relations between story fragments. Hypertexts are web-like systems where fragments of information can be encountered and remixed by the readers as they navigate through the space of the work. The author designs the content and the pathways through the system and encodes the packets of information as a series of clickable nodes. Forming

pathways between nodes in hypertext gives the author control over the closed structure of the work. But in location-aware works, this structure is open and unpredictable, dependant on the path that the audience chooses to take. The order in which the fragments are experienced is truly open and the author has no control over which path will be chosen by the participants. After designing the overall narrative structure, the author relinquishes control to the audience. The author's determination of the paths is erased and the audience has total agency in an uncontrollable, unpredictable way. We believe that the use of the city as a linking system, the freedom in which the audience is let explore the city and the story space some of the major strengths of these kind of projects.

An issue often encountered with artistically orientated projects is that they lack a formal evaluation of their results and the effect they have on their audience. Art projects tend to be experienced by a diverse audience, whose opinions or impressions are left unrecorded. Janet Cardiff's evocative and compelling work is a good example of this. The art practices do not include evaluation methods. One reason for this is that there is still an open debate on both the value of, and how to conduct, formal evaluations in the domains of the arts. These problems are exacerbated by the difficulties involved in evaluating complex interdisciplinary fields and the general lack of a methodology. Research projects, on the other hand, use more scientific methods to measure users' experiences, i.e. qualitative and quantitative evaluations such as interviews and questionnaires.

In the analysis of the reviewed projects, we have highlighted the use of a range of different narrative styles, from narrative conventions for storytelling such as dramatisation of the events, to documentary style interviews relating people's testimonials about stories and places. One project (the *Call Cutta* project) adopted a combination of storytelling and live performances, where the artists connected and interacted with their audiences in real time.

Not all location-based narratives make use of location-tracking technologies. Other approaches involve the use of a narrator to direct the participant's gaze and body through the space. However, more than half of the projects reviewed used GPS tracking to locate the user in space. A smaller set, 20 percent, opted to use WiFi signals to track users.

Interfaces to the projects ranged from CD players and video cameras, to mobile phones and PDAs. The interaction strategies were diverse, depending on the type of technology and interface used. For example, with PDAs users can walk around and experience video and audio delivered to them on site, whenever they happen to be in an appropriate location. With mobile phones, the audience is required to situate itself in the key locations and actively request content by dialling a number (e.g. the *[murmur]* project), or asked by the narrator to wait until they reach a certain spot before continuing with the story.

Through this review, we have identified three main categories in which the location-based narratives can be grouped:

1) Distributed Soundscapes and Audio Based Stories. These are projects in which artists and researchers have expressed themselves in the area of location-based stories through audio and sounds installations.

2) Distributed Multimedia Stories. These projects involve stories experienced on the move (by a mobile audience and through portable devices such as PDAs, laptop computers and mobile phones) and expressed in audio-visual media. Their methodology and design and content can be exported and reproduced for different locations.

3) Site-Specific Distributed Multimedia Stories. These are site-specific stories, distributed in real space, that make use of audiovisual language and mobile media to link stories to places. These narratives always have an exclusive link to the specific locations in which they are set.

Although most place-based narratives make use of some form of location-aware technology, they do not necessarily have to. For example, a system could involve fixed public screens, which react to the presence of their audience and release site- specific content, or pre-recoded media that play back as the participants walk around the place, instructed by the author, such as in Janet Cardiff's work.

As a result of our categorisation of location-based story projects, we can now situate LAMS as a subset of the category of site-specific distributed Multimedia narratives. This thesis therefore defines LAMS as narrative systems that specifically make use of location-aware technologies to locate and embed audio-visual content in space. This is illustrated in Figure 3.11 below.

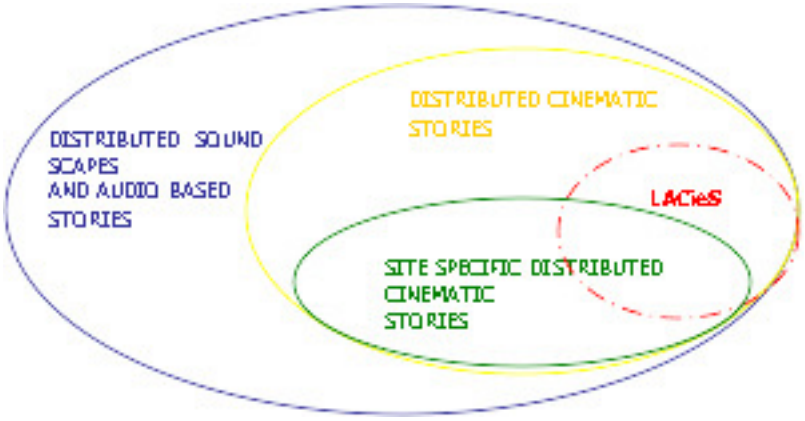

Figure 3.11 LAMS as a subset of the Location Based Stories domain

3.12 Synthesis: LAMS

LAMS possess the following characteristics: they are mobile, distributed or spatialised, site specific, location-aware and make use of multimedia and cinematic conventions. A narrative is mobile when its content is experienced on the move by its audience. The narrative is distributed when its content is fragmented and embedded in real space. In this way, its audience has to roam real space to collect story information. The content is site-specific when the same experience cannot be set up in different locations without having to rewrite or extensively adapt its content. These narratives deal with stories that are still experiences on the move, but the story content closely relates to the location where it is made available to its audiences because the story happened, was conceived or was filmed in that particular location. For such projects, the real place is an intrinsic part of the story experience, and a special resonance is triggered between the real place and the media artefact. The audience can relate the story to the location where it is experienced or where the narrative fragment has been retrieved. The spatial distribution of the story to the relevant locations is considered a design element and an expressive tool for the author. Furthermore, LAMS are multimedia audio-visual productions, often making use of cinematic style, in other words, using appropriate dramatic conventions and audiovisual language to narrate the story events.

3.13 Summary

In this chapter we have reviewed mobile location-specific story projects. We have identified similarities and differences among the projects and analysed how each one deals with the issues of narrative, space/place and immersion. We also considered if and how their work has been evaluated for academic purposes. We have drawn specific categories for different types of location-based narrative projects, and within this classification scheme we proposed the term LAMS (Location Aware Multimedia Stories) to describe a specific approach within locative media practice. We propose the term as a minor contribution of this thesis.

4 CHAPTER *CASE STUDY 1: HOPSTORY*

4.1 Introduction

In this chapter, we present the Hopstory concept and its implementations, versions 1.0 (H1.0) and 2.0 (H2.0). Hopstory (Nisi 2004b) (Flanagan 2004) is our first experimentation in LAMS systems. We conceived and designed the Hopstory with the intention of looking at the potential as well as the constraints of digital storytelling in the context of LAMS. By pushing the boundaries of visual cinematic narrative beyond the opportunities offered by linear media as well as interactive CD Roms that make use of screen based desktop computing as their main input and output. With Hopstory we decided to position the story out in the real space where the audience physical navigation of the space becomes a blind editing process of the story material. In Hopstory, the audience members assemble their own versions of the narrative based on their progress through the space but without changing nor choosing any of the particulars of the story itself. Furthermore the project explores how story content can be linked to the place in which the story is set and experienced, allowing the space to express history and personality. In this chapter, we describe the experimental approach we took to distribute the story in space and time, the creation and production processes, the interaction and interface design and its technical implementation. The complete audiovisual story material produced for Hopstory is included as support material in the NisiPhD DVD. In this chapter we also present a relatively informal evaluation of Hopstory version 1.0 and highlight principles that may prove useful for future LAMS. Subsequently, we describe the design principles of Hopstory 2.0, which was implemented on the basis of the feedback collected from the first version. Finally, we summarise our findings and the lesson learned from both versions of the Hopstory project.

4.2 Buildings as containers for stories

The Hopstory combines multiple-point-of-view narrative with the metaphor of a building as a container for stories. Buildings and architectural structures can be inspiring elements in interaction design as they prompt the audience in taking actions that are at the basis for a successful interaction design strategy.

> Architecture is said to be interactive because it allows the visitors to participate in the keys steps of interaction: observation, exploration, modification, reciprocal change. Elevator, windows, doors, staircases, all these environments are potential for interaction, but an empty building is only a frame for what happens there. The people make the place interesting, and the process of subdividing space, framing the interaction among people is the primary goal of interaction. (Meadows 2003)

I began exploring the concept of buildings as story containers through the desktop based project Weirdview (Nisi 2004a) and then expanded it into the Hopstory LAMS system (Nisi 2004a), (Nisi 2004b). Hopstory is a distributed cinematic story designed for Dublin's old Guinness Hop Store building, where the Guinness brewers used to store the hops for its beer making. The Hopstory narrative is composed of forty-eight story fragments that illustrate the lives of the four characters as the story progress through their day. Each character enters the building at a different point in the day and moves around the building to carry out his or her daily tasks. Ambient scenes supplement the narrative, providing background historical information when no character is present in the scene. Ultimately, when the participant is satisfied with the collected story fragments, she can play back her collection of clips. The story is experienced in the style of traditional cinema, through a linear succession of scenes played back on a screen. However, this final movie is assembled differently by each audience member, and each movie will possess a different number and combination of scenes, characters and plot events.

From the beginning, the intention was to provide the audience with a general feeling for a day in the old brewery building of the Guinness factory when it was an active industrial building. Arthur Guinness purchased Rainsford's Brewery next to the Hop Store in 1759. For decades, the Hop Store building was used to store hops, a key ingredient from which to make beer. (Guinness stout in fact is made from water, barley, malt, hops, and brewer's yeast. A portion of the barley is flaked (i.e. steamed and rolled) and roasted to give the stout beer its dark colour and characteristic taste). In the 1980s, the building became a museum hosting the 'World of Guinness Exhibition', an audiovisual show on the history of Guinness in Ireland, a model Cooperage and Transport Museum, a souvenir shop and a bar where Guinness beer

could be sampled by the visitors of the museum. The two top floors of the building used to host a variety of art exhibitions throughout the year.

During the autumn of the year 2000, the Hop Store building was in the process of undergoing major changes as it was being transformed into a cutting-edge technology research lab, the Media Lab Europe research centre, (MLE). MLE, from 2000 till the early 2005, occupied the renovated Hop Store building that had been historically part of the Guinness brewery complex on James's Street, Dublin. Situated in the heart of the Liberties area, an inner city, disadvantaged and historically charged Dublin neighbourhood, the Hop Store serves as a historical and anecdotal referential point for the area. However, the everyday life of Media Lab Europe was significantly different from the traditional brewery business conducted in the Guinness complex. Every few months, the MLE would host a day-long event where visitors and sponsors of the institution came to the Dublin lab to view the research that was carried out in the media and technologies fields. On those days, the researchers would demonstrate their current projects to the visitors. These situations provided the opportunity to implement and evaluate some challenging ideas about LAMS.

While the building was stripped of its museum elements and before it became filled with computers, we saw the potential of staging our stories in the building and filming in such an evocative place, before the transformation into a media research lab was completed (see Figure 4.1 below).

Figure 4.1 Two photographs of the first floor of the Hop Store building during the renovation works that transformed the Hopstore museum into the MediaLabEurope research facility. The pictures capture the authentic feel of the Hopstore as a Hopstore given by its stonewalls and dark lighting conditions. These atmosphere were captured in the Hopstory audiovisual in order to enhance the resonance between the story clips and the building itself.

Filming in the same location where the fictional characters might have worked would empower the place and augment the audience story experience. The intention was for the space to be a protagonist side-by-side with the characters in the story. A key design philosophy was to foster the immersive and engaging qualities of the narrated events by relating them to the real space surrounding the audience. Hopstory was conceived, written and filmed with the intention of letting the participants be immersed in the story world while collecting the narrative fragments. The building space was intended to function both as a navigation structure and as the setting for the events. For these reasons, the Hopstory scenes were filmed in the locations where the story is set, thereby creating a visual overlap between the film and the real space.

The story recounts a day in the life of four fictional characters who might have worked in the brewery building in the 1940's. As their day unfolds the audience is able to switch perspective depending which character they encounter in their walk through the building. At each stage in the story any particular character has a limited view of the building space. This view parallels what the audience sees at the time that they collect a particular scene. Walking around the building becomes an exploratory action in search of story elements and at the same time the editing process of the narrative itself. Furthermore, the progress of the story creates a relationship between a character's time and the time the audience takes to navigate the space.

A cynical brewery cat character was created based on a word of mouth anecdote, collected during an interview with a former Guinness employee that used to work in the Hop Store building. The anecdote refers to a big cat that used to live in the building, undisturbed by the work of the employees. Brewery cat sculptures were staged at particular spots of the building floors, indicating to the audience the locations where the story content is available and the location where they can view the story video clips. The cats were attracting attention and also representing mute and objective witnesses to the scenes. The cat sculptures in fact represent a special character in the story, an old brewery cat that conveys an objective point of view on the social conditions and historical facts of the neighbourhood where the brewery is located, at the times in which the story is set. Each cat has a unique ID associated with it, which

identifies the location and the time in the story at which the clip is collected. In fact, the Hopstory experience is mapped to real time. In order to progress the story time, the system would advance the clips available to the next time slot in the story every so often. The real time to which the story time is mapped can vary from one to a few minutes, depending on the authors' choice.

The audience traverses the building space according to their desire to visit the Hop Store and experiencing the story. During the visit the story progresses, and as the audience members pass the various cat sculptures they can collect the scene's unique ID tag that is current with that cat at that time. According to the timing and navigation of the journey though space, each visitor creates a different story edit. When they desire, visitors can go to the designated playback area and view the scenes they have collected in the order in which they have been retrieved.

In addition to what has been described above, the initial concept for the Hopstory encompassed an ad hoc network structure that connected the brewery cat character with the mobile audience. A mobile device operated by a researcher during the staging of the Hopstory experience would signal its presence to the fixed cat nodes sculptures. The audience retrieving content from that node at that time would receive a video clip narrated from the cat's point of view. The use of the ad hoc network to connect the cat to the story was intended to add an element of surprise and randomness to the narrative, combined with the novel use of ad hoc network technology for storytelling (Doyle 2002). The use of the ad hoc network was different in the two versions of the project. We will describe the specifics of the use of the ad hoc networks in the sections related to each particular version of the Hopstory.

4.3 Hopstory Design and Methodology

This section first presents the story design and narrative structure of the Hopstory. And secondly it describes the relationship between the place and the content of the story. The following sections describe the Hopstory I technology and installation.

4.3.1 The Story Design and Structure

A brainstorming session took place at the MIT Media Lab in Boston in November 2000, to kick-start the project. This researcher and Alison Woods from Story Networks, two members of the Interactive Cinema group, Dr. Linda Doyle from Trinity College Dublin (at the time closely involved with the Story Networks research) and Glorianna Davenport (head of the both the Interactive Cinema Group and the Story Networks Group) took part in the session. During this session, we decided upon the creation of the main characters for the story and the additional brewery cat character, the latter to be released through an ad-hoc network structure. The session was informed by Glorianna Davenport's workshop methodology for creating characters for interactive narrative (Pan 2004).

Alison Woods and I began to construct the story elements, such as characters, setting and plot, by investigating the history of the building that would host the installation. This research informed the choice of characters and the development of a perspective-based story for each one of them. The characters' actions were informed by personal accounts of social conditions in the Liberties, the neighbourhood surrounding the brewery, and the lives of workers at the brewery in early 1900. These accounts were drawn from a number of different sources. We interviewed former Guinness employees who used to work in the Hop Store building. The conversations with these former Guinness employees gave us some idea of how life was in that building around the times when it was still used as a Hop Store. For example, workers used to have free Guinness to drink during their break during the day. We also learned that big grey cats roamed the brewery grounds and buildings freely, especially during the night, to catch rats and mice, scaring the late-night employees and the security guards. The narrative was also informed by the history and folklore of the surrounding area (Johnston 1985) and of the Guinness brewery in particular (Byrne 1999). The researched information was reinforced by our access to the physical surroundings of the Liberties, and that provided a concrete starting point for scene visualisation and plot events. For instance, the girl whose father worked at the brewery would have lived close by in one of the small houses that were built by Guinness for the workers; the short distance from home to work-place meant that the girl in the story was able to bring her father his forgotten lunch. The architect working for the Guinness Trust, on the other hand, might have visited several locations of the estate during

the course of the day. He would have used a bicycle to get around. Plot events centred around an accident caused by a combination of arbitrary actions from each character, providing many causal threads from which the audience can build connections. The coherence of the audience experience, therefore, depends on how the scenes are crafted in their entirety. Story time always moves forward; this principle insures that no matter how many or how few scenes are collected story time will always progress. In addition to this principle, additional crafting helped the scenes flow from one to the next even as the ordering resulted in shifts in character perspective. These techniques are discussed below.

Simple themes are referenced in multiple scenes to unify the characters' stories. For example, a recurring theme is food. The foreman is very hungry throughout the whole story because he missed dinner the previous evening and forgot his lunchbox for the day. His hunger is mentioned repeatedly throughout his story and it also influences his actions during the day. To connect to this theme, the other characters often refer to food and meals during the day, creating a common theme among the story fragments narrated by the different characters. For example, the foreman's daughter starts her day by bringing a lunchbox to her father.

The characters' days are very different from each other. The foreman attends to the machinery while the foreman's daughter simply wanders through the building. Sometimes they can be seen at the same time in the same location or dealing with the same events from a different perspective, conveying the impression of a connected overall narrative. An example is the boy's accident, which happens in the Hop Store in the late afternoon. Each character experiences it in some form, even if just auditory. This technique is used to emphasise the differences in perspectives among the characters regarding the same incidents. The accident involves the boy falling on the ground while climbing a stack of kegs and it can be experienced by the audience from each character's point of view: the boy's first-person perspective of falling from the stack; the foreman witnessing the accident and feeling guilty about having assigned the task to the boy; the foreman's daughter who is scared by the noise but curious about its source; and the surprised planner, who hears the noise and wonders what's happening on the other floors of the building.

The perception of the different story fragments as a whole is further facilitated by the presence of some characters in other characters' scenes. For example, the boy arrives late into the Hop Store building. As he sneaks inside, he sees the foreman drinking a glass of beer with his men near a window. The viewer can see the men laughing from the boy's point of view. At the same time, the story experienced from the foreman's side does not mention the boy, because the foreman cannot see him. In another scene, the planner spots the boy hiding behind a wall. The boy is hiding from the foreman because he arrived at work late. From the planner's point of view, the encounter is of minimal importance as he is completely absorbed in his work and barely notices the child. The boy would be just a shadow in the background for the planner, but from the boy's point of view, the incident is quite important. In the boy's scene, the planner walks by in front of him and stares at him for a second. The boy then puts a finger in front of his mouth in order to ask the planner not to tell the other workers of his whereabouts.

With these techniques, we attempt to ensure that an audience member receives a coherent and meaningful narrative, regardless of the number and order of the scenes collected and independently of the presence or absence of any specific scene.

In Hopstory, we use the day-in-the-life narrative structure for each one of the four main characters, converging into a day-in-the-life story of the brewery Hop Store. Built up through a succession of incidents that occur over the course of the day in different parts of the building, the characters finally converge to witness a common event each from their own personal point of view. Alison Woods then wrote the story, developing the characters and events that feature in the narrative.

During the time that the story was written, Alison Woods and I worked together on the project content and interaction strategy, designing a physically distributed story structure where a real space coincides with the story setting and story time is mapped to real time. We combined the "day-in-the-life" documentary structure with the possibility of articulating the different points of view of each character in parallel, as they spend their day moving through the building. To visualise this structure, a two-dimensional grid was created where space and time are located on two axes and the characters move around the grid. The time was mapped

to the X axis and space to the Y axis. Each square in the grid corresponded to a particular point in time and space. The corresponding scene was described on a post-it note and positioned in the grid, in the appropriate time and position slot, as shown in Figure 4.1.

Figure 4.1 The structural storyboarding grid for Hopstory, space is reflected on the X axis of the grid while time is reflected on the Y axis . The initial storyboard for the Hopstory LAMS needed to capture the scene essential description as well as the characters movements through the building. Short description of the character actions were written on colored post it notes. Each post it has a different color depending on the point of view from which the action was described. Then each post it was positioned in relations to the time and space where the scene was going to be retrieve by the viewers.

As time progresses in the story from six o'clock in the morning to six in the evening closing time for the building the characters move from one location to the next. The story time is mapped to real time. Every hour in the story was mapped to one time slot in the diagram for a total of eight. Each time slot was assigned a duration in real time which could vary depending on the authors plans of how long they wanted the participants experience to land divided into eight time slots by compressing east. For the Hopstory I installation a value of 2 minutes was assigned to each time slot. As a result, the whole story lasts for 16 minutes. During this time the participants can visit up to six locations where the characters can be found. The whole story is made up of 48 one minute long scenes distributed through the 6 locations. At each location in fact the scenes are progressing through time from time slot 1 to 8. The progression of the scenes at each location simulates the passing of the time during the day and ensure a variety of content retrievable at each location.

A third layer of information was added through the use of colours. Each character was assigned a different colour. This was intended to enable us to spot immediately where each character was at any given time, just by looking at the board. Since not all the grid slots could contain characters at all times, we designed a number of additional scenes. We called these *ambient scenes*, as these scenes were conceived in order to fill in the story slots where no character was present. Each ambient scene related to a time of the day as shown in Figure 4.2.

Figure 4.2 Working scheme for the storyboard structure. The grid illustrates the spatio-temporal construct of the Hopstory, indicating the position of each character and of the ambient scenes at any given time. Time is reported on the Y axis and space is referred as Post (1, 2..etc) on the X axis. A number of these charts were produced before finding the final structure for the story and the position of all the Hosptory scenes.

We paid attention in post-production to carefully adjusting the light of the scene to suggest the time of the day when each took place (see Figure 4.3)

Figure 4.3 Two screenshots from the Hopstory audiovisual content. To the left: Early morning: the foreman cycling to work at dawn and to the right: ambient scene of a street of the Liberties neighbourhood, surrounding the Hopstore.

The ambient fragments do not progress the plot and have no audio narration, but they show locations and characteristic landmarks from the surrounding neighbourhood. They have ambient sound and are intended to add flavour and atmosphere to the story. A total of scenes of about one minute each were designed, scripted and produced. Additionally, for each scene we developed a narration of the events from the point of view of the witnessing brewery cat. The cat character media clips featured a close up of a cat narrating the event from its own objective point of view. When the roaming cat character metaphorically contained in the mobile device came within range of a cat sculpture, the tail of the cat sculpture would blink and the audience member, collecting content from that sculpture in that moment, would receive a scene narrated from the cat's point of view. The cat video clip would be superimposed onto the character or the ambient scene and the cat's audio narration would prevail. In this fashion, the cat would provide the audience with information about the social and historical conditions of the Liberties area in general and the Guinness brewery in particular during the 1940; the time when the story is set.

The other characters in the story move through the spatio-temporal grid representing the building time and space according to their role and actions over the course of the day. A young boy goes to work, entering the building from the back door, for example, while the young daughter of the foreman comes in to the building through the main door later in the morning. The planner and the foreman arrive at the building at different times of the day and move through the Hop Store as they go about their daily tasks. Within the creative limits of

each character's appropriate activity, a sequence of events was created to progress the overarching plot to a climaxing event. This climaxing event depicts the accidental fall of the young boy from a stack of kegs. The event is perceived by each character based on his or her physical location in the space. Although it is perceived by all characters, each from their own physical perspective in the space, the event is a driving scene for a couple of the characters, while for the others it is merely tangential.

Once the interactive story design for the Hopstory LAMS was completed we proceeded to script and storyboard the content for filming. Subsequently we went into production of the digital media. Non-professional actors volunteered to perform as the story characters. The story was set and directed in the Hop Store premises; care was taken to avoid the modern features of the building in order to maintain the feel and atmosphere of the 1940s. During production special attention was paid to the specific qualities of the place to be portrayed in the filmed elements. The brick walls of the Hop Store for example are easily recognisable in the film scenes, so are the windows.

Figure 4.4 Screenshots showing a sequence of frames of the girl character passing through the building. Attention was paid in the framing so to include the stone walls in the pictures to enable viewers to confront the visuals of the story with the real space surrounding them.

The filmed material was subsequently treated in post-production with multiple passes through colour filters to create a vintage atmosphere, as shown in Figure 4.4 and 4.5

Figure 4.5. Screenshots from the boy character's story. The selected frames a selection from the first scene to the last one of the boy's character story. Attention was paid to maintain the same mood and atmosphere through out the character day.

An important issue regarding the design of LAMS systems is whether story's fragments should be played out when the visitor is co-located with the space that relates to the story or whether the scenes should be collected for later replay. In the case of Hopstory, we chose the latter solution in the belief that, if the story was offered as a fragmented experience, the sense of the whole story would have to compete with other information given out in demos and random conversations taking place in the building at the same time. Therefore, rather than viewing each scene in full at the time it is encountered, the audience saves up its collections for later viewing, at the playback area. Only a short audio cue is played on location, manifesting the presence of the character just encountered and reassuring the audience members that a story clip has been uploaded to their collection.

4.4 Implementation of the Hopstory 1.0

This section presents the technological implementation of the first version of the project.

4.4.1 The Technology

The initial development cycle for Hopstory was two months, November and December of 2000. *iButtons*, metal coins made by Dallas Semiconductor (Maxim-Dallas semiconductors), provided a relatively inexpensive and easily programmable technology that would allow the audience to collect the story fragments in the Hopstory 1.0 installation. Often used for security applications, *iButtons* have two parts – a small button (or fob) and small metal contact receptors. In the Hopstory installation, receptors were embedded in each of the cardboard cat sculptures, and each audience member was given a fob (see Figure 6).

Figure 4.6 *Photographs showing the iButton fob and how it is pressed in its receptor in the above part of the picture. Below the picture shows a Hop Store cat sculpture with receptor in position.*

This arrangement enabled the audience to collect and play back their story scenes through physical contact with the cat sculptures. By touching the fob to a receptor, contact is established and a two-digit scene identifier is transferred from the receptor to the fob. Each receptor was connected to a local computer, which, when the fob was touched, played a short audio segment – either from the current scene or, if no character was programmed to be at that spot, a random anecdote as perceived by the cat.

When the audience members finish their journey, they touch their fob to a final receptor at the designated playback area and the list that they assembled is downloaded to the play back computer. The scenes are then played back seamlessly by an application written in Isis programming language (Agamanolis 1997).

In addition to the *iButtons*, Hopstory 1.0 made use of a mobile device that communicated with the cat nodes through an ad hoc network. The device metaphorically contained the cat character and its story anecdotes. The roaming cat-device moved around the space, operated

by one of the researchers. When the roaming device enters in range with a networked cat node (represented by the cat sculpture containing a discoverable ad hoc networked laptop), the spirit of the cat character entered the nearby node. The audience collecting scenes from that node at that exact time would retrieve a story fragment narrated from the cat's point of view.

4.4.2 *The Hopstory 1.0 Installation*

The Hopstory 1.0 installation takes advantage of the real space of the Hop Store building in order to navigate the story content. As David Rokeby points out in his essay, Transforming Mirrors:

> The navigable structure can be thought of as an articulation of a space, real, virtual or conceptual. The author structures the space with a sort of architecture, and provides a method of navigation. Each position within the conceptual space provides a point-of view […]. Exploring this structure presents the spectator with a series of views of the space and its contents. The sequence in which the spectator experiences these vistas forms a unique reading of that space (Rokeby 1995).

Inspired by Rokeby's description of navigable structure, we interpreted the story space as a navigable structure or world. In the case of the HopStory, the architectural metaphor can be taken literally, and audience members can order their scene list based on their own decisions about how to journey through the space.

While using the fob was simple enough, some introduction to the installation was still required. We settled on the following scenario. As the visitor entered the space, she picked up a key ring with an attached *iButton* and card, which contained the following instructions:

> When you see a cat, approach it. Press your *iButton* against its silver disc for a few seconds. As the story progresses over time, you can visit any cat more than once. The story starts again every quarter hour. When ready to see your story, bring your *iButton*

to the playback projection area. Press it onto the cat you find there to view your personal version of the Hopstory.

After reading the short instructions audience members set off to explore the Hop Store space and experience the Hopstory installation.

4.4.3 Audience Reactions to Hopstory 1.0

Hopstory was demonstrated at the "Extreme Interfaces" show case event, held at MLE in January 2002. Throughout the day of the event as visitors entered, we handed them an instruction card and an *iButton*. Visitors freely roamed the MLE second floor, where the Hopstory was installed, collected scenes and returned to play them back at the designated playback station. As they returned, they shared with us their impressions and learned more about the installation. Since we did not conduct a formal evaluation, the results are somewhat tentative.

In general, the audience was interested in and curious about the distributed structure of the narrative; they found the concept of a location-based narrative fascinating. A variety of visual aids were used to explain how the story was distributed in space and time, as shown in Figure 4.7 below.

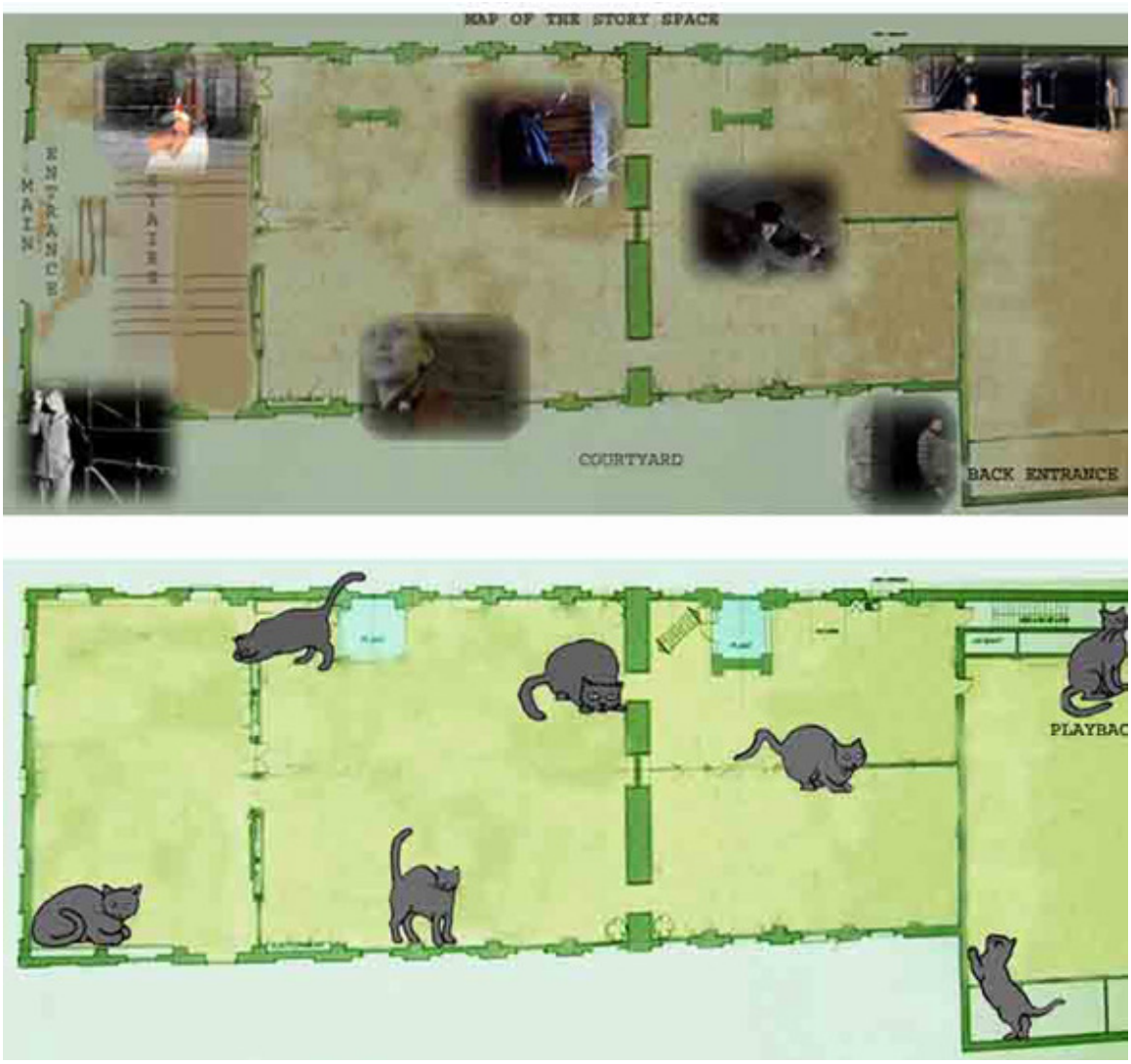

Figure 4.7 Visual aids for the audience of the Hopstory experience. Above: a picture of the Hopstore floor with screenshots from the different story characters present at different locations of the floor space, representing a visualization of the Hopstory concept. Below: a map of the Hopstore floor where the Hopstory takes place with the cat where story content is available to the audience.

Very few audience members had problems with the *iButton* technology. The interaction was simple and most users were able to interact with the system with no difficulties. The audience enjoyed looking for and touching sculptures of the brewery cats; they were easy to find, appealing and even amusing. On the other hand the implementation of the ad hoc network during the installation was unstable and the audience was confused about it. The connection between the roaming device and the fixed nodes was not always successful and the cat narration was not released in the presence of the roaming device. Lack of formal testing did not allow us to establish the causes of the malfunction.

The separation of story navigation and story viewing provoked mixed response among the users. While some had difficulty relating the collected fragments to the experience, others enjoyed the fragmented experience. They pointed out that not having to stop and view the story at every node created a less disruptive experience, which contributed to a more coherent plot when retrieved at the end of their journey. In the end, the separation of story navigation from content viewing and the final public projection of the different audience members' assembled stories, turned out to be revealing, sociable and fun. At the playback area, audience members were able to compare their assembled movie with those gathered by others in the form of a public projection. As audience members compared story paths, they learned from other collections more about the characters' experiences during a day in the Hop Store. This style of viewing emphasises the cinematic experience of narrative, and stimulates reflections on how public installations can be used for collective cinematic experience.

The audience recognised elements that were present in the film and in the surrounding space as well, such as red brick walls, windows and some architectural features such as the little alcoves in the middle of the rooms. See Figure 8 below. The audience recognised those elements and made connections between the filmed media and in the surrounding space, which often let to surprising and satisfying moments in the experience.

Figure 4.8 Screenshot from the Boy's story: the Boy behind the alcove. The video clip of this scene was available to the audience in front of the window featuring in the background of the shot in order to connect the audience experience of the building with the story world.

Different visitors collected story fragments in different ways. Some visitors did not realise that the story only lasted around 20 minutes and collected fragments only when they happened to come upon a cat sculpture during the day. When these visitors came to the playback area to cash in on their story, we usually had to refresh their understanding of how the experience worked in order to help them relate to their collected fragments. Other visitors focused fully on the Hopstory installation, actively searching for all the cats. These visitors collected story segments rapidly and then immediately came to the playback area to review the story they had collected while navigating the floor. These visitors had a better understanding of the story experience. A few wanted to go back and experience more stories and encounter different characters, as they had noticed from the public projection of others that different story clips could be encountered. Finally, the visitors passing by the playback area who had not participated in the Hopstory demonstration stopped and watched movies that others had collected and wanted to talk about the demo.

One advantage of using *iButtons* for interaction with Hopstory was the non-intrusive quality of this technology. *iButtons* are portable and undemanding, leaving the audience free to make choices about their level of engagement with the story at any given time. They could remain in a bag or pocket, easily accessed if a participant chose to engage with Hopstory. They stored story bits so that a conversation could be held during collection, and viewing could occur later when convenient. Furthermore, *iButtons* are easy to use also because they don't have a screen or buttons.

With the Hopstory, we place the selective interactive act of the audience in the navigation and collection of story fragments before the viewing. Consequently, each audience member is empowered with the agency and personal responsibility to explore the physical environment and by doing so to collect story fragments in order to assemble a complete personalised narrative. The story experience only comes in at a second stage. When the interaction with the location is concluded, then and only then can the final result be viewed. This aspect of the interaction design was appreciated by the audience, who could choose whether to engage fully in the story experience or save their story collection for later viewing. Furthermore, each participant's story will differ from those constructed by other audience members, and each will be made public at the projection station. In this way, the Hopstory LAMS design allows the audience to experience agency in navigating the story world and collecting personalised versions of the narrative, maintaining the characteristics of story sharing. Finally, the story is linearly presented and is intended to preserve a loosely arced narrative structure, even if this result was not achieved with every combination of the story clips.

Drawing from these results, we decided to maintain the same media content and implement a second version of the project, redesigning its interaction strategy and interface, but maintaining the public projection of the collected content at the end of the experience, preserving the separation between navigation and viewing.

4.5 Modifications for Hopstory 2.0

A second version of the Hopstory was designed and implemented after the feedback received on Hopstory version 1.0. We decided to re-design the Hopstory interaction strategy and interface in order to strengthen plot coherence by allowing the audience to follow one character at the time, and we also decided to rethink the use of the ad hoc network in the project (See Fig 9). The following sections describe the re-design of the Hopstory project, its implementation and informal evaluation. The implementation of the Hopstory 2.0 system and the testing was carried out by Sean Flanagan, an undergraduate student at Trinity College Dublin, for his final year project (Flanagan 2004).

Figure 4.9 A sketch for the redesign of the Hopstory 2.0 interface on a mobile device. The screen of the device shows a map of the building where the Hosptory experience takes place as well as the characters encountered while roaming the space. In the bottom right corner the icon of the cat alerts the viewer when a cat station with available content has been found.

4.5.1 Hopstory 2.0 Design

A number of changes were implemented in order to improve and experiment with the Hopstory concept. This section discusses these changes and their rationale.

We decided to develop a more subtle interaction between the story and the audience using Bluetooth enabled *iPAQs* instead of the *iButtons*. The intention was to make the story experience more seamless by having content signalling itself to the audience, instead of the audience having to collect it by looking for and touching the specific cat nodes where the content was stored. The Bluetooth technology has a range of circa ten meters. As a result of this fact, to avoid "story cells" overlap, the content needed to be spread out through a larger space and the networked cat nodes had to be spread through the building with a distance of at least ten meters between them. The second version of Hopstory, therefore, was implemented across the three floors of the Hop Store building instead of just over one floor, as in the previous version. Each cat had a whole room assigned to its set of story fragments. A map of the section of the Hop Store was displayed on the *iPAQ* screen in order to help the audience orient itself while exploring the building in search of the cats, as shown in Figure 4.10.

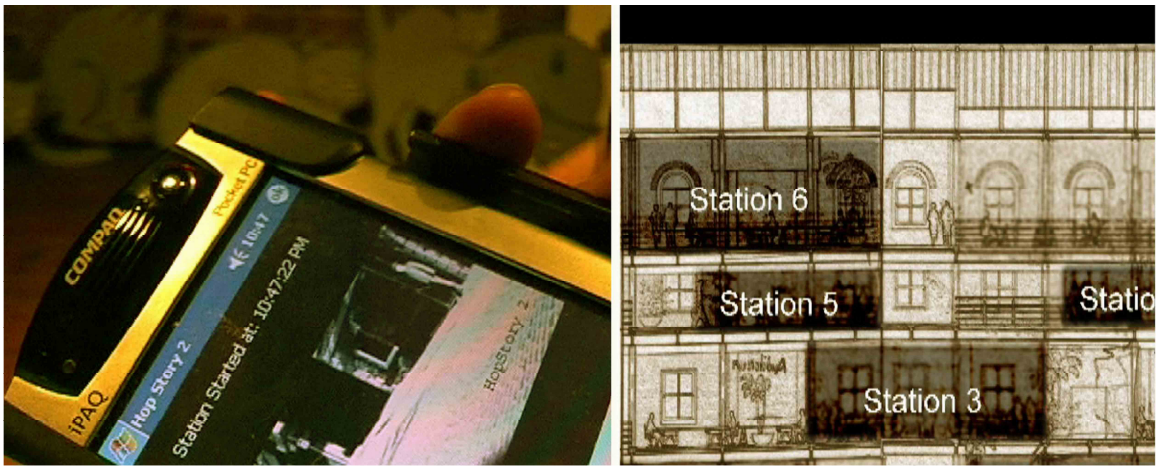

Figure 4.10 On the left: Picture of the iPAQ *Screen as the Hopstory 2.0 starts up. On the right: a close up of as the screen interface featuring the map of the building where the Hopstory takes place.*

The second major redesign of the project concerned the brewery cat character and the use of the ad hoc network. Due to the problems encountered with the ad hoc roaming cat in the Hopstory version 1.0, in the second version, the cat character video clips were interweaved in

the narrative progression without the use of the ad hoc network. The cat clips were inserted at places and times in the story when no character point of view was available. The cat close up was superimposed onto the ambient clips while the cat audio would take precedence over any ambient audio. With Hopstory version 2.0, the ad hoc network was replaced with Bluetooth technology, which was able to discover the cat nodes and communicate their location to the mobile device. A typical user scenario would unfold as follows: as the audience member enters in range with the cat node, the recorded sound of a cat meowing is broadcast from the cat sculpture, allowing the audience to easily find the cat sculpture. An icon of the cat will also appear on the client device. The sound of the cat meowing stops once the audience member has acknowledged the cat by clicking on the cat icon on the handheld device. The system will know that the audience member's client device is now prepared to receive information, and the ad hoc network is created via Bluetooth transmissions.

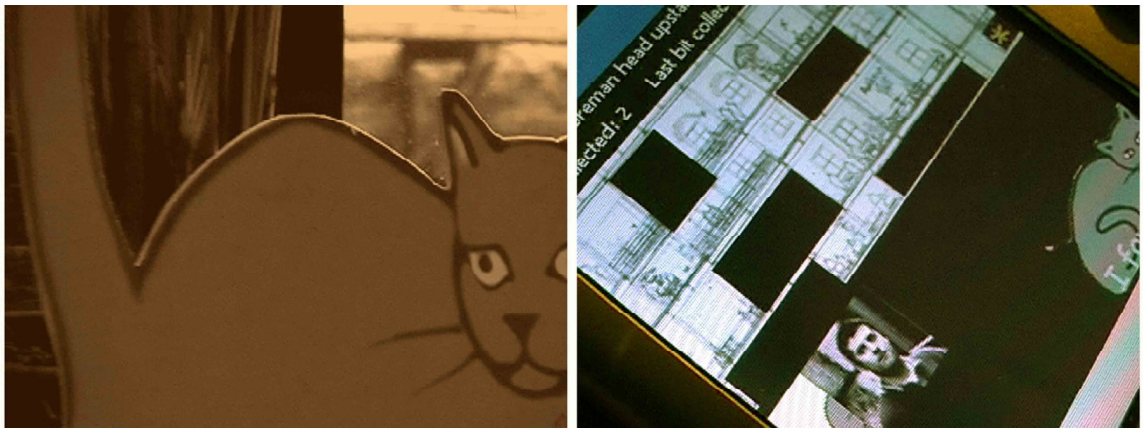

Figure 4.11 On the left the picture shows a Bluetooth enable Cat node detail. On the right the picture shows a detail of the working interface with the map of the building, a character icon and the cat icon.

This ad hoc network allows the user to receive a scene tag for the Hopstory narrative during each device–cat interaction. While the story clip identification number is being downloaded to the device, an icon representing the character just encountered appears on the screen together with a text message, as shown in Figure 4.11, 4.12 and 4.13. The text message appears on top of the device screen in the form of a suggestion coming form the cat character, e.g.: "I saw the foreman go upstairs". In this way, the text gives the audience the opportunity to follow one character at the time.

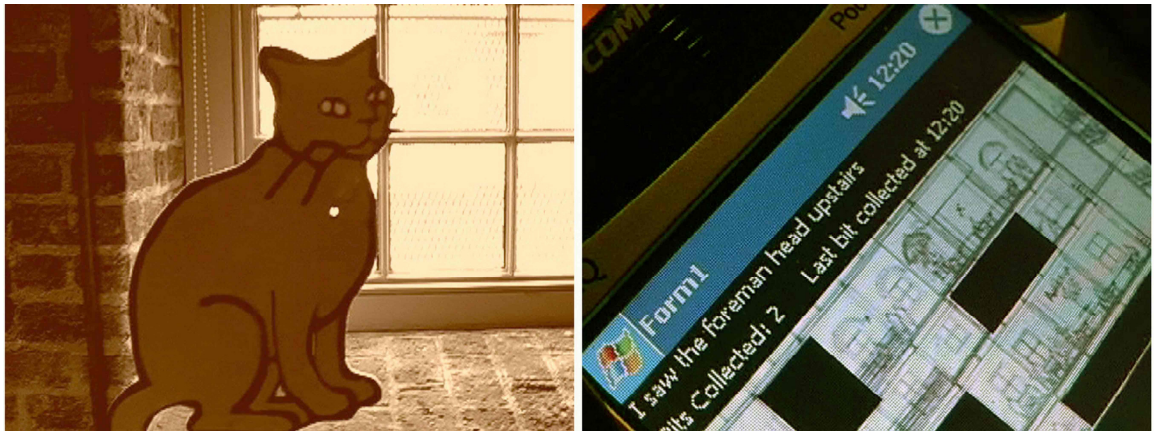

Figure 4.12 To the left of the image: Bluetooth Cat node positioned on the window to attract attention to the location. To the right: detail of the interface with a text message appearing on the device screen, signalling the next movements of the character just encountered.

This method is intended to strengthen the perception of the story plot and maintain coherence of character perspective throughout the collected fragments.

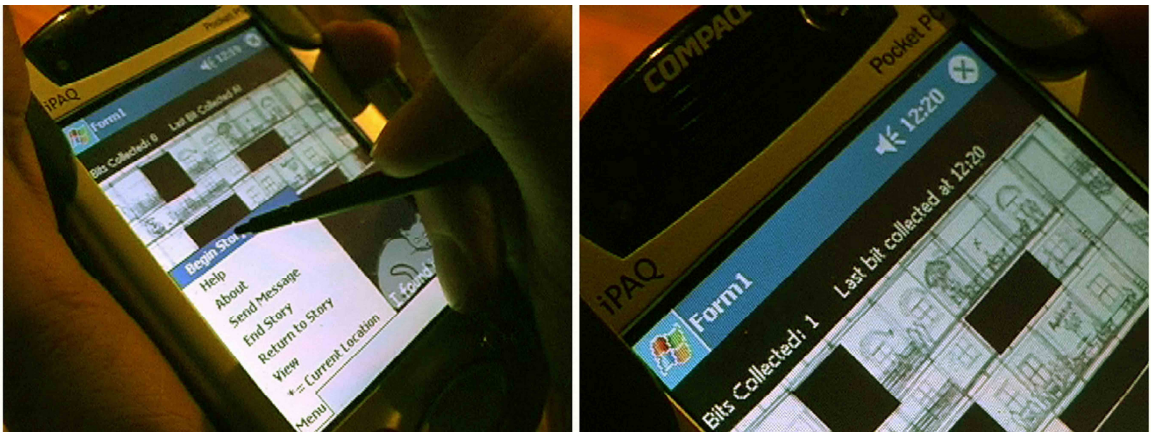

Figure 4.13 Pictures of Interface details. To the left, the user is starting the applications through the touch screen interface. To the right: detail of the mobile device screen reporting of how many story clips have been collected so far by the audience member and when.

As in Hopstory 1.0, when the audience members are ready they can direct themselves to the playback area, where the story clips tags collected on the mobile device are uploaded to a server machine, are assembled in software and presented to the audience in a public screening projection.

Story Bit Name	Pre Dawn	Dawn	Day	Afternoon	Evening	Guard	Planner	Foreman	Girl
Textual Representation	R	D	Y	A	E	U	P	F	G

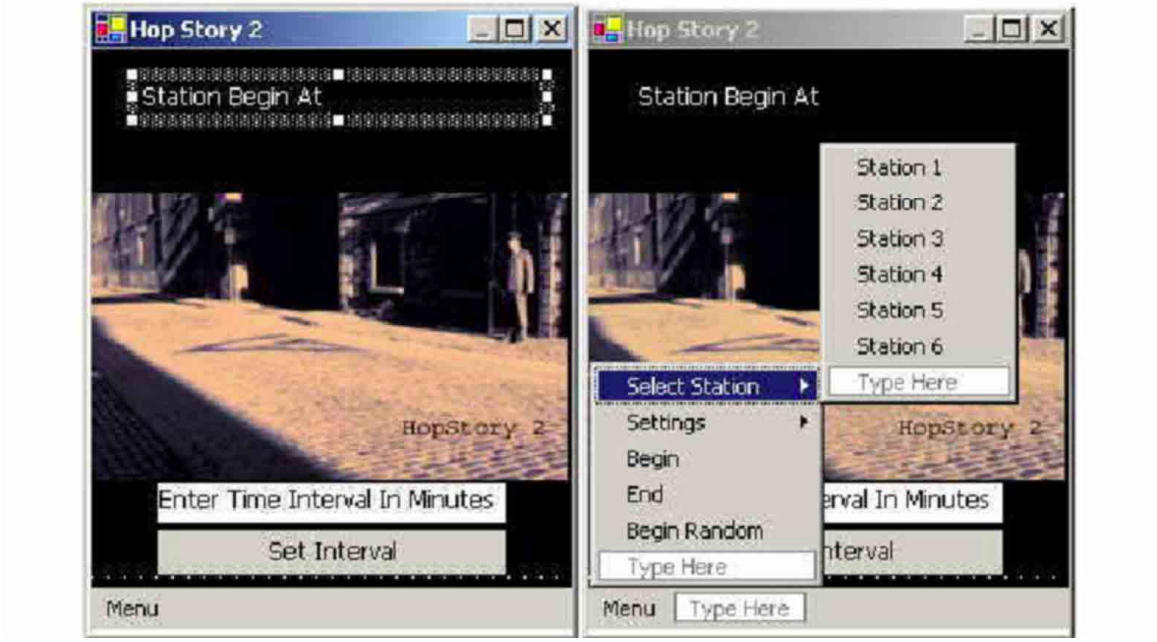

Figure 4.14 Picture illustrating some details of the Hopstory authoring software. Interface for the Story structure planning (above) and set up of the locations where the story is distributed in the real space of the building (below).

4.5.2 Technical implementation

Specific hardware and software was constructed by Sean Flanagan to fit the story distribution and the collection of story fragments via Bluetooth-enabled devices (Flanagan 2004). Three different pieces of hardware were constructed for the system: the story distribution stations, mobile user devices and a playback station. The following describes the design of each element.

- **Distribution station**

  Each of the 6 distribution stations was designed in the same fashion. Behind each cardboard cut out cat there was a Compaq *iPAQ*, model H3970. The *iPAQ* was equipped with a Bluetooth module, type BC-01, and had 48 MB Read-Only Memory (ROM) and 68 MB Random Access Memory (RAM). The device was running Windows CE 3.0. The

Bluetooth module was turned on and the Bluetooth interface allowed the user's *iPAQ* to communicate with the cat *iPAQ*. Due to lack of funding, only one station out of six was fully constructed.

- **The mobile user**

Any user with a Bluetooth-enabled device with a Microsoft operating system would have been able to participate in the tour. For the project development and testing an *iPAQ* H3970 was used, but devices such as a Microsoft smart phones should be able to have the same results.

- **Playback**

The playback consisted of three separate devices: One computer desktop running Windows 2000, a Belkin Bluetooth dongle for the communication between the mobile device and the playback station and a data projector to display the media clips stringed together.

4.5.3 Evaluation

Tests were conducted by Sean Flanagan, as part of his final year thesis entitled Distributed Location Aware Multimedia Narrative, over a period of several days during January and February 2004. The tests were designed by Flanagan to examine the range of Bluetooth communication, the user interaction with the software and the overall functionality of the system (Flanagan 2004). Due to lack of funding, only three devices were available, so one *iPAQ* was used behind a cat station, and one for the mobile user. The third device served as the dongle that was used for the playback station. Users were chosen among MediaLabEurope staff and visiting sponsors. The evaluation was quite informal and involved the users performing partial tasks that made up the Hopstory experience, such as approaching a cat node and downloading some story content as well as cashing in the collected story fragments at the playback area. After performing the tasks the users were asked questions by Flanagan on the nature of their experience. The following section summarises Flanagan's tests and results.

- **Story collection tests**

Since the story collection is an essential part of the experience, it was important that the users understood and enjoyed the collection phase of the H2.0. The first stage of the test therefore involved the user collecting different bits of the story and understanding the system. Story bits were collected by the user at different distances from the cat nodes to test the Bluetooth range and the reactions of the users. Bluetooth technology guaranteed transmission of data up to a distance of ten meters. More then ten meters distance between the user and the cat node would imply longer times to transfer information and render the story experience less enjoyable. The meowing sound from the cat station greatly helped users realise that they were in range of story content even without seeing the cat sculpture and often produced a smile or a laugh in the participant. In general, the meowing sound helped the audience in navigating the story space since it was taking place in the whole building, a much wider space than the Hopstory 1.0. Most of the user interaction was positive. The interface was perceived as simple to understand and to use. The information given to the user in the form of text, such as the indication of where the character just encountered was directed next, was not very effective. Comments were made about such information that if it were displayed in a graphical form it would have been of more use and more enjoyable. The software and hardware functioned reliably during the tests.

- **Playback tests**

Ultimately, the user transfers the collected story fragments to the playback system. The fragments are then publicly projected as a linear sequence of scenes for the user to view them. This stage of testing involved the user interacting with the playback station and watching the final movie. After the audience transferred the clips to the playback station and watched their movies, they were asked about their enjoyment and understanding of the narrative. The overall understanding and enjoyment of the narrative varied greatly from user to user. The users were affected by such factors as how many clips they collected, the tendency to follow one character and the level of activity in exploring the building. The more nodes were visited the more the understanding of the story was clear.

Due to the lack of mobile devices, the Hopstory 2.0 experience was never fully installed. The tests conducted by Flanagan demonstrated some basic aspects of the interaction, such as the enjoyment of the meow sound cues and how the system worked smoothly from the technical point of view. However, due to the limited scope of the installation and, subsequently, the tests performed, it was not possible to draw insights into the story design or the interaction strategy.

4.6 Summary

We conceived and designed the Hopstory LAMS with the intent of pushing the boundaries of digital storytelling outside of the computer screen into the real space. In order to foster immersion in the story experience, we bound the stories to the architectural structure of the building where the facts are taking place, distributing the story in time and space.

Two versions of the Hopstory have been designed and implemented using the same story content but two different sets of interaction strategies, interfaces and technologies. In this chapter we have described the design, the production and the informal evaluation of both projects. The Hopstory concept is novel in the way in which it combines physical navigation through the installation space with character point of view; furthermore, the story connects to the audience's sense of time. As the story progresses, the characters move through the building, living out their day in the 1940s. Similarly, as the audience wandered through the same building, experiencing the installation, they encountered the four characters at different locations and times. Sculptures modelled after the brewery cat, the special character in the story, indicated the locations where the story content was available. While Hopstory 1.0 occupied only one floor, with Hopstory version 2.0 the content was distributed through the whole building. For Hopstory 1.0 then, the installation was contained in limited space and happened by means of touch upon the cat sculptures through *iButton* technology. For Hopstory 2.0, the story was installed throughout the whole building and interaction happened wirelessly through a Bluetooth-enabled handheld device. In Hopstory 2.0, a map of the building on the mobile device screen functioned as the interface for navigating the story content.

The cat nodes, containing Bluetooth–discoverable ad hoc networked devices, signal the availability of content by proximity with the client devices. The client devices download suggestions on where the character just encountered is directed next, giving the audience the option to follow one character at the time in its journey through the building. This change from Hopstory 1.0 was geared towards strengthening the audience engagement and story coherence. In fact, in Hopstory 1.0 the audience had no means of knowing which character was encountered, except for a brief audio cue played at the moment of story ID collection, and no possibility of choosing to follow the same character through his or her journey through the building. This generated a sense of confusion in a few audience members and demonstrated how paths through Hopstory 1.0 could not always generate engaging story sequences. On the other hand, the lack of a formal evaluation of these projects prevents us from making more definitive conclusions about the exact effectiveness of the approach.

The Hopstory project marked our initial steps into the LAMS domain. It had been an important learning experience in terms of how to design and implement LAMS systems. Hopstory has been a successful exploration in pushing the boundaries of interactive narrative into the location based distributes stories domain. Firstly, through Hopstory we have moved the first steps in experimenting with the use of real space in distributed mobile narratives as well as the use of classical narrative elements (such as characters, settings and plot events) and story structures (linear, day in the life, multiple points of view) in LAMS. Secondly, Hopstory helped us uncover the constraints that plot driven narrative may pose in order to produce an engaging distributed version of the same effects of the linear one. We realized that a complex connectivity is needed at the level of plot structure and story events in order to maintain coherence and meaning through out all the different paths that the viewers might take through the story experience. Thirdly, the second version of the project, Hopstory 2.0, led us to experiment with the use of a mobile visual interface. This interface allowed the visualization of the space in which the story experience was distributed through the use of a screen based map.

Fourthly, we have identified that the process traditionally used for non-site-specific content also allows the production of site-specific content. In fact, when producing LAMS references should be made to precedent practices in audiovisual production such as film and

documentary film making in particular. Story design and development, production of the media content, interaction and interface design and implementation have to be carefully orchestrated by a person functioning as an overall director in order to be able to conceive, create and manage a coherent and successfully engaging LAMS project.

Finally we noted that in Hopstory, and in particular the first version of it, the disruption of suspension of disbelief does not always detrimentally affect of the story experience. In fact, at times disruption can give the audience a sense of freedom in combining the explorative tasks necessary for experiencing the story with a number of other activities. In the light of this last observation Hopstory did not support our exploration of LAMS as seamlessly immersive story systems but pointed out how not all narrative experiences require continuous immersion or suspension of disbelief in order to be successfully enjoyed by their audience.

5 CHAPTER *CASE STUDY 2: THE MEDIA PORTRAIT OF THE LIBERTIES*

5.1 Introduction

In this chapter we present the Media Portrait of the Liberties (MPL), our second study involving LAMS, which investigates the use of space as a design element. The intention with this project was to increase immersion in the story experience. Through the MPL we intended to capture the atmosphere of a neighbourhood by representing real local stories, maintaining audience immersion in the narrative experience by letting the participants explore the streets of the area. The audience members can therefore build in their minds a portrait of the neighborhood, by making connections between the stories, the place and the people inhabiting it.

In order to show how the MPL compares with the LAMS systems previously described and reviewed in chapter 3, this current chapter first describes the relationship between the MPL story content and the space where it is embedded. In order to be able to do that, we will first draw an historical panorama of the neighborhood and outline our first steps into getting to know its community, which was a process that was necessary in order to select the appropriate story content for the MPL LAMS. Secondly, we describe in detail the design of the application, and its implementation. Stories were researched and produced in the real space where they are to be experienced. A mobile platform was designed and implemented in order to deliver the stories to participants as they wander through the neighborhood streets. A PC desktop compatible demo version of the MPL complete with all the audiovisual story material is included as support material in the Nisi PhD DVD. Finally, we conclude the chapter with some reflections on the entire process. The evaluation of the project is presented in detail in chapter 6.

5.2 Into the Real

Through the MPL we envisage using a whole neighborhood as a physically navigable structure and we embed story contents in its streets. The relationship between the stories and the space is different from that in our previous case study. Instead of using buildings as containers of stories, with the MPL we are now distributing audiovisual narrative content in an outdoor space and relating that content to the people inhabiting the area as well as the physical space itself. We believe that the disruption of suspension of disbelief caused by the act of choice in stationary interactive narrative is alleviated in the MPL system by the sense of agency created from the exploration of the real space, which in this case consists of the streets of the neighbourhood. In fact, the audience never leaves the story world where the stories once happened (and have been filmed); they are constantly immersed in its colours, smells and atmosphere. Location and stories refer to each other in the MPL, creating a double movement in the audience's mind. Firstly, while the audience is exploring the streets of the Liberties area, the focus shifts from the real space – which audience members are exploring in order to locate the story content – to the story clip itself. Once the story is found and has been played back in the appropriate location, the audience's focus shifts back to the real space in order to asses how the story related to the place and how the place relates to the story. By letting the audience be immersed in the neighbourhood space all the time, we intend to foster immersion in the narrative experience and to alleviate the disruption of immersion caused by the above-mentioned movements of the audience's mind. Thus the audience can build connections in its mind between the stories and the place, thereby strengthening its involvement in the LAMS experience.

Furthermore while the audience is roaming the neighborhood streets in search of story content, it discovers features and aspects of the neighborhood otherwise unnoticed by someone just passing through the streets to reach a pre-set destination. The time spent walking in the neighborhood streets is used by the participant to make virtual connections among the stories and the real place, its community and its history. The past and present conditions of the area are compared and linked together. Thus, with the MPL, we intend to

create an immersive narrative experience by portraying a neighbourhood atmosphere and harnessing the power of real community stories and real space. We envisage such a system as being able to function on one hand as a stimulus for non-residents to get to know and understand a neighbourhood, and on the other hand, as a story and memory catalyst for community members.

In order to achieve these results, we envisage a neighbourhood space as an intricate web of stories generated by the people who inhabit the place. Each story has a specific location in the neighbourhood space, and each location has a story to tell. The space of the neighbourhood constitutes a physically navigable structure in which the fragmented narrative is embedded. Furthermore, the MPL associates stories with places but also with people. The inhabitants of the area can also function as possible connections among story fragments. The same people might feature in more than one anecdote, and by linking the anecdotes featuring the same characters we create a second layer of connections through the narrative. Hence, the audience can browse the collection of stories not only by roaming the streets of the neighborhood, but also by following the same characters through different story fragments. By letting the audience browse the narrative fragments in these ways we intend to show how a neighbourhood is in fact a complex construct made up by its inhabitants as well as its streets and houses, its history and the memories of its community. On this topic, as Doreen Massey explains in her book on *Space, Place and Gender*:

> What gives place its specificity is not some long internalized history but the fact that it is constructed out of a particular constellation of social relations, meeting and weaving together at a particular locus. Instead then, of thinking of places as areas with boundaries around them, they can be imagined as articulated moments in networks of social relations and understanding (Massey 1994).

By portraying its history as well as its community and how members of that community used to live together as such, the MPL is intended to provide its viewers with a nuanced and evocative sense of place as they walk the streets of this striking neighborhood.

The MPL project development encompassed a number of diverse activities: a preliminary effort to get to know the Liberties area, followed by the identification, collection and production of re-enacted stories in the form of video clips, each of which related to a particular location within the Liberties. In tandem with this effort, a handheld display system was developed. This system is location-aware and capable of delivering the video content mediated by the device itself and by the audience position in the real space. Essentially, the system only allows a video clip to be viewed when an audience member is co-located with the events depicted in that clip. Co-location could mean to stand in the same street as which a family drama had once taken place, or to look at the ruins of a once-grand building. In addition, an information architecture was developed, which allowed the clips to be arranged in a highly connected network. This structure allows viewers to experience the clips in a variety of orders, depending not only on the physical path they took through the city, but also on topics or plot elements that attracted their interest along the way. Plots were developed around multiple themes and characters by creating a series of narrative fragments that eventually intersected with one another. The system was created as an artefact intended to be of interest both to local community members and to casual visitors to the area.

5.3 Preliminary Research

In order to meaningfully embed stories in specific places is important to understand the space as a complex construct made of its architecture, history and the people who inhabit it. In order to understand the Liberties as a neighbourhood, we undertook some preliminary research in terms of investigating the history of the area and its community. The following sections of the chapter present the history and the origins of the name of the Liberties area. The discussion is based primarily on Mairen Johnston's historical recollection about the area (Johnston 1985). In addition, we describe the process of getting to know the Liberties neighbourhood and the ethnographic interviews carried out within the community.

5.3.1 Historical Profile of the Dublin Liberties

Johnston, in her book on the Liberties "Around the Banks of Pimlico" (Johnston 1985), describes the origins of the neighbourhood and its name. Johnston says that during the Norman invasion, the city of Dublin became the centre of the English regime in Ireland. In

1520, King Henry VIII abolished all religious orders in Ireland and gave Thomas Abbey and the land surrounding it, which correspond to the actual Liberties, to his treasurer William Brabazon. In 1627 the treasurer's grandson, also William, was made Earl of Meath. From then the area was known as Earl of Meath's Liberties. There were originally twenty-five Liberties of Dublin. Each Liberty took its name from the principal individual residing in the locality. The Liberties were outside the Dublin city jurisdiction and had their own independent court. The Earl of Meath's Liberties included Kevin Street and Booter's Lane, Bride Street, Bull Alley, Meath Street and Mellefont Lane, and they had their own court at Thomas Court Bawn, between Pimlico and Marrowbone Lane, which was destroyed in the 19th century. From this description of the neighbourhood we can understand why the Liberties area has such a complex and independent character compared to other areas of Dublin. The neighbourhood has gone through high and low periods for the past 400 years. Thriving in the early 17th, with the Huguenot wave of immigration and as the centre for woollen workers, the neighborhood plunged into very poor conditions in the first half of the 19th due to the famine spreading through Ireland. Later, when Guinness and the Jacobs biscuits factory settled in the area the neighborhood started to flourish again. "During the late 19th it was fairly wealthy around the Coombe. […] Guinness and Jacobs biscuit factory were employing around 8000 people" says John Gallagher, local community member and social worker in the Liberties during an interview conducted by the author and sociologist Irene Queen. The neighborhood plunged into poverty again in the 20th century, with the first and second world wars. Nowadays the Liberties are still considered a disadvantaged area of the Dublin inner city, despite efforts at the revitalisation of the neighbourhood. Recent developments have brought some substantial changes to the area. In fact, in 2000 Guinness became open to selling off some of its properties. The Irish government decided to purchase the properties, in order to create an international centre stimulating innovation and creativity, focused on digital media and technology enterprises. The project is managed by an Irish government agency, the Digital Hub Development Agency. The digital Hub Development Agency describes its premises as follows:

> The core development of nine acres is located a ten minute walk from the city centre within the historic Liberties area of Ireland's capital city, Dublin. Over the next decade, this initiative will create a mixed-use development, consisting of

enterprise, residential, retail, learning and civic space. (Digital Hub 2007)

Since the establishment of the Digital Hub project, the area is rapidly evolving. New properties are being built and old ones renovated. New people are moving into the area attracted by the restoration of the old cottages and the flourishing of the Digital Hub media enterprise cluster. The old residents are witnessing a rapid change in their neighbourhood's atmosphere and appearance. It was during this process that we took the opportunity to focus our attention on a section of the Liberties community, with the aim of capturing the old Liberties neighborhood atmosphere. We believed that capturing that atmosphere while the changes where happening would be beneficial for new and old residents, as well as being a challenging experiment in LAMS systems.

5.3.2 Electronic Postcards from the Liberties: Stories from the Streets

A first step in getting to know the Liberties community and its stories was made by the present author and fellow researcher Alison Woods in the Electronic Postcards from the Liberties (EPL) project, at MLE (Nisi 2001). EPL is a short project conceptualised during October 2001. This project focuses on collecting, digitally producing and distributing stories about the Liberties area. We examined the architectonical space and the community space as a dynamic structure for stories and memories to be exchanged between the community and the passers-by. By talking to people in the streets of the Liberties, we captured up to six short stories and anecdotes from the neighborhood. From these collected stories, we produced a series of electronic postcards. While talking to the storytellers in the streets of the neighbourhood we asked for specific pointers to the location that the story referred to, so that we could take pictures of the place and explicitly refer to it in the story. Potentially, these postcards are available to the people passing through the neighborhood streets via mobile wireless technologies. The technical part of this system was never implemented, but from the experience we gained an important insight into how to collect story content from a neighbourhood community. We realised that it takes a long time to find community members who would engage in conversation and spontaneously provide memories or anecdotes about the neighbourhood for our purposes. Reports on community stories workshops backed up our experience (Beeson 2005) (Miskelly 2004). Miskelly, in particular, reports on the difficulties

of getting people to spontaneously engage in storytelling activities without a strong setting or preparation. “Participants are often self-conscious about recording or hearing their own voices. They would rather read from material they have prepared at home” (Miskelly 2004) .

In light our experience with the EPL project and Miskelly and Beeson’s reports, we took into account the difficulties of engaging ordinary people from the area to provide us with story content for the LAMS project story database. We therefore opted for an author-centered approach to the MPL story content. We intended the authored stories to be a catalyst for facilitating and inspiring the community to contribute with their own stories at a later stage. The crafted stories were intended not only to offer a stimulus, but also to be a model and inspiration for the members of the community for their memories and their eventual contributions to the MPL system. Infact, we would like to think about the MPL as a starting point for the community to build and extend the existing database; we also believe it can offer an interesting perspective on the Liberties community to the locals as well as to visitors, as it is drawn from the accounts of a local writer of life in the Liberties.

5.3.3 The Liberties Community

In order to get to know the Liberties community and its predisposition towards digital technologies and stories, the author, together with sociologist Irene Quinn, conducted twenty ethnographic interviews with community members, ranging from social workers to random people met in the street. The analysis of these interviews suggested that many different types of communities intersect in the Liberties, making it a surprisingly complex and diverse neighborhood (Bassoli 2002).

During the ethnographic interviews the author paid particular attention to identifying important issues for the community and therefore identifying which stories are important to them and need to be highlighted when selecting the story material for the MPL project. During the interviews, many stories and anecdotes were told, in particular by old community members, as examples of the neighborhood’s history, issues and needs. This material has a very rich emotional charge, transmitted directly from the storytellers to us. In the telling of the stories, fragments of social and local history became linked together with the stories,

giving them depth and texture. As an example, John Gallagher told us about when the tenement houses, built by the government for the Liberties community during the 1930, were only assigned to community members who were in stable employment and did not have drinking problems. This anecdote would recall memories in many of the community families who had tried to be assigned a tenement house. When a similar story was found in Mairen Johnston's book, it was selected for production. In general, the stories and anecdotes that emerged during contact with people of the neighbourhood, helped in the selection of the anecdotes that were produced as MPL story content.

5.4 Design Methodology for the Stories

This section describes the process behind the selection, design and production of the MPL stories. It presents the scripting and storyboarding processes as well as the production methods and the design of the MPL narrative structure.

5.4.1 Real Stories as Content for an Interactive Narrative

Stories based on a community of people and their everyday life can provide powerful content for a narrative. Everyday stories appeal to us as an audience because they are directly connected with what we perceive to be real events and history; such stories can provide us with inspiration for our own lives, prompting us to recollect anecdotes, memories and similar stories. Like a spider web, real stories lead into each other, connect characters and themes, providing a natural hyperlinked structure that can be used as the basis for an interactive modular narrative project. Local writer Maireen Johnston's book *Around the Banks of Pimlico* (Johnston 1985) provided us with a socially and historically detailed narration about the Liberties neighbourhood stories, characters and anecdotes, rendering a warm and engaging picture of the Liberties area from the early eighteenth century till the 1950s.

From Johnston's linear narration of the historical and chronological story of her family life in the neighbourhood, anecdotes and stories were parsed to form the basis of the MPL story collection. Previous contacts with the community members and explorations of the neighbourhood streets with Johnston herself, directed the choice of subjects and locations for the story fragments to be used. Recurring locations and events such as, for example, the local women doing their laundry on the banks of the Pimlico river that used to run through the

neighbourhood, seemed important markers in the community's old traditions. On one hand, the disadvantaged and tough conditions of the Liberties' inhabitants during the 19th and 20th centuries, as well as the fact that the Liberties' area was a Gaelic speaking neighbourhood during the 19th century, because many members of its community arrived from the West of Ireland during the famine times, are all examples of stories and memories still alive in the neighbourhood old residents' minds. On the other hand these facts and anecdotes are not always known to the occasional visitor or passer-by. These two reasons motivate our content choices, in relation to our aim at informing and stimulating visitors to get to know the area beyond its surface, and stimulating memories and story recollection in old resident community members.

5.4.2 Production Phase

After selecting the relevant content from Johnston's book, we proceeded by shaping it into self-contained fragments and scripting each fragment in relation to a specific location in the neighbourhood. Particular attention was paid to the Johnston family's history as an example of what a family might have had to endure to survive during the 19th and early 20th centuries. Anecdotes spanning from when Johnston's ancestor Honora first arrived in the Liberties from Gort, Co. Galway, with many other emigrants, in the 19th century, until the more recent stories involving Johnston herself were selected. For each story, sketches and watercolors were made. Once the storyboarding was completed, the locations for filming the scenes were researched, on the basis of their affinity with the time and setting of each story.

A variety of methods were employed in the production of the stories, according to their different characteristics. The stories ranged from ghost stories to descriptions of architectural changes in the area, to individual portraits of local characters. In creating the audiovisual media segments, we used a mix of video, animation and photographic media and a narrating voice that related the anecdotes in the first person (which is consistent with Johnston's book). Leo Monhogan, a former tourist guide, made available his collection of old photographs of the Liberties for use in the project. Charlie Hammond, a member of the local Marylands Residents' Association, had offered papers, booklets and anecdotes on the history of the Liberties during the earlier ethnographic interviews phase of the project. This historical

material has proven especially valuable in the process of reconstructing the visuals for some of the stories, and the fact that it was offered also communicated the desire of the community itself to share its sense of history through this project. “Social history is rich in this area. I believe it is important for this community to understand its area,” Charlie Hammond told us in an interview.

Figure 5.1 Selection of frames from the MPL story video clips.

In order to harness the friendly and open atmosphere of the neighborhood, films were set in the Guinness Hopstore (which at the time, had been transformed into Media Lab Europe) and around the Liberties area. Locals and colleagues from the Media Lab re-enacted the selected stories, using costumes and settings inspired by the descriptions in Johnston’s book. One of the most interesting sets was that for the reinterpretation of the traditional music session that used to take place every Sunday during the 1940s in “Mickey Murphy’s Yard" (see Figure 5.2).

Figure 5.2 Community residents participating in the "Mickey Murphy's Yard" story filming session. After the shooting, a storytelling and socializing session started spontaneously with local inhabitants of the neighbourhood. Photograph used as Courtesy of the author Rob Bourke

Local people came along and engaged in the action, participating as local characters in the filming. The session itself was also an opportunity to informally chat to locals about the project and verify their enthusiasm for providing new content to the story collection. It also contributed to reviving memories, anecdotes and a sense of pride in being from the Liberties area.

Figure 5.3 Picture of The set of the traditional music session in "Mickey Murphy's Yard". Courtesy of Rob Bourke

A different kind of story, referencing buildings that do not exist anymore, was produced using photographical material collected during the research and some of the watercolour sketches produced for the storyboarding process. The varied methodology added expressivity and freshness to the stories, and highlighted some ideas for how to develop a framework under which to guide the community members in the feedback collection phase, when they would be able to provide and produce their own stories to add to the collection.

5.4.3 Modular Story Structure

We initially extracted about 150 short possible stories and anecdotes from Johnston's book, ranging from the history of the place, to its architectural features and some specific characters of its community. Each selected story fragment was then scripted and analysed in terms of time, locations, characters, and themes present in the story, such as the Guinness brewery, or death, birth, marriage, etc. Subsequently, each fragment was storyboarded to test its feasibility in accordance with our budget and means of production, given that access to actors and costumes, as well as to props and special effects, was limited. In accordance with our production means, the number of anecdotes that could be realised was reduced to 40.In the end, as a result of time, budget and technical constraints, 20 stories were fully produced.

The stories were crafted as units of a modular structure, where story fragments are interchangeable. The classical, arced, plot-based story structure was exchanged for a more fragmented way of organising the clips, whereby each scene is a self-contained anecdote that references a particular location in the Liberties neighborhood. This approach places fewer requirements on adjacency of story material and ensures that the scenes can be experienced in any order. The resultant hyperlinked structure consists of the collection of story fragments, and the different types of links that connect them. The participant can end the experience at any time, without needing the closure that is typically expected in stories that have a strong story arc. This kind of structure is designed to remain open and evolve, allowing new stories to be added at any time.

Since the MPL is grounded in a real place, the influence of this fact on a user's experience is twofold. The participant can merge the story settings portrayed in the video clips with the surrounding real space, adding it to their mental image of the story and augmenting the real space with the story's content and aesthetic. This may add atmosphere and warmth to the neighborhood, bringing it to life. In addition to that effect, relationships between places can be used to trigger memories and recollections of an audience member who is intimately familiar with the area, or with similar situations and contexts from his or her own neighbourhood.

The spatial distribution of the stories is used as one of the navigation criteria for the narrative, providing the readers with a map of the story space that illustrates how the content relates to specific locations, as well as strengthening the spatial-temporal immersion of the audience members and transporting them into the scene. Spatial-temporal immersion takes place when the distance between the position of the narrator and his/her audience, and the time and place of the narrated events, are reduced to near zero (Ryan 2001a). By placing the story fragments in the location where they originally happened and allowing the audience to experience them there, we intended to reduce that distance and increase spatial-temporal immersion, as we discussed in section 2.4 above.

5.5 Technological Implementation

In parallel with the production of the story segments, the MPL content model and its hardware and software platforms were designed and developed. As a hardware platform, we selected an iPAQ handheld. This was equipped with a Global Positioning System (GPS) card to provide location awareness, and a microdrive or large SD (Secure Digital) memory card on which to store the video material. The iPAQ is easily programmable and comfortably capable of displaying the rich multimedia content used in the MPL, and GPS is a standard technology for outdoor location-awareness. Choosing to use local memory storage to house the content, rather than have it delivered over a wireless network, reflects the infancy of these technologies in Ireland at the time when the project was being developed. As we were primarily interested in the user experience of the project, we opted for the simplicity and reliability of local storage.

5.5.1 Content Model

At the same time as we were preparing for audiovisual production, we were also designing the content model to use in order to experience the MPL story content as an interactive, non-linear, hyperlinked structure. Since the MPL content model takes into account the social network of the community as well as the architectonical and topographical characteristics of the area, in order to be able to meaningfully hyperlink the story clips together, each fragment was analysed in terms of time, place and characters present in the story. Furthermore, the main themes were extracted for each story, to form a comprehensive list of all themes contained in the chosen narratives fragments. At the end of this process each story was related to a number of other stories in terms of commonality across time, place, characters and themes. This set of relationships has been modelled in the XML mark-up language as shown in Figure 5.4 (see also the Liberties.dtd file in the Appendix).

libertiesContentMOdel.txt

```
<?xml version='1.0' encoding='UTF-8' ?>

<media_portrait>
<system>
        <project_name>Media Portrait of the Liberties</project_name>
        <map_filename>.\Storage Card\liberties\yellow.jpg</map_filename>
        <left>-6.289500</left>
        <top>53.343201</top>
        <right>-6.273500</right>
        <bottom>53.336300</bottom>
        <theme_rels>1</theme_rels>
        <character_rels>1</character_rels>
        <time_rels>0</time_rels>
        <location_rels>1</location_rels>
        <radius>20.000000</radius>
        <user_filename>.\Storage Card\liberties\libertiesUserfile.xml</user_filename>
</system>


<character_list>
        <character>
                <character_id>1</character_id>
                <character_name>Brabrazon Family</character_name>
        </character>
        <character>
                <character_id>2</character_id>
                <character_name>Woolen Workers</character_name>
        </character>
```

Figure 5.4 XML file starting the content model

Four types of topics are supported: characters, locations, themes and times. These topic titles relate to the content of the story video clips. After a video clip has been played by the audience, all topic-related clips are displayed on the map, indicating to the audience members where to position themselves to access related content. Relationships across these four topics can be activated or deactivated separately. It is possible to view clips related by theme alone, or those related in terms of character and location, or to view clips linked across all relationships. For instance, all clips containing a character called Honora are related to one another by the character relationship set. Some of these clips also feature other characters, for instance Honora's son Michael, and are therefore also related to all clips that he appears in, as shown in Figure 5.5.

```
<character>
        <character_id>6</character_id>
        <character_name>Honora</character_name>
</character>
<character>
        <character_id>7</character_id>
        <character_name>Honura's son, Michael</character_name>
</character>
<character>
        <character_id>8</character_id>
        <character_name>Julie Ward</character_name>
</character>
```

Figure 5.5 XML section with description of characters

When this practice is applied to all four topics, it forms a rich web of interconnections between the video clips. Furthermore, it is easy to place new content in the web of stories, as the connections between content pieces happen through meta-tags describing the themes, characters and locations for each story, as shown in Figure 5.6. Each story is described by a set of keywords that link to the content of other pieces tagged with the same keywords. Listing a few topics that apply to the story is sufficient to richly connect it to the web of other stories in the project.

```
<content_list>
        <content>
                <content_id>1</content_id>
                <theme_list>
                        <theme_id>1</theme_id>
                        <theme_id>3</theme_id>
                </theme_list>
                <character_list>
                        <character_id>6</character_id>
                </character_list>
                <time_list>
                        <time_id>1</time_id>
                </time_list>
                <location_list>
                        <location_id>1</location_id>
                        <location_id>3</location_id>
                        <location_id>5</location_id>
                </location_list>
                <region_id>1</region_id>
                <filename>.\Storage Card\liberties\movies\story1.mpg</filename>
                <thumbnail>.\Storage Card\liberties\thumbnails\story1.jpg</thumbnail>
                <gps_x>-6.281061</gps_x>
                <gps_y>53.340656</gps_y>
        </content>
```

Figure 5.6 XML description of one piece of content, corresponding to one story fragment

5.5.2 The MPL Platform

MPL is currently running on the Pimlico software, a bespoke platform developed by Ian Oakley under the CARMEN project-funding framework supported by the Irish Higher Education Authority (HEA). Two versions of Pimlico exist, one for wireless mobile devices (iPAQs) and one for desktop PCs; the latter was developed in order to be able to demo the project outside the Liberties location. Portable devices are the primary target platform. An iPAQ equipped with a GPS card enables the audience members to view the stories depending on their current position on the streets of the Liberties neighbourhood. Access to the story content is facilitated through the appearance and disappearance of selectable icons. Each icon represents a particular story and is positioned on the digital map on the iPAQ's screen, in the location where the story is set. Once an icon is selected, the corresponding audiovisual story fragment is played full screen. At the end of the video clip, the digital map of the area is returned to the screen, on which new icons for other stories have now appeared. These new icons represent stories that relate by character or theme to the story just viewed. The viewer can continue to walk around the neighbourhood looking for new stories or can direct himself or herself where the suggested new icons are positioned. With the help of the map and the GPS positioning system, a participant can reach the location where the icon is positioned and view the audiovisual clip. In fact, each clip is viewable only when the audience member is co- located with the place where the story happened. This design choice is made to strengthen the connection between stories and place, and to encourage the audience to walk around the neighbourhood, exploring its streets and connecting to its atmosphere.

Figure 5.7 The MPL mobile device interface. The pictures shows the GPS enabled iPAQ interface, showing a map of the Liberties neighbourhood and a number of authoring tools and navigations aids such as the radar, on the bottom right of the screen and the Developer's Toolbar at the top of the screen.

The desktop version of the project offers a taste of the MPL experience offsite, by providing a story map of the area on a desktop PC screen. The interface and functions of the desktop platform are the same as those of the mobile one, except for the GPS function, which in the desktop version is not implemented. The cursor hovering over the map uncovers clickable icons representing the stories relating to specific spots of the map. The viewer can click on any of the visible icons or continue to hover over the map looking for more stories.

5.5.3 The MPL Interface

The MPL interface takes the form of an interactive map displayed full screen on the handheld device. To help users locate the story content on the map and orient themselves in the real space of the Liberties neighbourhood and in relation to the stories, we designed a series of graphical navigational aids as part of the interface. The interface is shown in Figure 5.7. The interface consists of two parts: a toolbar that can be switched on and off, which is designed for use by the story designers, and the map and navigation aids, which are designed for the use of the audience members. Through the toolbar, the developers can change the kinds of map displayed, add more stories to the map and switch navigational aids, such as story pointers, on and off. The more aids that are activated, the more the user is guided through the Liberties tour. With fewer aids displayed, the experience becomes more akin to a free exploration of the area, where story material can be unexpectedly stumbled upon. We describe the design and functionality of these interfaces' elements in detail in the next sections.

5.5.3.1 Developer's Toolbar

The developers' toolbar appears at the top of the iPAQ screen, as shown in Figure 5.7, when a user draws a V shape on the screen by tapping with the pen tool at any three points (Top, Bottom, Top) to outline a V letter. Each square icon on the toolbar is a button that accesses a different function, and the function can be turned on and off by tapping on the icon once. A line of text appears underneath specifying the icon's function and how to operate it. In the sections below, we describe each icon's functions in detail. Each number preceding the icon's description corresponds to the numbered icons in Figure 5.8.

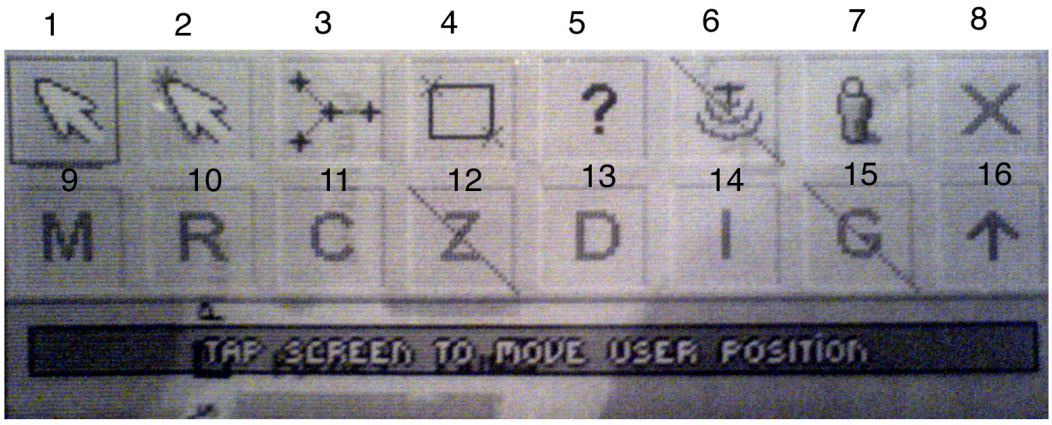

Figure 5.8 The picture show the developer's toolbar: Detailed view with numbers corresponding to the button functions explained in the text below

Tapping on each button will bring up a blue rectangle around it, indicating that its corresponding function has been selected and is active.

1. The 'arrow' button allows users to change their position on the map manually.
2. The 'arrow with a star on the tip' button allows users to select and move regions and icons of the stories around the map. This function is used by the developer to position and re-position old and new stories on the map.
3. The 'four-networked crosses' button allows the developer to select which relationships among stories to be active within the current MPL experience. The developer can choose among characters connections, locations and themes. Chronological order is also possible but not implemented in this version of the MPL. All the relationship can also be turned on at the same time.
4. The 'rectangle' button allows the developer to calibrate a new map on the device's screen. This function is not operational on the current MPL version.
5. The 'question mark' button indicates the help function. Selecting it and then clicking on a part of the interface will reveal the function of that part of the interface in form of text explanation.
6. The 'antenna' button indicates how to toggles the GPS function on and off.
7. The 'user' button brings up the current user information.
8. The 'X' button closes the application
9. The 'M' button turns the map on and off.

10. The ‘R’ button toggles the radar icon on and off
11. The ‘C’ button turns on and off the circle with a red dot in the middle; this is the symbol used for indicating the user’s position on the map according to the GPS measuring.
12. The ‘Z’ button turns on and off the blue squares indicating the regions where the stories can be found.
13. The ‘D’ button turns on and off the green dots indicating each story position.
14. The ‘I’ button toggles all icons on, off or to the current user mode, which depends on the user’s position in the neighbourhood.
15. The ‘G’ button is a toggle for a text string displaying the raw GPS data. By default it is turned off.
16. The ‘up arrow’ button collapses the menu so that it is hidden.

5.5.3.2 User interface

The MPL user’s interface consists of a map of the neighbourhood and a series of aids to help the audience move around in search of stories. When the user’s position coincides with a story location the interface will display a specific icon for each story present in the GPS range of 10–15 meters. To view a piece of content, when encountered, the user simply taps on the specific story icon. The clip will play full screen. At the end of the audiovisuals, the interface returns to the map of the area. At this stage, story icons of where to encounter further content related to what has just been seen are displayed on the map, as shown in Figure 5.9. In the following section, we describe in detail the elements of the user’s interface.

The Map: The map is hand-drawn, but neatly labeled with street names. The minimalist hand-drawn style serves to distance the piece from other map-based interfaces (e.g., tourist guidebook applications, or route-finding software), while the street names are included to ensure that the map remains a meaningful navigational aid. To present a reasonable level of detail, the map is larger than the screen of the handheld device, but it can be scrolled simply by dragging the iPAQ stylus across the screen. Although this differs from the display paradigm found in much location-aware software (where the on-screen map is always centered on the user’s current position), we feel it is appropriate for our project, which

focuses more on whimsical exploration than efficient navigation. By letting users scroll the map freely, we let them search the map for stories beyond their immediate vicinity.

The Story markers: These indicate the position of each story on the map. They appear in the form of small, high-contrast green dots. They are designed to stand out from, but not to obscure, the map.

The Story icons: The story icons are the interface through which the audience activates video clips, and through which we display the links and inter-relationships between the stories. They take the form of shrunken representative frames extracted from the stories. They appear on the map under one of two conditions: either the user's position is coincident with the story's location, or the story is related to the last story viewed. In this second case, the story icon is displayed semi-transparently. Each icon also features additional information in the form of small markers along its rightmost edge (see Figure 5.9 below). Three markers are used. A triangular play symbol indicates that a story is currently available for viewing. Selecting an icon marked in this way causes the video clip it is associated with to play full screen, returning the user to the map upon completion. Video clips that have already been viewed are further marked with a tick symbol to indicate this viewed status. In addition to being semi-transparent, clips that are related to the clip most recently viewed, but that are not currently available for viewing because they are situated in an area of the map away from the user's current position, are marked with an icon showing a series of footsteps. If the user moves to the map location occupied by such an icon, its state, and graphical representation, changes to that of a currently playable icon. The intention is to allow a user to choose to follow particular themes, allowing them a sense of control and providing additional structuring to the piece.

Radar: The radar provides an overview of the map. It takes the form of a transparent grey area in the bottom right of the screen, which represents the total map area. A darker rectangle within the grey area indicates the portion of the map currently shown on the screen. This adjusts automatically as the user scrolls the map. A small red dot indicates the user's current position, as calculated from the GPS readings. This radar view shares many similarities with

those designed for use in shared-editor Computer Supported Collaborative Work (CSCW) systems.

User position indicator: This takes the form of a small semi-transparent circle, which simply shows the user's current (GPS-derived) position on the map. If a user selects the position indicator using the stylus, a screen displays all the stories previously viewed, in the form of a list of story icons. Clicking on an icon displays the story once again, irrespective of the user's current position.

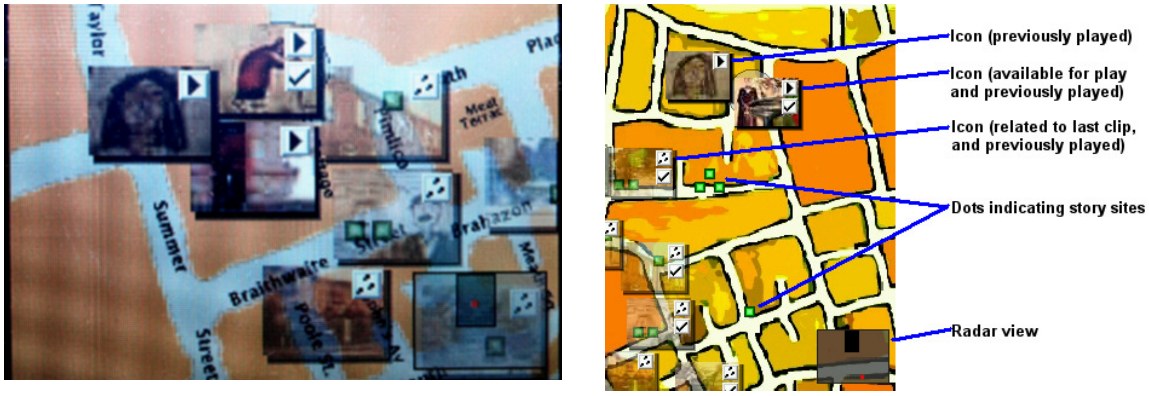

Figure 5.9 Picture showing two screenshots of the graphical interface of the MPL. To the left: navigation aids such as the map, the radar, the green dots and the story icons as they would appear on the device used to experience the MPL. To the right: a text explanation of the functions of each icon present on the screen during the users experience of the MPL.

5.6 Reflections on the MPL development Process

With the MPL project we are extending a LAMS system to an outdoor space. We have combined a modular, non-linear narrative structure with the use of a real place, providing a navigation strategy for the narrative fragments and community-related real stories that represent the content of the project. We first researched and crafted a series of self-contained short story fragments inspired by the community of people inhabiting the selected place. Subsequently, we linked each story to the place where it originally happened by means of narration, visuals and interface constraints, allowing the story clip to be viewed only if the audience position coincided with the appropriate location. By using the real space as a navigable structure, and by overlapping the audience's exploration of the space in search of stories with the story world where the stories are set, we aimed to improve the feeling of

immersion in the narrative experience. In addition, such a collection of neighbourhood stories is intended to play an important role in capturing the sense of community and the atmosphere of the place. We intended such a collection to have a twofold effect on its audiences, depending on the audience's relationship to the place. On one hand, we aimed at stimulating memories and stories of recollection in the local community within the Liberties. We hope that this process will eventually feed into a general sense of awareness of the community itself, empowered by the re-appropriation of the local, social and personal stories, and furthered through the narrative process and its distribution. On the other hand, we focused on visitors to the neighbourhood, hoping that their interaction through the MPL will allow them to get beyond the negative impression of the Liberties created by the disadvantaged conditions of the area and to instead connect with its rich history and traditions.

5.6.1 The Content Authorship

While researching the community-related story content for the MPL project, we discovered an important distinction. In the 1960s, critics of structuralism perceived the study of literature as a sub-section of the social sciences and tried to develop a model that would equally serve theories of anthropology, sociology, psychology and linguistics. Critics soon realised that all these disciplines are concerned with narrative, but differences in purpose and materials within the disciplines make it very difficult to see how they are interrelated. Theories are dependent on the material selected for study and the diverse objectives of the theorists in different disciplines are evident in their dissimilar approaches to narrative. The question the anthropologist asks is almost opposite to the one posed by the critic. The anthropologist looks for the collective function that a myth serves, while the critic is asking what this identifiable author means and why a particular story is unique. Features such as point of view, characterisation, description and style, which are so important to the literary critic, scarcely exist in the oral tale. The anthropologist, as a social scientist, is committed to a conception of methodology that is certainly more constraining than that encountered by the literary critic (Wallace 1986). Being thus aware of the differences in focus between the anthropologist and the narrative critic, we kept in mind that a story is an act of interpretation of the world, rooted in the particular perception of the author. There is no mechanical or digital way to substitute this, and no reason for wanting to do so (Wallace 1986).

We envisage that in order to start the process of developing a neighbourhood or community story project such as the MPL, the author must have control over the many levels of artistic choices involved. At the same time, the author should also keep in mind that while dealing with real stories about a community of people, artistic manipulation of the stories can raise interesting discussion points, such as those relating to privacy issues, ownership, copyright, etc. These issues can open possibilities for further research in many different disciplines such as art, social sciences, anthropology, etc.; but these are beyond the scope of this thesis.

If, subsequently, a project such as the MPL begins to function as a catalyst for provoking more stories from the local inhabitants themselves, then the author could release artistic control to them. For example, we envisage that as the communities within the Liberties might become more involved in the MPL project and their story contributions begin to fill the database, their different styles and interpretations could take over the project. The collection would thus belong more and more to the community and become a repository of their memories and anecdotes.

5.7 Summary

With the MPL project we have used stories from and about a particular place as the content for an interactive LAMS system. We also aimed at fostering an improved feeling of immersion by letting the audience physically navigate the real space where the stories featured in the project once took place. The stories have been scripted and produced as a collection of short, visual, self-contained multimedia segments. In order to achieve this result, we linked each story to the specific location where the original event happened. With the MPL, the Liberties area of Dublin thus becomes a geographical map of stories, and the audience can physically navigate the story collection. Furthermore, through the MPL LAMS system, we aim to convey to local residents, and to non-residents, the atmosphere and local history of the neighbourhood where the stories belong, in the hope of eventually stimulating recollection and memories in residents and creating interest in the disadvantaged neighbourhood among people who did not come from the area. “Our path through the structure of the work reflects our choices back to us making us more aware and responsible

for our experience", states interactive artist David Rokeby in his essay "Transforming Mirrors" (Rokeby 1995). The MPL experience acts as a mirror towards its audience in different ways. First, to the general public or tourists, by letting them explore the Liberties community story set and to choose their path through it. In this way they are free to follow what interests them, leaving with a very personal idea of the community and of the work itself. Second, the audience members who belong to the Liberties community can experience the work literally as a mirror of themselves, against which they can compare, discuss and redesign their past, present and future.

It should be noted that the MPL project as it stands relies on the author or artist's interpretation to facilitate the community's reaction to and feedback on the neighbourhood stories. Based on the initial EPL experience (Nisi 2004a) and Miskelly's location-based community stories workshops (Miskelly 2004), it seemed that the community needed an inspirational starting point to get its own stories flowing.

In order to assess the effect of the MPL LAMS system on residents and visitors of the area, we conducted an extensive user study, and that study is presented and discussed in the following chapter.

6 CHAPTER *EVALUATION OF THE MPL*

This chapter is intended to present the MPL evaluation process and the results of that evaluation. We describe the methodology used to evaluate the MPL application and how the process evolved through multiple user studies. One characteristic of qualitative research is that the research focus becomes clearer and more defined as the research goes on. In the following sections we first outline some general problems with the evaluation of interdisciplinary research projects on the art/technology boundary, and we then present, in turn, the pilot study and the two user studies of the MPL that we had conducted. We conclude the chapter with a summary of the findings from the evaluation process.

6.1 Evaluation Strategy

6.1.1 *General issues with the Evaluation of Interdisciplinary Projects*

Because of the interdisciplinary nature of the work and its artistic approach, the question of how to evaluate a LAMS system is not as straightforward as it would be for a typical academic work in the arts or sciences. Although we can state that art and research are similar in that they are both exploratory, they do take different approaches to exploration and evaluation. This problem has been observed in a number of contexts; for example, during the PLAN symposium held in London in 2004 (PLAN 2004), attention was drawn to the difficulties of evaluating interdisciplinary locative media projects and to how the dissemination of acquired knowledge happens through public talks, exhibitions and art-based events, rather than through academic conferences and articles.

During the PLAN symposium, it was said that trying to understand what happens between interdisciplinary works and their audiences can be difficult and frustrating. Valuable information comes from observing people using the work, during exhibitions and from having long conversations with the audience. The audiences of these projects are usually mixed. Some are artists; some are academics with different kind of media expertises, from digital to traditional. In addition, if a project takes place in a public space every one is entitled

to use the work, and for this reason deciding which kind of audience to target becomes a very specific choice.

Nevertheless the evaluation of such a system is important if the project is to be considered a research project, and evaluation is necessary in order to share knowledge with the research community.

6.1.2 Approach to the MPL Evaluation

Since the narrative process always involves a story, a narrator, a medium and an audience, to complete our study of LAMS systems through the MPL project we needed to capture the audience reactions to the story experience in order to draw conclusions about the degree to which LAMS systems can contribute to the fostering of immersive feelings in the narrative, as well as a sense of place in regard to the locations where the narratives are experienced. An initial pilot study and two user studies were designed and conducted to capture the audience response to the MPL experience in regard to the following issues:

- The extent to which LAMS systems and the MPL in particular foster *immersive feelings* in the audience members' minds during the narrative experience through the combination of real place and location-based stories.
- The extent to which LAMS systems, and the MPL in particular, can be appreciated by audiences as a *place enhancer*, capturing a place's atmosphere and its community folklore.
- The extent to which the MPL project functions for the community members as a *memory and story catalyst*, fostering recollection, revisiting and telling of memories and local stories, as well as stimulating a new vision of their neighbourhood from a broader point of view, challenging their preconceptions or leading them to a new vision of the space.

In order to understand how to evaluate the MPL LAMS project, one pilot study and two users' studies were carried out. We started by conducting an initial exploratory pilot study. This pilot helped us to identify how to structure the user study and which kind of users to

target for our purposes. As the pilot study was purely exploratory, it will not be used as a basis for the majority of the conclusions of this thesis. The pilot study was followed by a more focused user study in which three types of audience were involved and two different ways of experiencing the MPL were examined. In the first user study we targeted users with digital media expertise, in order to uncover the main issues regarding the interface and the interactive design of the system. Residents and visitors to the Liberties neighbourhood were also invited to try the system, in order to asses the different effects the MPL had on audiences with different degrees of familiarity with the place. Each user group had two options of experiencing the MPL: individually or in pairs. By giving this option, we intended to examine how the system could stimulate storytelling activity, recollection among locals and/or simply communication among different types of audiences. Each user was interviewed after the tour to capture his or her main impressions about the experience. The information collected during the first user study indicated that a more focused user study was required for a more focused second study. In the second study we therefore narrowed down the diversity of the audience members to those from the Liberties Community, Dubliners and Foreigners living in Dublin, in order to clearly map the differences in reactions to the systems on the basis of the familiarity with the place, the culture and the traditions. Each user toured individually and completed a semi-structured interview and a questionnaire at the end of the experience. This enabled us to gather and frame the data more tightly. In the following sections we will describe in detail the process of creating our user studies and the actual user studies carried out in order to evaluate the MPL LAMS application.

6.2 Pilot Study

In accordance with the issues raised during the PLAN symposium about the difficulties in evaluating interdisciplinary projects, and in particular locative media projects, a pilot study of exploratory nature was conducted during December 2004 in order to find out how to design a user study to evaluate the MPL. Because of its exploratory nature, we are not presenting here the full details on the methodology and analysis of the pilot study, but only the issues that we found relevant in order to shape the following users studies. In total, 15 users participated in the pilot study. Four users went out as one group, accompanied by the author, and four went out in pairs. Of these two pairs, one was accompanied by the author and the other toured on

its own. The other seven users tried the MPL as individuals. Of these seven, four toured with the author and the rest toured on their own.

From this first pilot study a number of issues became immediately apparent. Before starting the tour, I asked the participants if they would prefer me to walk with them during the tour or if they would rather meet me later, after the trial. Answers were mixed. Some preferred to go on their own (Karen and Enrico), and some did not have a preference (Mark). Others, who were not very familiar with the Liberties area or with the technology (Christina), preferred me to go with them. As a result, I walked with some and followed others from a distance, taking notes of their trails and behaviours (shadowing practice). While walking with the participants, I realised that my presence was more of a distraction. Participants would ask questions instead of concentrating on the story experience. I felt that some more of these questions could have been kept for later, or that the participants would have figured out the answer themselves very easily if I had not been beside them all the time. Through conducting the pilot study, I realised that shadowing the participants and taking observation notes of their movements was the best way to learn about the users' experience with the system without influencing them. From former MLE colleagues Enrico and Karen's comments and trial of the project, it also became clear how difficult it is to direct people through the experience and explain how to use the interface at the same time. The interface has to be extremely intuitive, in order that that no attention should go into using it. I realised the interface has to be explained and understood before the user begins the tour, otherwise the story experience is spoiled.

Another issue that was clarified during the pilot study was that it is better to share one device and two pairs of headphones among the two users rather than having the two users doing the same tour with one device each. If participants who want to experience the application in a pair and share the experience hold a device each, they are likely to have two asynchronous experiences; they end up focusing on their own device and having two different tours of the Liberties, thus defeating the purpose of the paired tour. In comparison, having more than one user at the time trying the MPL on the same device stimulates dialogue and social interaction, but it also distracts from the story experience itself. In fact, if more than one participant tries the application from the same device, the exchange of opinions, stories and memories

happens at the same time as the experience. While this can be a success factor from the point of view of using the MPL as a story and memories catalyst, on the other hand the participants view fewer stories than if they were touring individually, and they pay less attention to the experience with the result that they get less immersed in the stories. In fact, the 4 users who toured as one group, equipped with two devices and four pairs of headphones, had the most unfocused experience of all. They continuously asked questions of me and among themselves and compared devices and results while the stories were playing. While this could be seen as a successful brainstorming session about the system, it did not work in terms of fostering *immersive feelings* in the audience's mind during the narrative experience, nor did it work as a *place enhancer* or *memory catalyst*.

These initial pilot tests were important in framing a structure within which to evaluate the application in terms of the sequence of events taking place during the evaluation, the number of users necessary and the time that it would take to carry out each trial. To summarise the conclusions of the pilot study, we can state that:

- All aspects concerning the use of the technology and its interface should be explained to the users before the tour starts, and every effort should be made to ensure that the users feel comfortable with it.
- Users should tour on their own with an observer following them at a distance, in order not to disturb the tour but to make them feel comfortable in case of arising problems.
- Large groups with more than two people sharing devices do not suit the experience.
- All of the story material of the MPL can be covered in a one-hour walking tour.
- A user study based on case studies would provide richer data in order to investigate the project's effects in terms of strengthening *immersive feelings* in the audiences' minds, working as a place *enhancer* and as a *memories and story catalyst* in relation to its audience.

6.3 First User Study

On the basis of the conclusions from the pilot study, we proceeded to shape a user study to evaluate the MPL project. Thus, the pilot study was an integral part of the *process* of evaluation, but not of the evaluation itself. While an evaluation of the MPL could be made (and conclusions could be drawn) on the basis of the final studies alone, we include the methodology and results of the pilot study as a way of documenting the whole process of evaluation. We believe that doing so may be of benefit to other multidisciplinary researchers on the art/technology boundary, and it also acknowledges the issues raised by the PLAN symposium on the difficulties of evaluating interdisciplinary and locative media projects. By sharing our exploratory process in constructing an evaluation for the MPL, we aim at increasing the knowledge in the field of evaluating multidisciplinary research, and locative media projects in particular.

In order to make sure that the methodology adopted for the MPL study conformed to sociologically sound methods, the first user study was designed in collaboration with sociologist Dr. Christina Quinlan from Dublin City University. The specification included project challenges, questions and a preliminary evaluation structure. Users were asked to evaluate the MPL and provide us with feedback on the how the system worked, in terms of fostering *immersive feelings* in the audiences' minds while they were experiencing the MPL, how the MPL worked as a *place enhancer* by conveying the neighbourhood sense of place to its audiences and how it functioned as a *story and memory catalyst* for the local residents.

In order to compare different experiences of the project in relation to the different users who were experiencing the MPL, we decided to target three different types of users: people living in the neighbourhood, who we will call Local Residents; people visiting or passing through the neighbourhood but who do not live in or have any other relationship with the area, who we call Visitors; and people with experience in a media and technology field, who we will call Media Experts. Each group was selected for specific reasons.

- Local Residents of the Liberties neighbourhood were included in the study in order to

evaluate how the MPL LAMS application influences their sense of place, personal memories and recollection of stories. We were aware that local users would have memories and stories that related to the neighbourhood, but we were not sure that such a system could function as a stimulus for them to remember and share these stories; in other words whether the system could work as a *memory and story catalyst* for local users. It was hypothesised that the system could also inhibit the storytelling activity, due to being such a technological approach to a rather traditional art such as storytelling.

- Visitors, including Dubliners not residing in the Liberties area, Irish citizens in general as well as Foreigners living or visiting Dublin, were sampled in order to evaluate how much the system works as a *place enhancer* by conveying a sense of the atmosphere and personality of the neighborhood to people not very familiar with it.
- Media Experts from a variety of disciplines, from software engineers to interaction and story designers, music technologists and media artists, were included in the study in order asses the system interface and interaction design. They also commented on the system as a mobile story experience fostering *immersive feelings* in the audience's mind.

6.3.1 Participants and Configuration

A total of 21 users were selected for the study: 7 users from each group. The users' background and relation to the place, as well as the duration of the tour, is listed in Table 5.1. For each group, 3 people toured on their own and 4 in pairs (see Figure 6.1), except for the non-residents, where we had only one pair and the rest of the group did the trail on their own. In any case, this difference did not disrupt our study because as the study was progressing, we realised that the tour by pair was not going to be used as a method to asses the MPL. During the study, we observed that the users touring as a couple became too distracted from the experience as a result of a series of practical issues, such as having to manage one device between two people while being linked to it by two sets of headphones, or having to negotiate decisions on where to go next. All participants were followed during their tour of the Liberties in order to observe their reactions and the path they took through the neighbourhood. At the end of each tour, a semi-structured interview was conducted with each

pair or single participant. The leading questions asked during the semi-structured interview were based around the following topics:

- To what extent did they enjoy the MPL experience, and did it foster *immersive feelings* in their minds?
- To what extent did the MPL work as a *place enhancer* and did their understanding of and feeling about the place benefit from the MPL experience?
- To what extent did the MPL function as a *story and memories catalyst*, and if it did, would they like to have their own anecdotes recorded on the system as well?
- Would they like to change anything in the MPL experience?.
- Would they like it applied to other areas of the city or other to cities altogether?

Figure 6.1 Two moments of the MPL initial user study. A couple is experiencing the MPL as a pair. To the left both users are watching a clip on the device screen. To the right: one user has located the where the story clip refers to in the real space and explains it to the other one by pointing at the real place where the content relates to.

Audience members from different user groups demonstrated different focuses and interests in the project. The next sections describe the issues brought up by each audience group and present the three main categories of comments that emerged from the collected data.

Residents (7 users)			
Group Size	**Participants**	**Background**	**Tour Duration**
2	Aileen and Adele	Born and raised in the Liberties	45/50 mins
2	Liz and Mariel	Born and raised in the Liberties	45 mins
1	Maria	Moved to the Liberties when she got married 2 years ago	30 mins
1	Sheila	Moved to the Liberties 22 years ago when she was a college student at NCAD	40 mins
1	Paul	Born in Dublin and has lived in the Liberties for 20 years	30 mins

Non-residents of the Liberties area (7 users)			
Group Size	**Participants**	**Background**	**Tour Duration**
2	Julian and Oscar	Julian is from Dublin, Ireland; and Oscar is from Havana, Cuba	40 mins
1	Pier Paolo	Pierpaolo is from Milan, Italy	40 mins
1	Bart	Bart is from Ghent, Belgium	60 mins
1	Stephen	Stephen is from Dublin, Ireland	60 mins
1	Kevin	Kevin is from Dublin, Ireland	45 mins
1	Matt	Matt is from Michigan, USA	45 mins

Media Experts (7 users)			
Group Size	**Participants**	**Background**	**Tour Duration**
2	Sara and Rainer	Sara is from Los Angeles, USA; and Rainer is from Cologne, Germany	60 mins
2	David and Siobhan	David and Siobhan are from Dublin, Ireland	60 mins
1	Alison	Alison is from Albany, USA	30 mins
1	Jussi	Jussi is from Turku, Finland	30 mins
1	Linda	Linda is from Donegal, Ireland	30 mins

Table 6.1 List of all participants of the first user study

6.3.2 Analysis of Residents' Reactions

Residents of the Liberties area were selected for the user study from the "Living Heritage"

class organised by the local community centre of Saint Nicolas of Myra on Carman Street, in the heart of the Liberties area. The contact was made through John Gallagher, head of the centre and also a well-known member of the Liberties community. The community members were enthusiastic about experiencing the project. I followed them around the Liberties area, together with John Gallagher, who often told stories on the spot and prompted conversations about the neighbourhood during the tour. Going around the Liberties with local people offered great insight into the community atmosphere and constituted a very different experience from observing audience members from the other categories. People on the streets had a very friendly attitude towards other community members. Often conversations with passers-by would start spontaneously in the street, with topics ranging from questions about what the group was doing, to local news and events happening in the neighbourhood. The Liberties is a disadvantaged inner city area, and it was clear that most audience members who are not native to the area were not able to relax and enjoy the experience as much as the community members.

The first four participants of the study (Adele, Aileen and two sisters: Liz and Mariel) were born in the area. Liz and Mariel's family worked for the Jacob's biscuit factory (a well-known firm that started its business in the Liberties in the 1940s) for three generations. Adele and Aileen are also descended from families rooted in the Liberties for two or more generations. Memories were triggered in each local community member by the stories in the MPL. An example is an anecdote about a rude dispensary officer in South Earl Street Health Centre. From residents' memories triggered on the spot, we got to know that, until a few years ago, the dispensary officer was still performing his job with the same rude manners portrayed in the story. Another location that triggered memories and stories in community members was Braithwaite Street. Liz and Mariel's family used to live there and they knew the family of the man in one of the anecdotes. At one time, he was a familiar face in the Liberties, walking the streets selling coal from a horse-drawn cart. Liz and Mariel told that when they were children, they used to play in the shed where he stored the coal, even though it was dirty and full of rats. "His hut and stable for the horse were only recently demolished" Liz and Mariel recall. Adele and Aileen on the other hand, recall him shouting: "Coal" as his horse and cart criss-crossed the Liberties.

On returning to the Saint Nicolas of Myra community centre for the focused discussions, members of the "Living Heritage" class would spontaneously join the conversation and contribute with their comments. The comments included stories about the poor conditions of the area in the past, and how men used to run to the pubs and bars as soon as they received their salary; how women were not allowed to enter the pubs until recently, and used to have to ask John Gallagher to go to retrieve some of their husbands' salaries before it was all spent on drink; how people from the area still remember which houses originally belonged to the Guinness workers and which to the Jacob's factory workers, despite the fact that the Jacob's biscuit factory is not located in the area anymore and Guinness now employs few Liberties residents. These sessions clearly indicated the interest of the community in participating in and contributing to the MPL with their own stories, and in expanding the database with old and new anecdotes about their neighbourhood.

6.3.3 Analysis of Non-Residents' Reactions

Non-residents, ranging from native Dubliners to foreigners living in Dublin, showed a variety of reactions to the MPL. People from outside Ireland generally were drawn towards more historical information. They enjoyed listening to stories that would tell them about the origins of the area, and to socio-historical anecdotes about the Liberties population and the area's architectural structure. Particular favourites were the stories about the Courthouse of the Liberties, or the Brabazon family, which was descended from the Lords of the area. Oscar, a Cuban citizen living in Dublin, expressly commented on the desire to know specific dates and facts about monuments and striking landmarks of the area, such as the statue of the Jesus on Gray Street. John Gallagher, the local community member, was present when Oscar made the comment, and he was able to answer the question immediately by telling about the origins of the statue and how it used to be a fountain. This type of interaction between the people experiencing the tour is interesting, as it shows how the system can not only prompt memories and anecdotes about the neighbourhood, but also how it stimulates a dialogue and interaction between locals and visitors to the neighbourhood.

Some non-residents commented that they could not connect to characters in the anecdotes, such as the Honora character and her family who moved around the Liberties from house to

house and job to job. They found those stories too fragmented to be able to synthesise them as a whole. Others reported the feeling of being dropped in the middle of a story, missing out on a beginning. We attribute such comments in part to the fragmented nature of the narrative, but we have also identified a number of other possible reasons for these reactions. For example, a feeling of not being able to connect the story fragments as a whole could be influenced by the fact of not being from the area, and therefore not being able to connect the story fragments to similar stories that might have occurred in their own families or close friends. We have hypothesised that lacking a cultural frame of reference may have diminished those users' interest in and capability to relate to these kinds story fragments. Also, familiarity with the place as a neighbourhood and community construct can help participants to link the story fragments together as a coherent description of the area. On the other hand, we also had contrasting reports. For example, Bart, a native of Belgium visiting Dublin for his second time just for a few days, enjoyed the Johnston family's anecdotes most. He found them warm and entertaining and was not disturbed by their fragmented nature. This indicates that interest in the stories is to a great extent driven by personal taste and by interests in different narratives styles and structures: from fiction to more factual historical information or documentary, and from content ordered in a chronological and linear way to that of a more fragmented structure.

6.3.4 Analysis of Media Experts' Reactions

The participants from the media experts group had a variety of different responses to the experience. The technology was sometimes reported as distracting from the story experience itself. We hypothesised that media experts were focused on analysing the interface issues and were not very familiar with the Liberties neighbourhood, and therefore the navigation of the real space was a demanding task for this group of participants. One of the users, Rainer, a German writer who had been working within the field of multimedia stories and interaction design, felt the stories were too fragmented to form a coherent narrative, especially if considered from a classical narrative point of view. He found the underlying narrative structure too weak to form a coherent story and reported that the characters lacked motivation and psychological depth. Rainer explained in the interview that he is not very fond on interactive stories in general. Users more familiar with the fragmented nature of many

interactive narratives, such as two former colleagues from Media Lab Europe, found the fragments pleasing and reported that the relationships between the fragments were engaging and motivated them to seek related story fragments.

The media experts often observed that the link between a story and a specific location to which the story fragment was related was not always immediately obvious. This comment was reported by audience members in all three user categories. Due to the GPS resolution (10-15 meters), the audience was not always situated in exactly the right physical location when a story became available to them. Furthermore, the audiovisual media fragments did not always provide precise pointers as to their setting. Suggestions to resolve this problem included starting each video clip with an image of the location in which the story is set, instead of having the location visualised somewhere in the middle of the clip, according to the demands of the story being told. Another suggestion was to use the narration to direct the audience's gaze in the appropriate direction. For instance stories could commence in the following style: "Can you see the red brick building opposite No. 8 South Earl Street? That used to be the local Health Centre." By explicitly naming and describing the important locations, the participants would then be able to familiarise themselves with the setting before the beginning of the story, without missing out on the visuals or feeling confused about what they should be looking at.

6.3.5 Reflections and Conclusions

The fist user study was insightful on multiple levels. It helped us refine the procedure and methodologies required to evaluate the project. We found that case studies and semi-structured interviews worked as appropriate methods to find the users' reaction to issues that are otherwise difficult to quantify, such as the audiences' response to the system in terms of immersive feelings and sense of place, for example. On the other hand, we realised that we needed to complement the data gathered through the recorded comments and interviews by general questions about each user, such as age and occupation, or their disposition towards technology, stories in general and interactive stories in particular. These details are important in order to frame their comments in a much more informative way. For example, the user's focus on the place during the MPL experience is in relation to the user's familiarity with the

area and with her orientation skills in general. A specific questionnaire was therefore designed in order to frame the audience members' comments to the system within their personal experiences and preferences. The questionnaire template is included as Appendix B in this thesis document. All the second users study questionnaires are included in the DVD Appendices folder as Appendix D.

Moreover, through the first study, we came to the conclusion that we needed to tighten our audience samples in order to be able to draw more focused conclusions from their experiences. The fact that in the Residents group we had Liberties-born participants as well as newcomers to the area, made it difficult to draw conclusions on the reaction of the sampled community audience. Some users born and raised in the Liberties would make connections about how the area used to look and how it looks at present, or would recognise some of the characters portrayed in the story fragments, while the newcomers would not. The MPL system, however, had no influence on whether these people could make the connections or not. Their comments were dictated by their different relationship to the place rather than by the effect of the MPL on their perception of the place. A newcomer recruited as part of the residents group would not have the same recollections about the place as an old resident. These are important factors to realise in order to test how the system works as a story catalyst, as well as in capturing the traditions and atmosphere of the place.

However, because of the wide variety of audiences that were sampled for the first study, we were able to identify the main issues regarding the technical and interactive aspects of the system. All the issues regarding the technology, the user and the graphical interface, as well as the interaction design of the experience uncovered during the first study, were raised also during the second study, demonstrating that we reached the saturation of the possible comments raised by the users regarding those subjects. These issues can be summarised as follows:

- Design the LAMS experience for your targeted audience. Each of the three user groups had different opinions on many aspects of the system, from appreciation of the content to use of the interface. For locative media, the question of who the audience will be should be at the forefront of every design decision.

- Modular stories convey atmosphere. Short story fragments work well in the context of LAMS systems. Generally, we found that the users were able to stitch together the disconnected scenes they watched into a cohesive whole, in relation to the atmosphere of the area that the LAMS was referring to; to link the fragments that directly connect with one another; and to absorb the rest as detail contributing to a richer and more atmospheric experience.

- Include guidance, such as paths or timelines. Users unfamiliar with a neighbourhood tend to use the system as a tour guide or to aid navigation. Providing tools to support this, such as paths suggesting where to go next, may make the system more accessible for them.

- Explicitly situate media. It is important that the media is explicitly designed to allow users to situate the content in the environment. If they are unable to superimpose the videos on their location, the effect of the experience is lessened. One technique is to start each clip with a photograph of the relevant location.

- Screen User Interface (UI) is a visualisation, not an interaction. Generally the users wanted to see more (e.g., the path they had taken or might take next, or an indication about whether they had already seen a piece of content) but do less. They wanted to look at the system, but keep actual, explicit interaction to a minimum.

For the second study therefore, we decided to focus more on the intangible aspects of the experience, such as how a LAMS system can function as a *place enhancer* and can influence the neighbourhoods' sense of place that users build in their minds, and the *immersive feelings* in the narrative stimulated by the relation of the stories to the real place. Furthermore, we wanted to focus on how the system could work as a *memories and stories catalyst*, in particular with local residents. Once the focus of the study was tightened, we proceeded in organising a second and final evaluation study of the system.

6.4 Second User Study

For our second study of the MPL, we sampled participants based on their connection with the neighbourhood, but from different cultural backgrounds and hence with a different point of view in relation to the area and the content of the MPL. In order to do that we sampled foreign users born outside Ireland, Dubliners living in a different neighbourhood of the city and Liberties-born community members. In the following section we describe the study configuration and its results.

6.4.1 Participants and Configuration

A total of 15 participants, 5 for each user group, were recruited in order to evaluate the MPL system as an *immersive narrative experience*, as a *place enhancer* and as a *memories and stories catalyst* for the local community.

- Five participants, who we call Community users, were born and raised in the Liberties and were familiar with the area's folklore and traditions. These participants were recruited in order to collect the local reactions to the system and to observe if memories and story recollection were stimulated by it.

- Five non-resident participants coming from a different Dublin neighbourhood were sampled, in order to collect reactions to the place from a wider point of view. These users were familiar with the city but not particularly with the Liberties area, but still had a strong feel for Dublin city history and stories. We call this group Dubliners.

- Finally, we sampled 5 participants from outside Ireland, belonging to different cultures and having different nationalities, but fluent in English and familiar with Dublin because of working in the city. We call this group Foreigners.

By observing the reactions of these three different sets of users, we had covered the main target audience of our system as a potential *place enhancer* for locals inhabitants and visitors to the Liberties, from Dublin and abroad. Furthermore, we intended to examine whether a system such as the MPL could function as a *stories and memories catalyst* for local

community members. Across the three user groups, particular attention was paid to the *immersive feelings* generated by the system and its ability to generate interest in and familiarly with the area.

The method of data collection was drawn from the first study. Each user was firstly taught how to use the mobile device and how the MPL interface worked. Then he or she was asked to roam the neighbourhood streets independently in search of story content. All users had an audio recording device switched on at all times during their tour, and they were asked to record their comments on the experience. Participants were encouraged to record their comments by speaking loudly into the recording device, but only if they felt comfortable in doing so; we did not want them to be distracted from the main experience of the narrative by feeling uncomfortable in the commenting task. In fact, the use of a recording device to record comments during the tour was not always effective. Often after the trial, users reported that they forgot to talk in to the recording device or felt awkward in doing it while walking in the streets of the neighbourhood. Moreover, each user was followed through the neighbourhood at a distance. This enabled the researcher to observe a user's chosen path through the area and to step into the MPL experience if any problem arose or if asked by the participants; but it prevented the spontaneous, disruptive communication observed in the pilot study. At the end of the tour, each user was engaged in a fifteen- to twenty-minutes long semi-structured interview. During the interview, the conversation was directed towards the effectiveness of the system in terms of what it was like as an immersive experience involving narrative and place, whether the system succeeded in communicating a sense of place and interest in the neighbourhood and, finally, if it functioned as a story and memory catalyst for audience members that belonged to the Liberties community. During the interview, questions were asked about the efficacy of the interface and if there was any other comment on or change that they wished to make to the system. Participants were asked if they liked the MPL system in general, if they would like to experience it in other places (their own neighbourhood, for example) or in a new city that they had never visited before. Users were also asked if they would be interested in sharing their own stories through such a system, and finally, if they preferred it to a traditional guided tour or a guide book. In fact, while the objective of the MPL is different from that of a tour guide, the tour guide is the closest comparable experience that most people not familiar with locative media would have had.

After completing the interviews, the participants were asked to fill in a questionnaire that was the same for all the users groups, in order to frame their disposition towards stories, the technology and the place. Transcriptions of the recordings of the users' comments during the tour, and the semi-structured interviews, the researcher's observation notes and the questionnaire data were collected across the three groups of audiences. In the following sections, we describe and analyse each user group through the data collected on the questionnaire, the comments about the system recorded during the tours and the issues raised during the interviews. When necessary, we refer to the words of a particular user by giving the time of the transcript and the name of the user. For example, if we refer to a quote by Charlie, [Charlie, 00:34] would refer to the lines of Charlie's transcript that are marked with the time: 00:34. If the interview is broken up into more than one recording, the number after the name would refer to the number of the recording file; for example, Eileen2 would refer to the transcript of the second file of her interview. Due to the length of the transcripts we did not include them as appendices in the thesis printed document but as a digital Appendices in a DVD attached to the thesis printed document. For the complete transcripts of the interviews and the recorded comments then, see Appendix C contained in the DVD folder called Appendices.

6.4.2 Analysis of Community Group Reactions

For the analysis of the data collected from the Community group, we are going to analyse first the questionnaires, then the transcripts of the recorded comments made by the users during the tour and then the semi-structured interviews. In analysing the transcripts we extracted a set of categories that recur in more than one user's recording and grouped the comments under those subheadings. For the Community users, the categories of comments found in the transcripts are: the MPL as a story and memory catalyst, the learning aspect of the MPL, the MPL's narrative aspects, immersivity, orientation issues **and** the "disadvantaged neighbourhood" reputation**.**

6.4.2.1 Analysis of the questionnaire data

The members of the local community group sampled were all born and raised in the Liberties area. They varied in age, occupation and gender. The group consisted of: Charlie, union officer, aged 70; Chris, educational manager, aged 50; Eileen, musician, aged 36; Steven, I.T. technician, aged 32; and David, chemistry lab technician, aged 26. The community users affirmed that they liked technology and were quite familiar with it, apart from Charlie and Chris. David was the only community user who had used a handheld device before. Charlie and Chris asked me to stand by their side during the MPL tour, in order to make them feel more comfortable with the technology. As a result, the comments recorded during their tour are more akin to a spontaneous conversation, in comparison with the short statements about the MPL experience recorded by the users who toured on their own. At first, due to the experience of the pilot study where my presence next to the user was a disturbing factor for the evaluation purposes, I was reluctant to be at the users' side while they experienced the MPL. Eventually I conceded, because I did not want the users to have an unpleasant experience of the MPL due to their discomfort with the technology. Later, from the transcripts of the recording made while touring with these users, I realised that the fact that I was standing next to them during the MPL tour did not disturb the experience as it had done in the pilot study. The difference was in the fact that the Community group, being from the Liberties instead of from outside the area like all the participants of the pilot study, were really focusing on the story aspect of the neighbourhood. Thus, my presence next to them seemed to reassure them with regard to the technology they were using and stimulated a dialogue about the place and its stories. After all the records from the three different groups were transcribed, I realised that many participants did not record very many comments during the tour, and many of the comments recorded were repeated during the semi-structured interviews conducted at the end of the tour.

All members from the Community group reported that they liked stories and knew what an interactive story was. Furthermore, they liked the idea of a story being interactive, even if, except for David, none of them had experienced one before. This is an important piece of information to take into consideration when evaluating the success of the system as an interactive narrative. In fact, the critiques about the interactive and fragmented nature of the

systems reported during our studies were made by participants with a strong predisposition towards traditional storytelling methods, such as Steven who is writing a traditional book about his own memories in the Liberties.

Being born in the area, every participant was familiar with the neighbourhood's geography, but not everyone was comfortable about their own orientation skills and using maps. In the case of the Community users, not being familiar with orientation tasks did not influence the experience as much as it did for the other groups, because the members of the Community group were familiar enough with their own neighbourhood streets. Finally, all the Community group users stated that they would have repeated the MPL experience in the Liberties again, as well as in other neighbourhoods or cities. All of them, except for Eileen, felt comfortable at the idea of sharing their own stories through such a system. Eileen mentioned that she would not necessarily be against sharing her stories, but it would have depended on the story and the context.

COMMUNITY AUDIENCE MEMBERS: DATA FROM THE QUESTIONNAIRES
(Users are listed in alphabetical order)

PERSONAL

Name:	Charlie	Chris	David	Eileen	Steven
Age:	70	50	26	36	32
Occupation:	Trade Union Officer	Education Co-ordinator	Lab Technician	Musician	I.T. Technician
Nationality:	Irish	Irish	Irish	Irish	Irish

THE TECHNOLOGY

Name:	Charlie	Chris	David	Eileen	Steven
Do you like Technology? Scale from 1 to 10 (running from *Least*=1 to *Most*=10)	1	10	10	8	8
Are you familiar with it? Scale from 1 to 10 (running from Least=1 to Most=10)	3	10	8	7	8
Have you used a handheld mobile device before? Answer: yes or no	no	no	yes	no	no

INTERACTIVE STORY

Name:	Charlie	Chris	David	Eileen	Steven
Do you like stories in general? Scale from 1 to 10 (running from *Least*=1 to *Most*=10)	10	10	7	8	10
Would you say that you know what an interactive story is? Answer: yes, vaguely, no	yes	yes	yes	yes	yes
Do you like the idea of stories being interactive? Answer: yes or no	yes	yes	yes	yes	yes
Have you experienced an interactive story before? Answer: yes or no	no	no	yes	no	no

NAVIGATION

Name:	Charlie	Chris	David	Eileen	Steven
Are you comfortable with using maps? Answer: yes, average, no	average	no	yes	yes	yes
Are you comfortable with orientations tasks? Answer: yes, average, no	yes	average	yes	average	yes
Do you know the Liberties area? Answer: yes, average, no	yes	yes	yes	yes	yes

GENERAL

Name:	Charlie	Chris	David	Eileen	Steven
Would you do the experience again? Answer: yes, maybe, no	yes	yes	yes	yes	yes
And if it was updated with new content regularly? Answer: yes, maybe, no	yes	yes	yes	yes	yes
Would you do a similar experience in other cities? Answer: yes, maybe, no	yes	yes	yes	yes	yes
Would you like to have this system active for the area where you are currently living? Answer: yes, maybe, no	yes	yes	yes	yes	yes
Would you feel comfortable sharing your own stories through such a system? Answer: yes, maybe, no	yes	yes	yes	maybe	yes

Table 6.2 Summary of the Community data extracted from the questionnaires

6.4.2.2 Analysis of the recording transcriptions

From the transcripts of the recorded comments and semi-structured interviews, we can report that, compared to the other two sets of participants, the Community users were mainly focused on issues regarding the neighbourhood, local stories and characters, and personal memories, rather than on technology, interface or orientation issues.

The MPL as a Story and Memory Catalyst

The Community users' familiarity with the neighbourhood and its traditions drew their attention to the narrative and cultural aspects of the project. Charlie, for example, mainly took the MPL narrative system as a starting point to retrace the whole history of the Liberties from when "the weavers and the Heugenots lived in the area 300 years ago" [Charlie, 3:21]. He tied in the MPL stories with his own family history and his mother's brother "being a weaver himself" [Charlie, 4:17]. During the tour, Charlie also remembered characters of the area that are not mentioned in the MPL, such as Doctor Moss [1:18:30], who built the Coombe hospital to help women have their babies in safer conditions. Moreover, Charlie and Chris, remembered other stories and local characters not mentioned in the MPL, such as Bang Bang, Mary All Papers [Chris, 15:31] and Doctor Lomes, who was appointed by Guinness to supervise the conditions in which brewery workers were living [Charlie, 28:43]. Charlie did enjoy the system very much, because it would prompt him to tell stories and at the same time keep the focus on one location at a time [Charlie's Observation Notes].

All the Community users were reminded of some personal anecdotes concerning the area. Charlie was reminded of his beautiful aunt who featured on the biscuit boxes of the local biscuit factory [Charlie, 34:19]. Chris remembered herself being sent to work in a weaving factory when she was still a young girl [Chris, 43:25] and how she used to help her grandmother carrying vegetables from the Fruit and Vegetable market on the other side of the river at 5 o'clock in the morning, in order to sell them later in the day on Thomas Street [Chris, 28:09]. David remembered how his mother used to take him to the shops in the Liberties to buy clothes, and how he hated the experience [David, 36:47]. Steven remembered

how his family helped their grandmother to move out of one of the big flat complexes on Marrowbone Lane [Steven, 36:24]. Eileen, hearing the story of young Honora dying of gastroenteritis, remembered how she nearly died of gastroenteritis herself when she was a child [Eileen1, 16:52]. Community users were often tying the stories with past traditions and social issues concerning the neighbourhood. After hearing the story of a girl, who had been christened with a male name and resisted changing it until she really needed to fix the mistake in order to get her pension, Steven commented about the anti-authoritarian nature of the inhabitants of the Liberties and how they would not like to deal with authorities unless it was strictly necessary [Steven, 14:29]. Eileen also mentioned in her comments how, through the MPL, she has actually remembered how Grand Canal Street was filled with water when she was a child [Eileen4, 00:39]. Grand Canal Street in fact used to be a water-way for the Guinness barges, and animals and children used to roam free on the banks of the canal. Eileen said she had forgotten that the canal used to be there, and she used to play around that area herself [Eileen4, 00:39]. Chris enjoyed most of the stories, in particular those that she could relate to, like the stories featuring the local doctor and the dispensery officer. She remembered that people used to get the same medicine all the time, and that the officer used to be very rude to people queuing at his hatch to receive their prescriptions; she also related to the anecdote about the window decoration competition. Chris remembered how her mother used to tell her about that competition when she was a child [Chris, 5:00]. The amount of personal and historical information that was weaved into the conversation shows how the MPL system can function as a story catalyst and memory collector for local residents and community members of the Liberties.

The Learning Aspect of the MPL

Community users also enjoyed the learning aspects of the MPL experience. Chris appreciated learning about facts and stories she did not know about the neighbourhood, such as the origins of some street names [Chris, 10:25] or the fact that women used to do their laundry on the banks of the Poddle river [Chris, 2:20]. David also appreciated this [David, 31:33] and remarked that a lot of the Liberties history is not generally known and that the MPL system was a nice way to be introduced to it.

The Narrative Aspects of the MPL

The audiovisual treatment of the stories was generally appreciated by local participants [Eileen4, 3:57], [Chris, 4:19], [Charlie, A2], except for Steven, who did not like the story visuals [Steven1, 17:03, 19:33, 25:09]. He commented that they were too tightly edited and that he could not connect them to any location in particular. He felt a bit distant from the characters portrayed in the stories [Steven1, 42:17] and also found the content too fragmented [Steven2, 3:02]. While introducing the project to Steven, before the tour took place, he said that he had already seen the MPL stories from the project website [Steven's Observation Notes]. It is possible that this might have affected his perception of the MPL in a negative way, pre-empting the interest in the stories themselves. Furthermore, Steven added in the interview that he is writing his own book about his own stories of the Liberties [Steven2, 11:29], and also that he would prefer a linear documentary about the area to get to know the neighbourhood, rather than the fragmented MPL experience [Steven2, 3:02]. It may be that since he is writing a chronologically ordered book of stories about the area, Steven is more attuned to experiencing linear and chronologically ordered story material. Charlie, on the other hand, found the fragmented nature of the MPL very inspiring. He appreciated the fact that each story was condensed into a minute of audiovisuals [Charlie, 1:12:11]. Charlie gives tours of the Liberties to groups of tourists himself, and he mentioned in the interview that he tends to lose focus as he tells the stories of the neighbourhood. He said that a system like the MPL would help not only people touring the area, but also someone giving a tour, to maintain a more focused performance [Charlie's Observation Notes]. Even Steven, who did not appreciate the visual treatment of the stories and the fragmented nature of the narrative, did find the MPL an interesting experience overall, and a very promising concept to develop further [Steven2, 5:03]. He could not compare it to a tour guide or an interactive story. He said that it was like nothing he had tried before [StevenV2, 2:35]. Eileen, Charlie and Chris found the system comparable to a special kind of digital tour guide, only more enjoyable and more flexible.

Immersivity

In terms of the immersive feelings generated by the MPL, they were explicitly mentioned only by Eileen, who stated that she felt very immersed in the stories despite the traffic and the noise of the city streets [Eileen3, 8:25]. The stories brought her back to her childhood and memories and anecdotes started to flow in her mind [Eileen, 1:14]. Eileen could connect the stories to the location without difficulty [Eileen3, 0:20], which helped her feel immersed in the MPL experience. Steven, on the other hand, had difficulties focusing on the visuals of the stories, which he found were distracting him from looking at the real place that he regarded as more important than the visuals of the stories themselves [Steven1, 25:09]. He considered the visuals not very useful in general and in particular not helpful in generating an immersive experience. The MPL seems, then, to function for most community users as a story and memories catalyst rather than as an immersive narrative experience. For all community users, the MPL functioned to re-connect then to their neighbourhood traditions and folklore. For example, Eileen recollected the Liberties tradition of decorating the cottage windows after viewing the MPL story in Gray Street [Eileen4, 5:13]. Chris, after viewing the stories about the Health Centre on South Earl Street, remembered how the Guinness workers used to have privileges over the other community members, such as a free doctor made available to them by the Guinness employers [Chris, 9:30]. Some Community members mentioned that through the MPL they were encouraged to see their own place with new eyes; David, for example, he had not ventured down some of the Liberties streets for a long time [David, 33:29] and was able to rediscover the area through the MPL.

Orientation Issues

Orientation was not an issue for any of the Community participants. The fact that they did not have to pay attention to orientating themselves enhanced the narrative aspect of the project and the story and memories catalyst effect. Community users also did not focus their attention on the technology and interface aspects of the system. Few comments were made in that regard. If, on the one hand, the interface was perceived as nice and intuitive [Steven1, 44:39], [David, 31:02], on the other hand, the icons indicating the story material were

perceived to be cluttering the screen [Steven1, 45:22]. Steven, in particular, would have liked more help in order to find where the stories were positioned in the real space. He suggested a navigation system similar to the one used in cars, which would direct users to the correct direction in which to find the story content [Steven1, 2:35].

The "Disadvantaged Neighbourhood" Reputation

During the interviews, some general issues about the Liberties area came up, such as the lack of proper structures for the community [Chris, 36:08, 37:09], safety, and squatting problems mentioned by Steven and David in relation to their grandmothers' apartments situated in a big block of council flats [Steven1 36:24], [David, 36:29]. These issues, and the risk of being on foot in the area with expensive devices [Steven1, 1:19, 22:40], point to the disadvantaged condition of the neighbourhood. In relation to that, we can argue that a system such as the MPL, depicting the folklore and history of an area, can be useful somehow to counteract its bad reputation. The MPL can give the local community a voice and can give visitors to the area an insight into a different face of the neighbourhood, making visible its traditions, folklore and community values. The comments of the participants who were not from the area, the Dubliners and Foreigners, pointed out that their experience of the MPL tour encouraged them to discover the neighbourhood and consider it in a new light [Philip, 28:31]. Furthermore, despite its disadvantaged conditions, more than 50 people toured the Liberties with the MPL equipment in their hands and no safety problems were ever encountered during the trials.

6.4.3 Analysis of the Dubliners Group Reactions

To analyse the data collected from the Dubliners group, we will first look at the questionnaires, then the transcripts of the recorded comments made by the users during the tour and finally the semi-structured interviews. In analysing the transcripts we established a set of categories that recur in the users' comments and grouped the comments under those subheadings. For the Dubliners users, the categories of comments found in the transcripts are: Orientation issues, interface issues, immersivity, the narrative aspect of the MPL, the relationship between story and place, safety issues and exploration of the neighborhood

6.4.3.1 Analysis of the Questionnaire Data

The Dubliners group of participants were all born and raised in Dublin city. They varied in occupation, gender and age: PhilipS, musician, 32; Ella, television producer, 27; Irene, councellor, 42; Fionnuala, researcher; 32; and Eamon, climbing wall manager, 36. Their appreciation of and familiarity with technology on a scale from 1 to 10, ranged from 8 and 9 for Fionnuala, who is quite familiar with technology, to 5 for Eamon, who is not too familiar with nor keen on technology. All the participants in this group liked stories in general and interactive stories in particular. They felt familiar with the idea of an interactive story as they had all experienced one before.

Participants were quite familiar with the neighbourhood geography, except for Irene who said that she did not know the area very well, nor was she comfortable with orientation tasks or following maps [Irene, 55:44, 57:00]. Similarly, Ella reported that although she knew the area roughly, she was not so familiar with maps and orientation skills. In the case of the Dubliners group, not being familiar with orientation tasks or with the area would influence the experience of the MPL, because the attention and focus in the MPL experience would have to compete with participants orientating themselves through the neighbourhood. Possible uncomfortable feelings could also arise due to the visibly disadvantaged conditions of some of the neighbourhood streets and its bad reputation. Irene, for example, mentioned the uncomfortable feeling of being followed and added that she was glad that I was close by in case anything happened to her [Irene, 10:09]. Four out of five Dubliners stated that they would have repeated the MPL experience, especially if the content was going to be updated regularly. They would have all liked to try the experience in other cities, except for Fionnuala, who in the questionnaire noted that she was not sure if she wanted to try the system in another city or even within her own neighbourhood. On the other hand, during the interview she did mention that she would like to have a similar system available for other neighbourhoods [Fionnuala, 55:44]. From this discrepancy we can hypothesise that either the questionnaire query or the interview question might not have been well understood by her. She also was not sure about sharing her own stories through such a system. Furthermore, Philip explicitly stated that he would not feel comfortable about sharing his own stories

through such a system. The rest of the group was positive about using such a system to share their own personal anecdotes and memories.

DUBLINERS AUDIENCE MEMBERS' DATA FROM THE QUESTIONNAIRES
(Users are listed in alphabetical order)

PERSONAL

Name:	Eamon	Ella	Fionnuala	Irene	Philip S
Age:	36	27	32	42	32
Occupation:	Climbing Wall Manager	RTE producer	Researcher	Counsellor	Musician
Nationality:	Irish	Irish	Irish	Irish	Irish

THE TECHNOLOGY

Name:	Eamon	Ella	Fionnuala	Irene	Philip S
Do you like Technology? Scale from 1 to 10 (running from Least=1 to Most=10)	5	8	8	7	7
Are you familiar with it? Scale from 1 to 10 (running from Least=1 to Most=10)	5	7	9	5	7
Have you used a handheld mobile device before? Answer: yes or no	yes	no	yes	no	yes

INTERACTIVE STORY

Name:	Eamon	Ella	Fionnuala	Irene	Philip S
Do you like stories in general? Scale from 1 to 10 (running from *Least*=1 to *Most*=10)	7	7	8	9	8
Would you say that you know what an interactive story is? Answer: yes, vaguely, no	yes	yes	yes	yes	yes
Do you like the idea of stories being interactive? Answer: yes or no	yes	yes	yes	yes	yes

Have you experienced an interactive story before? Answer: yes or no	yes	yes	yes	yes	yes

NAVIGATION

Name:	Eamon	Ella	Fionnuala	Irene	Philip S
Are you comfortable with using maps? Answer: yes, average, no	yes	average	yes	yes	yes
Are you comfortable with orientations tasks? Answer: yes, average, no	yes	average	yes	yes	yes
Do you know the Liberties area? Answer: yes, average, no	yes	yes	yes	average	yes

GENERAL

Name:	Eamon	Ella	Fionnuala	Irene	Philip S
Would you do the experience again? Answer: yes, maybe, no	maybe	yes	maybe	yes	yes
And if it was updated with new content regularly? Answer: yes, maybe, no	yes	yes	maybe	yes	yes
Would you do a similar experience in other cities? Answer: yes, maybe, no	yes	yes	maybe	yes	yes
Would you like to have this system active for the area where you are currently living? Answer: yes, maybe, no	maybe	yes	maybe	yes	maybe
Would you feel comfortable sharing your own stories through such a system? Answer: yes, maybe, no	yes	yes	maybe	yes	no

Table 6.3 Summary of the Dubliners data extracted from the questionnaires

6.4.3.2 Analysis of the recordings transcripts

In general, from the transcripts of the recordings we noticed that the Dubliners group focused on different issues of the MPL than the Community group. Dubliners were more focused on interface, interaction and orientation issues compared with the Community members who mainly focused on the content of the system.

Orientation Issues

The Dubliners participants found problems in orienting themselves in the neighbourhood [Irene, 5:06, 15:01], [Philip, 15:57] because they did not know the area that well and were relying more on the GPS signal and the map than was the case for the Community users. Neither the GPS signal nor the map were detailed enough to provide a consistently precise indication of where the user was situated. At times, the GPS would jump to a different location on the map [Ella, 10:31], [Eamon, 4:53], confusing the user. Moreover, the hand drawn map was not as accurate a reproduction of the neighbourhood topography as a survey map would be and caused some misunderstanding in the lengths of the actual path from one story another [Philip, 32:20].

Interface Issues

Another problem affecting orientation encountered by all the participants was related to the interface of the MPL, in particular to the icons that would pop up on the map to indicate availability of story material. The icons were often reported as covering the map and cluttering the screen. Everyone wished to have the option of switching them off in order to view the map better [Eamon, 00:40], [Ella, 4:34], [Philip, 19:29], [Irene, 11:38], [Fionnuala, 30:15]. The other interface pointer to the story material were small green dots, three pixels by three. The dots were intended just to give awareness to the users of where the stories were positioned in the neighbourhood area. Nevertheless, users often commented that they would have liked the dots to hold more information than just the position of the stories. By having the dots in different colours, they could suggest a possible trail for the user to follow, says Eamon [Eamon, 4:15]. Similarly, Irene would have liked a trail to follow and the option of a

“back” button so that she could trace back where she had been previously [Irene, 29:57, 30:48]. Eamon would also have liked a “back” button in order to rewind and go back to some decision point to choose a different path through the stories the second time around [Eamon, 3:48]. However, despite the icons cluttering the screen, everyone found the interface quite intuitive and easy to use. Irene enjoyed looking at the screen to follow the map despite the difficulties [Irene, 35:19]. Phil suggested that the map should have been positioned differently, so that the North of the map would be on the top of the iPAQ [Philip, 7:26]. That would have made orientation easier.

The same issue was encountered by Fionnuala, who ended up turning the device upside down in order to help her orient herself on the map [Fionnuala, 31:01]. Fionnuala and Eamon commented they would have liked the map to re-centre automatically around the user position. The user position should be kept in the middle of the screen at all times, they suggested, giving them less scrolling to do with the map [Eamon, 00:40], [Fionnuala, 40:22]. On the other hand, Fionnuala later in the interview added that during the trial she got to like scrolling the map looking for where she was positioned onit, because that allowed her to discover if there were more stories connected to the already viewed ones but that were positioned outside the part of the map that was visible on the screen [Fionnuala, 41:46]. In general, the map was perceived as pleasant, despite the inaccuracy of its proportions and the difficulties in reading some of the street names. The problem often encountered in reading the map and with the visuals in general was mainly related to the daylight reflecting on the screen. Fionnuala commented that she would have like to do the tour at night time in order to get the most out of the visuals [Fionnuala, 35:04]. Moreover, Irene suggested the use of virtual reality goggles, whereby the image could be projected in front of the users’ eyes, as a possible interesting interface [Irene, 1:06:47] to help provide a better experience of the visual part of the MPL. Ella felt she was looking at the screen too much, which was a common comment among the Foreigners, but quite unusual among the Dubliners. She would have liked to have the option to choose to see the video clip or to just stay with the audio [Ella, 5:55].

Immersivity

Most participants mentioned that they did feel immersed in the experience. Irene explained that she felt she was in a "bubble" [Irene, 1:12:01] and even forgot that I was following her as part of the user study [Irene, 1:12:09]. She mentioned that she forgot about the city traffic and the people surrounding her [Irene, 1:13:19] and that she was "there" captured by the experience [Irene, 1:13:41]. Irene added that only a man warning her about safety in the area or her phone ringing brought her back out of the experience [Irene, 1:13:43]. Likewise, Ella explicitly mentioned that she felt immersed in the experience. [Ella2, 1:13, 1:34]. Fionnuala felt that standing where she knew that the story had happened helped her in achieving immersion [Fionnuala, 36:50]. Fionnuala, similarly to Ella, added that comparing the old visuals with the space as it looks in the present did help them to get immersed in the experience [Fionnuala, 36:50], [Ella2, 3:29]. Ella pointed out that the visuals helped her by prompting a comparison between how the place used to be and how it looks now [Ella2, 3:01]. Moreover, Irene commented on the fact that the visuals often depicted buildings that no longer existed. While on one hand this was fascinating, on the other the difficulties in looking at the visuals on the screen during daytime detracted from the experience [Irene, 1:06:47]. She mentioned also that the disruption in the GPS function was a disturbing factor, and when it occurred it interrupted the immersion in the MPL experience [Irene, 1:13:43].

The Narrative Aspect

The story element was well received by all in the Dubliners group. On one hand the fragmentation of the stories did cause some perplexities in some users, but, as Ella commented, the feeling was soon overcome by the feeling of getting a general impression of the neighbourhood [Ella2, 3:46]. She also added that she appreciated the open-ended feel generated by the fragmentation of the stories [Ella2, 6:48]. Eamon, on the other hand, who was interested in a particular Johnston family's characters, would have liked to have a way to experience the family history in a less fragmented way, such as in chronological order [Eamon, 3:02]. The same was the case for Irene. Once she discovered there were some recurring characters, she would have liked more aids, such as a narrator introducing the

stories, which would have allowed her to follow a character through the whole narrative [Irene, 58:29]. In all participants' comments there were indications that they would have liked some more introductions to the characters as well as to the location depicted in the stories. Irene mentioned she would have enjoyed the experience much more if there had been an introduction to the narratives, especially those featuring characters from the Johnston's family [Irene, 58:29, 59:47]. Furthermore, Fionnuala suggested that making clear at the beginning of the tour the option of following a family history through the Liberties might help the participant decide on a certain strategy to follow in order to collect the story fragments [Fionnuala, 42:47]. In fairness, this strategy was implemented in the story design of the MPL, whereby the user can at the beginning of the tour choose the type of stories he or she is interested in discovering by selecting among Characters, Themes and Locations as the three main types of stories available through the MPL system. The user could choose to view only characters stories for example, which were mainly depicting the Johnston family and their peregrinations through the Liberties neighbourhood. The reasons why this did not work are twofold. The first reason can be explained in terms of the success of the adopted strategy in giving the user the choice of which types of stories to view before the experience starts. On one hand, for the sake of the consistency of the user study, we did not give the option to each user to choose which kind of stories to pursue, since we wanted all the users to have the same MPL set up in order to compare results. On the other hand, even during the first study, when the users could choose which type of stories to view, no one chose to limit their stories to one type of stories—all the users included all the three types in their choice. Not knowing how the MPL experience was going to be, the users felt like leaving all their options open to start with. A solution to this issue is to include a button enabling the users to toggle between story types explicitly visible on the graphic interface throughout the whole experience and not only at the beginning of it. The second reason why the strategy did not work was that the family stories were not numerous enough to make up a whole narrative trail on their own. This shortcoming was due to budget and time constrains during the story production time. To obviate to this problem a second round of story production could take place, in order to complete the Johnston family story trail and add more stories about them to the system. In fact, the family history did intrigue a great number of users, especially from the Community and the Dubliners users groups.

The audiovisual media was appreciated but often perceived as overwhelming [Ella2, 0058], [Irene, 30:48], and it could not be taken in all at once [Fionnuala, 54:09]. Irene loved the graphics [Irene, 32:54] and the video material [Irene, 1:02:45], even if it was difficult to see on the iPAQ screen [Irene, 1:07:55]. Although Dubliners felt that having to look around the place and at the screen at the same time was a lot to take in at once, they appreciated the visuals aspect of the MPL. The feeling of being overwhelmed was accentuated in participants with low familiarity with the iPAQ device and orientation skills, such as Ella. As a solution, some users would replay the stories multiple times, as Irene and Fionnuala did [Irene, 31:12; Fionnuala, 35:33]. The audio and the narration was appreciated, especially the use of different voices for the narration of different kinds of stories [Philip, 14:29]. Some comments were made about how a voice can be more suitable than another, and this made it clear how the accent and the narration skills of the voice over are crucial in such an experience. Irene, for example, really enjoyed some of the narrators' voices but not others, to the point that she was disturbed by the voiceover in certain instances [Irene, 1:00:58]. She felt the accent did not fit the area.

When asked if the experience felt more akin to a narrative or a tour guide, the answers were mixed. Irene and Fionnuala did not think it was anything like a tour guide [Irene, 35:43], [Fionnuala, 51:45] while Eamon did find it comparable to a tour guide rather than to a narrative [Eamon, 6:21]. Philip found the MPL better than a guided tour of the area [Philip, 41:04], especially with regard to the feeling of freedom to explore the area in the way the users want to [Philip, 40:32]. The only draw back that Philip mentions is that the user might miss something [Philip, 40:32]. In any case, the MPL experience was preferred to a guided tour or a book about the area by all Dubliners users. Also Irene and Eamon said that they preferred the MPL to a guided tour because of the freedom of choosing where to go and how long to spend in each location. Irene felt that it felt "empowering" to be able to choose where to go and how long to spend there [Irene, 1:06:02]. Eamon preferred the MPL because he does not like the constrain of a tour guide deciding how to walk around the area [Eamon, 6:38].

In general, the Dubliners' response to the MPL indicates how such a system is perceived as a possible alternative to traditional tour guides. We can envisage how the experience could be

developed in two different directions. On one hand, by focusing the content of the application more on the narrative aspect of the stories, such as plot, and clearer sequential order of the scenes, character development and settings, the system could work as an interactive immersive narrative experience. On the other hand, if the content of the application focuses more on the historical and social aspects of the neighbourhood, its folklore and traditions, the systems works as an alternative kind of tour guide for the area, different from books, documentaries or tours guided by a person. The diversity of the MPL from a more traditional way to get to know the area seemed very much appreciated by all in the Dubliners group.

Places and Stories Relationship

With regards to the link between the narrated events and the place where they related to, this was reported not always being obvious [Fionnuala, 33:58], [Philip, 34:54, 35:40], [Eamon, 4:53], [Ella2, 1:54]. The participants perceived that the connections between the story and the place were too vague at times. Participants suggested a number of techniques in order to strengthen the links between stories and the locations where they happened. Suggestions ranged from having the narrator suggesting to the viewer to keep an eye open for specific features on the street landscape [Ella2, 2:30, 5:55], or directly stating to the viewer the location to which the story relates before going into the story itself [Philip, 15:27], to leaving some visible marks on the buildings or street walls in the exact spots to which the story relates [Fionnuala, 33:58]. On the other hand, for Eamon, the difficulties in finding the location to which the story relates seemed more linked to the problems encountered with the GPS, which at times would behave erratically [Eamon, 4:53].

When the link between the real place and the story was identified, it generated a thrill in the user [Irene, 1:03:31]. Fionnuala reported that she was very excited in connecting the story about Lord Brabazon and the name of streets such as Brabazon's Street [Fionnuala, 39:44]. Likewise, Irene felt very satisfied when discovering the connection between the street name and the story fragment relating the Brabazon's family history [Irene, 33:14]. Irene adds that sometimes the connection would happen later when she had passed the street but still remembered the name and connected it to the anecdote [Irene, 33:50]. Philip enjoyed seeing

the old pictures featuring how the area used to look and comparing it with the present [Philip, 41:04]. He also appreciated the fact that the user knows he or she is standing in the real geographical location that the facts relate to, even if the connection to the place is at times too vague to exactly pinpoint the precise spot to look at [Philip, 39:48]. Moreover, Irene mentioned that the experience in general does add to the sense of place because it adds a layer of history to the tour of the area by showing things that are not there anymore, but she also mentioned that if it had been easier to follow the visuals she would have got a better sense of place [Irene, 1:06:47].

Safety Issues and Exploration of the Neighbourhood

The rest of the comments about the experience regarded various issues. Some specific comments were made about safety in the area. Fionnuala preferred to start the tour on a different street than the rest of the users in her group, because some intimidating looking people were standing at the corner of Meath Street [Fionnuala, 00:30 1:14], which was the usual starting point for the tour. Irene asked me initially if the device was insured against theft [Irene, 35:59], and later she was warned by a local man to be careful about touring the area with that equipment in her hands [Irene, 35:27, 35:40]. Nevertheless, Fionnuala and Irene liked walking around the neighbourhood streets very much and reported that the MPL was a very pleasurable experience and they would have spent more time with it if they could have[Fionnuala, 29:18] or would do it all over again [Irene, 1:04:59], [Fionnuala, 36:50] even at night [Fionnuala, 35:04].

All the users enjoyed the experience despite the shortcomings of the GPS and the map. They found it different from anything they had tried before. The MPL did change the impression they had of the neighbourhood, even if some of them, such as Phil and Fionnuala, had lived in the Liberties for a while in the past. In particular, Fionnuala mentioned that she had a pleasurable feeling of discovery during the experience, like being in a treasure hunt, and that she felt curious about what was happening inside buildings even after the tour [Fionnuala, 37:16]. This is one of the most powerful aesthetic qualities of the MPL, to stimulate curiosity and exploration of the neighbourhood as well as a pleasurable sense of agency through the discovery of the stories, coupled with the neighbourhood geography and atmosphere. All the

participants would like a similar experience for other cities and for their own neighbourhoods [Irene, 1:19:27], [Ella2, 7:03]. Fionnuala, in particular, could see the use of something similar for her own neighbourhood, as an artistic experience or an educational tool [Fionnuala, 55:24]. The Dubliners users said that they would not mind sharing their stories through such a system for their neighbourhood; except for Philip, who feels that he is not a storyteller [Philip, 44:10]. After the tour, Irene and Fionnuala remembered personal anecdotes and stories that related to the Liberties [Irene, 57:49] [Fionnuala, 39:16].

6.4.4 Analysis of the Foreigners Group Reactions

For the analysis of the data collected from the Foreigners group we are going to analyse the questionnaire data first, then the transcripts of the comments made by the Foreigners during the tour and finally their semi-structured interviews. In analysing the transcripts, we grouped the comments under those subheadings reflecting the category the comment belongs to. For the Foreigners group the categories found in the transcripts are: the exploration of the neighbourhood and its reputation, orientations issues, interface issues, place and stories relationship, the MPL narrative aspect, the MPL as a place enhancer.

6.4.4.1 Analysis of the Questionnaire Data

The participants of the Foreigners group all had different nationalities, and their occupations involved technology in different ways. They are within a close age range, from 25 to 35 years old. Their English language knowledge is very high, but some of them, like Francesca, Lukas and Alfonso, who had been living in Dublin for less than a year, had some difficulties in understanding the accents in some of the narrated stories. Francesca in particular commented that the story that had my voice narrating it was much easier to understand, because of the Italian accent. They all liked technology, except for Lukas who gave himself a 5 mark to describe his liking of technology, on a Scale from 1 to 10 (running from Least=1 to Most=10). All the group was quite familiar with technology. Alfredo and Philippe had used a handheld device before, while the rest of the group had not.

The whole group liked stories, but Francesca more so than the rest of the group. Francesca, Alfredo and Tilman knew what an interactive story is, while Philippe and Lukas did not have

a clear idea about it. The whole group liked the idea of a story being interactive, exept for Philippe who sasid he was not sure. Francesca and Alfredo had experienced interactive stories before. Tilman and Philippe had not. Lukas reported that he experienced an interactive story when his parents would bring him to places and tell him what they had already experienced there.

The whole group was comfortable using maps. Everyone exept for Philippe was comfortable with orientation tasks. The group was not very familiar with the neighbourhood except for Alfredo, who claimed to know the area. Philippe mentioned that he knew the area vaguely.

After the tour everyone marked on the questionnaire that they would repeat the experience, exept for Tilman, who was not sure he would do it again, even if the content was regularly updated. Everyone in the group marked that they would like a similar experiences in other cities. All the group would also like to have a similar system for the area of Dublin where they are currently living, exept for Tilman, who said that he believed that his current neighbourhood would not have interesting stories to share through this system. Francesca and Alfredo would feel comfortable sharing their own stories through such a system, while the rest of the group was not sure they would like to author and share their own stories for a public audience.

FOREIGN AUDIENCE MEMBERS' QUESTIONNAIRE DATA
(Users are listed in alphabetical order)

PERSONAL

Name:	Alfredo	Francesca	Lukas	Philip	Tilman
Age:	33	26	29	32	35
Occupation:	Online operations coordinator	Google Employee	Online coordinator	Software developer	Computer Games developer
Nationality:	Spanish	Italian	Czech	French	German
English language knowledge (only for the foreign audience members) Scale from 1 to 10 (running from Least=1 to Most=10)	7	8	10	8	9

THE TECHNOLOGY

Name:	Alfredo	Francesca	Lukas	Philip	Tilman
Do you like Technology? Scale from 1 to 10 (running from Least=1 to Most=10)	9	8	5	8	8
Are you familiar with it? Scale from 1 to 10 (running from Least=1 to Most=10)	9	7	7	7	9
Have you used a handheld mobile device before? Answer: yes or no	Yes	No	No	Yes	No

INTERACTIVE STORY

Name:	Alfredo	Francesca	Lukas	Philip	Tilman
Do you like stories in general? Scale from 1 to 10 (running from *Least*=1 to *Most*=10)	8	9	7	8	8
Would you say that you know what an interactive story is? Answer: yes, vaguely, no	Yes	Yes	vaguely	Vaguely	Yes
Do you like the idea of stories being interactive? Answer: yes or no	Yes	Yes	Yes	Yes and No	Yes

Have you experienced an interactive story before? Answer: yes or no	Yes	Yes	Yes, With my parents when they were showing me places they had visited and telling me what they experienced there.	No	No

NAVIGATION

Name:	Alfredo	Francesca	Lukas	Philip	Tilman
Are you comfortable with using maps? Answer: yes, average, no	Yes	Yes	Yes	Yes	Yes
Are you comfortable with orientations tasks? Answer: yes, average, no	Yes	Yes	Yes	No	Yes
Do you know the Liberties area? Answer: yes, average, no	Yes	No	No	Average	No

GENERAL

Name:	Alfredo	Francesca	Lukas	Philip	Tilman
Would you do the experience again? Answer: yes, maybe, no	Yes	Yes	Yes	Yes	Maybe
And if it was updated with new content regularly? Answer: yes, maybe, no	Yes	Yes	Yes	Yes	Maybe
Would you do a similar experience in other cities? Answer: yes, maybe, no	Yes	Yes	Yes	Yes. I feel it would be more interesting for people that vaguely know the area already, so you understand the context of the stories	Yes
Would you like to have this system active for the area where you are currently living? Answer: yes, maybe, no	Yes	Yes	Yes	Yes. But the area has been rebuilt in a large measure. But there could be some interesting hidden stories	No
Would you feel comfortable sharing your own stories through such a system? Answer: yes, maybe, no	Yes	Yes	Maybe	Maybe	Maybe

Table 6.4 Summary of the Foreigners data extracted from the questionnaires

6.4.4.2 Analysis of the Recording Transcriptions

From the analysis of the transcripts and the observation notes, in general we can state that for the Foreigners group, the MPL experience was quite an adventurous one, challenging and inspiring.

The Exploration of the Neighbourhood and its Reputation

The participants knew about the bad reputation of the neighbourhood and some of them brought up safety issues during the interviews and during their tour of the area. Lukas felt unsafe in carrying an expensive device such as the iPAQ around the Liberties and asked me if he should worry if I was not right behind him during the trail [Lukas, 00:03]. All the users were a bit concerned with safety at the beginning of the tour, but they did relax as the tour progressed. Because the neighbourhood has a quite bad reputation, Philippe and Tilman explicitly mentioned that they would have not otherwise have visited the neighbourhood if it was not for the MPL project [Tilman, 39:19, Philippe, 28:31]. This indicates that the MPL and LAMS in general have potential future applications in terms of opening up possibilities for disadvantaged areas to attract and stimulate interest, not only from locals but from tourists as well.

The Foreigner participants were challenged in exploring the area through the MPL experience. During the tour they had been pleasantly surprised by some of the neighbourhood features. Francesca and Lukas said that while they were searching for stories, they discovered parts of the neighbourhood that they did not expect. Lukas in particular found the cottages off Gray Street [Lukas, 18:57] or the Pimlico cottages up near Marrowbone Lane very interesting, noting that they did not belong to the architectural landscape he had been walking through since the start of the tour. Francesca commented further about how the architecture of the Liberties was so surprisingly varied [Francesca, 43:36]. She noticed the striking difference between the big blocks of council flats on Marrowbone Lane or Braithwaite Street and the old, small cottages at the corner with Pimlico or inside Gray Street [Francesca, 43:36]. She would not have expected these two styles to co-exist so close to each other if she

had not found out about it while roaming in search of the MPL stories [Francesca, 43:36]. Lukas added that he enjoyed the tour because it gives the viewer a different perspective on the neighbourhood, through some personal stories mixed with some history [Lukas, 45:34].

Orientation Issues

Everyone in the group had some problems with orientation and directions, getting lost and confused about where to go [Alfredo, 1:01, 15:16; Philippe, 5:55, 26:59; Tilman, 6:20, Lukas, 14:07]. They attributed the problem in part to GPS inaccuracies [Tilman, 6:20; Lukas, 23:03] and in part to the fact that the map on the handset was difficult to read [Tilman, 44:04] and got cluttered with the icons indicating the story available to the user [Alfredo, 10:45, 11:42].

Interface Issues

Apart from orientation issues, the interface was perceived as very intuitive and easy to use [Tilman 44:04; Philip, 41:11; Lukas, 47:31]. With the Foreigners, there were not many comments raised about the interface. Francesca and Lukas had some suggestions regarding the green dots indicating the position of the stories on the map. Lukas would have liked to have more information regarding the stories just viewed and to be viewed. He suggested that trails of coloured dots on the map could indicate thematic trails through the area [Lukas, 46:06]. He also mentioned the use of text to give some background information on some particular points of interests in the neighbourhood [Lukas, 46:06]. Francesca suggested that if the green dots had been numbered, they could have indicated a chronological order in which to view the stories, or at least give an indication to the user if he or she is seeing the content in the right order [Francesca, 38:43]. While many users (across the three different groups) found that the icons cluttering the map [Francesca, 17:50, 38:47] caused them some difficulties in orienting themselves, Tilman did not find any problem with the icons [Tilman, 45:03].

In general, responses relating to the issue of system guidance through the experience were mixed. On one hand, some users were happy to wander around the neighbourhood, such as

Philip who was happy to go around the neighbourhood first and then followed the system's suggestions on which stories to go and seek next [Philippe, 41:36]. On the other hand, some other users would have appreciated more indications on where to go next, for a suggested starting point or a trail to follow in the neighbourhood. Tilman actually reported that a definite starting point and indications to where to go next after each story would have improved his experience of the MPL [Tilman, 36:00].

Relationship Between Place and Stories

Some users mentioned difficulties in connecting the stories to the locations [Tilman, 36:54; Alfredo, 53:17; Philippe, 45:42], while one said he had a problem locating only one of the stories [Lukas, 49:44]. Alfonso mentioned that it was hard at times to take in the story, the video and the real place all at once, but he nevertheless defined the experience as altogether interesting [Alfredo, 52:51]. Furthermore, Philippe and Alfredo added that they felt they were looking too much at the screen and missing out on the real place or vice versa [Alfredo, 3:16, 6:13; Philippe, 38:36]. Moreover, when noticing some of the natural architectural landmarks of the area, such as the Jesus statue in Gray Street, or the Guinness brewery, nearly all of the Foreigners, except for Francesca, were expecting to have more information or stories referring to those particular landmarks [Tilman, 37:35; Lukas, 11:58, 12:50].

The Narrative Aspect of the MPL

The Foreigners users liked the stories in general and their visual treatment [Tilman, 38:05; Alfredo, 16:03, 22:33], even if at times it was hard to see the images with the sun reflecting on the screen [Philippe, 47:18]. Some participants mentioned that the visuals distracted them from the place itself by encouraging them to focus too much on the screen [Philippe 36:38; Lukas, 54:18]; or they felt that they would tend to look around the real place rather than at the screen [Alfredo, 3:16, 6:13]. Participants had different favourite stories. The variety of comments showing which story was each participant's favourite support personal taste and memories that each user has connected to particular stories rather than pointing at specific issues with the story-production methods. Most of the Foreigners—Francesca, Lukas, Tilman and Alfredo—explicitly mentioned their appreciation of the historical anecdotes and the use

of old pictures [Tilman, 38:18; Alfredo, 22:33; Francesca, 10:30; Lukas, 1:01:02]. On the other hand, Lukas added that if he had known that there was a story thread that related to a person he would have liked to follow that through the neighbourhood. He stated that getting to know the character's story and past would stimulate the interest in the place [Lukas, 1:01:02].

At times, the experience was perceived as being overwhelming for different reasons. Alfredo commented that the audiovisuals and the location together were too much to take in all at once [Alfredo, 52:51], and Philippe said in the interview that there were too many names to remember [Philippe, 38:53]. Lukas would have liked more factual information about the place and its architecture and population as part of the experience, and he would also have liked to have more stories to listen to [Lukas, 48:41]. Generally, the stories were perceived as fragmented by all the users, but that was not a disturbing factor in the experience [Tilman, 38:37].

The MPL as a Place Enhancer

All the Foreigners users got a feeling of the neighbourhood through the experience [Lukas 48:41] and they mentioned that they appreciated the personal and grassroots history depicted in the stories [Lukas, 45:34]. The MPL really conveyed the atmosphere of the place as an Irish neighbourhood [Francesca, 43:36]. The users also reported that they would like to experience such a project again in other cities, and Lukas added that he would even have liked to have more stories to watch [Lukas 48:41]. Some reported that they liked the freedom and the flexibility that the system allowed to each participant compared to a guided tour, for example [Philippe, 43:29], and also they would recommend such a system for other cities too [Tilman, 41:11; Lukas, 57:33].

In relation to the Liberties neighbourhood experience in particular, all users reported that they did enjoy it as a way to get to know the area and its stories and to have an insight into its community. On the other hand, Lukas and Tilman said that if they could choose they would prefer a guided tour conducted by a person rather than a digital system in order to get to know a place [Tillman, 40:40; Lukas, 53:20].

To summarise this group's experience with the MPL, we conclude that for the Foreigners, the MPL was quite an exiting way to discover a new place. Despite the neighbourhood's bad reputation and disadvantaged conditions, the foreigners did venture in to the area, discovering unexpected features of the neighbourhood such as the Gray Street cottages, for example, and reporting an overall positive experience with the tour. Foreigners enjoyed exploring an area off the tourists' beaten track. As foreigners living in Dublin, they were keen to familiarise themselves with the city beyond the obvious tourist attractions and to get in contact with some local traditions, neighbourhoods and atmospheres. The MPL fulfilled this desire of the Foreigners group.

6.5 Reflections on the Second User Study

From the data collected from the observation notes and the interviews across the three different user groups, we observed a set of categories of comments emerging from the recorded data. The following categories that emerged from the data analysis are of particular interest for our research on immersive, location-aware narrative stories of places and communities: observations regarding the technology and the interface; comments about the stories and the LAMS experience in general; and personal recollections of memories and stories in particular from local residents. In the following sections we will treat each of these categories and its related subcategories in detail.

6.5.1 The Technology

From the experience of observing the audience, and from their comments discussed in sections 6.4.2, 6.4.3, 6.4.4, the technology used in the project (a GPS-enabled iPAQ, see Figure 6.2) has been demonstrated to be both simple to interact with and reliable. This is an important finding, as some of our target audience had limited experience with computer technology, and many mobile devices can be challenging to use. The simple interface we developed plays a considerable part in this success.

Figure 6.2 Picture of the iPAQ device interface displaying different types of story icons depending on their relations to the location and the users history.

As a miniature portable cinema screen, the iPAQ delivers good quality audiovisual media that allowed the audience to engage with both the audio narration and the visual interpretation of the story. Adopting an iPAQ as our delivery platform—a device that had to be explicitly rented or requested in order to try the experience—was a design choice made in order to stress the uniqueness of the experience. By ensuring that the project was only available under certain conditions and for an already interested audience, we were able to make the experience more akin to attending the theatre or visiting a gallery than more casual activities like watching TV or surfing the web. Actually, through the purchase of a ticket and the allotment of time to dedicate to the experience, an audience member chooses to engage with the project and pays deeper, more focused attention to the work. From this consideration, we thought that if we had made the project available for mobile phones and other more popular and widely available mobile devices, it would have become more accessible but not necessarily more appreciated in terms of being a narrative experience, place-enhancing tour, and catalyst for stories and memories for the local community.

The fact that locations were not always immediately recognisable led to a mixed response. Some audience members were curious about where to find the stories and the places to which they related. In some cases, having to look carefully for where to relate the story to stimulated exploration of and interest in the area. However, for some users that experience was frustrating. The problem can only be partly attributed to the resolution of the GPS technology, which spans around 10-15 meters. Specific filming techniques could be combined with technologies that offer more accurate positioning measures, such as Bluetooth beacons or RFID tags, to ensure that stories can only be retrieved in the exact locations to which they are related.

The simplicity of the interface made it easy for most audience members to focus on the stories. Understandably, people unfamiliar with the area had more difficulties. It is interesting to note that community members paid less attention to the technology and focused on the content much more than the other groups of users. The non-residents could become engrossed in or distracted by the system, but the Liberties community members immediately focused on the content.

6.5.2 Interface Design

The interface was reported to be very easy to understand and to use (see Figure 6.3). Users appreciated the difference between the hand-drawn map we adopted and the more traditional survey style of map. The radar view and cursor indicating the user's position on the map were also useful and easy to understand. What led to a less favourable response from all user groups were the icon markers that indicated the presence of the stories. A frequent comment was that the dots that show story locations on the map could have been more informative. For example, dots of different colours could be used to illustrate whether stories had been previously viewed or not. Many people were unable to remember which stories they had already seen, even when they returned to a previously visited location. Another frequent comment was that the icons that appeared on the map to indicate story availability were too big. They "cluttered" the screen rather than offering useful information, limiting the visibility of the map, and they were of little descriptive value. This comment was expressed by a high

number of users. The majority commented that they would have like to be able to switch off the icons in order to be able to see the map more clearly. A more elegant solution could be to have small specific graphics, like the dots, appearing in order to indicate story availability, with bigger icons being displayed only by hovering on the small graphic.

Figure 6.3 Picture of the iPAQ interface: Story Icons completed with a play icon on the top right corner of the square, indicating the videoclip is available for viewing. The green dots on the map act as story placeholders and indicate where the story material is positioned in the neighbourhood. .

6.5.3 LAMS Experience Design

The modular structure of the story collection evoked different responses. Some people enjoyed it, finding it engaging and challenging. The fragments would motivate them to find more story parts to complete the picture, and to confront their notion of traditional narrative structure. Typically, users enjoyed the anecdotal self-contained style of the story fragments. The collection of stories was rarely perceived as a sequential narrative, but it was recognised as portraying the character of the neighbourhood. Some users expressed a desire to be able to experience the fragments in a more linear, traditional way. Very few users found the fragmented nature of the narrative confusing and frustrating. There were also comments about the simple treatment of the characters. The main suggestion for strengthening the characters was to have a brief introduction at the beginning of each clip, to help the audience situate the story fragment in the context of the bigger narrative collection; or have the

characters themselves introducing and contextualising their position in the Johnston family, informing the audience in which relationship they stand to the author's narrating voice. Unfortunately, this was the approach that was actually attempted in the project. The narrator, who adopts the point of view of Maireen Johnston, the last surviving member of the Johnston family, talks in the first person and specifies the relationship of the characters to herself. From the comments we received, it is clear that this technique proved to be insufficient to describe the complex web of the Johnston ancestors who feature in the story fragments. Furthermore, the relationships among stories were not obvious to everybody. Suggestions to strengthen these links ranged from displaying trails on the map to highlight continuity between the stories' themes, to using the narrator to explicitly make connections with other stories and to pass on suggestions as to where the audience should go next to collect related stories. A timeline was also proposed, to facilitate experiening the stories in chronological order.

From the users' comments and observation notes we can state that the MPL experience did foster *immersive feelings* in its audience. Most users expressly mentioned that they felt immersed in the experience. Other users indirectly gave us signals of having experienced immersion by mentioning that they forgot the fact that they were being shadowed or lost track of time as they were engrossed in the experience. The system helped users to feel part of the world where the anecdotes took place by physically navigating it and comparing the story visuals with the real space. This process was particularly stimulated by the use of old pictures, featuring the place as it used to be in the past. Only one user out of fifteen commented that the visuals were distracting to the point of not facilitating immersion. The audiovisual content was appreciated by the rest of the users and helped the immersion process. Two users, although appreciating the audiovisual clips, commented about looking too much at the device instead of looking around the location. They felt that they were paying too much attention to the screen and so were missing out on the real features of the place. This type of comment highlights how the audience might feel in relation to the screen interface and content delivery. The orchestration of real place exploration and content delivery through the mobile interface must be carefully balanced. The audience must have the time to take in the real environment inputs as well as the mobile content. Again, introduction to the story content, or the use of audio-only narration in some cases, could help the audience

avoid feeling overwhelmed by the LAMS experience. A user suggested having the video content as an option that the participant can choose to view or not depending on his/her disposition, while audio only narration should be the default mode of experiencing the LAMS.

The system was also appreciated through the treasure-hunt feelings it generated in many users. The exploration and discovery of the real place functioned as an interactive element in the users' experience, as did the fact of being able to change the course of the events in the stories. The feeling of being free to wander around the space was highly appreciated. Furthermore, the system was appreciated as a *place enhancer*, conveying atmosphere and warmth to the place. Often, users mentioned that they would have not otherwise ventured into such a neighbourhood, due to its disadvantaged reputation, but they were very pleased to have had the opportunity to do so. The image of the place had changed in their minds after the tour, and they were able to connect to the complex history and old traditions of the neighbourhood better. While even reading a book about the Liberties neighbourhood would have informed the audiences about its history and traditions, only the LAMS system really challenged its audience to physically visit the neighbourhood and walk its streets, encountering and eventually meeting some of its inhabitants.

6.5.4 Memories and Recollections

From the comments gathered across the three user groups we can argue that the system did work as a *story and memory catalyst* for the community group primarily. The recollection of stories and memories within the Dubliners group as well as the Foreigners is considerably less than that registered among the community group. Moreover, the fact that Dubliners did make comparisons with their own neighbourhood and family history quite often, and that they all liked the idea of having such a system available in their own neighbourhood, shows that this experience is a desirable one for many urban areas with a history and a community that is interested in sharing that history and communicating it to outsiders. Foreigners did not recall stories or memories about their own neighbourhood nor about their Dublin experiences, but on the other hand they did make connections about other cities and neighbourhoods from

their past experiences that had a striking history or architecture that would benefit from a system like the MPL.

We can therefore generally state that the Community group benefited from the MPL as a story catalyst in a different way from the other two groups. The older community members, such as Charlie and Chris, found that the system acted as a prompt to help them remember their own stories as well as anecdotes and characters well known in the area. It seemed from their reaction that they were pleased that their neighbourhood history had been recorded in such a modern way, involving new technologies combined with old stories and tradition. Furthermore, for most of the community members, except for Charlie, who actually knows the Liberties history and anecdotes perfectly and gives guided tours through the area, there was also an appreciated learning aspect to the system that filled in some gaps of their knowledge of the neighbourhood and revealed some entirely new anecdotes and information to them.

6.6 Conclusions from the Second User Study

Through this second user study, we have established that the MPL project succeeded in enhancing a disadvantaged area by making stories about the neighbourhood and its community available to the public through a mobile location-based narrative system.

All those who participated in the user study indicated that they would like to have similar experiences available in other cities as well as in their own neighbourhood. People agreed that the place acquired atmosphere and warmth after the tour and that the experience added to and strengthened their perception of the place. For community members the experience was twofold. On one hand they were able to discover new stories and anecdotes about the history of their neighbourhood, a process they found extremely rewarding. On the other hand they were also prompted and stimulated to recollect and tell their own stories about the area. From these responses, we can see the project successfully functioning as a catalyst for community awareness and for the recollection of individual memories that could comprise a rich social history.

The study also identified a number of important aspects of the story design. Comments from media experts in particular highlighted the need to develop more sophisticated strategies for linking story fragments together and to strengthen the depiction of the characters that appear in the stories. For some people, the fragmented nature of the narrative ensemble was a positive aspect of the project. It engaged some audience members in a sort of treasure hunt for story pieces, and a bigger image portraying the area's atmosphere did emerge in the audiences' minds. For people oriented towards more classical story structures, the fragments felt incomplete or too loosely related to each other.

The portable and intimate characteristics of the medium lend themselves to a closer relationship with the audience, something that is very different from the aesthetics of cinematic public screening. Audience members appeared to engage well with the MPL stories, but there is still much to explore in the area of a specific cinematic language for small portable screens.

The interface design was generally felt to be intuitive and easy to use. The navigation aids were all useful, except for the icons indicating story availability, which were perceived as cluttering the screen and not adding much information to the interface. The dots indicating story location could also have been more informative, for example if they had been coloured differently depending on whether the story had already been viewed, which would have allowed people to avoid involuntarily returning to already visited locations.

From the second user study it emerged that the MPL experience does successfully combine story- and place-enhancing *immersive feelings* in the user. Participants commented that they were "feeling in a bubble" while experiencing the MPL, forgetting about the city traffic and noises as well as the fact that they were part of an evaluation process and that they were being shadowed. The user feedback supports the thesis that the project has potential as a *place enhancer*, transforming the locations into something richer for both community members and more casual visitors. A strong positive feedback from the community itself showed that the MPL worked as a *stories and memories catalyst* for local residents, and to a lesser extent for some of the visitors too. Story sharing and empathising was a reaction expressed by all

sampled audience members, demonstrating the importance of stories in our culture and the need to continue to engage in combining narrative tradition with emerging technologies.

6.7 Conclusions of the MPL Evaluation Process

In this chapter we have presented the MPL pilot study and the two user studies that followed it, on which the formal evaluation of the project is based. Formal evaluation strategies constitute a new area of investigation in interdisciplinary projects, and through the exploratory and more formal studies presented here, we have shown how it is possible first to explore and then to shape a detailed and data-rich user study for LAMS systems.

Drawing from the whole MPL evaluation process we have gained the following insights. From the evaluation design point of view, we observed that a qualitative approach is suited to investigate and analyse audience reactions to issues that are difficult to quantify such as *immersive feelings*, *sense of place* and *stories and memories recollection* in relation to LAMS. The audiences' comments help us achieve valuable insights into these issues, as long as the participants are carefully sampled in order to focus on particular aspects of the system. In our case, the emphasis on place and stories directed our focus on audience members with different cultural relationships to and familiarity with the place. In any case, while the use of an initial questionnaire to frame basic issues about the audience, such as their background, familiarity with technology and familiarity with the place, proved to be necessary in order to draw meaningful conclusions from the data collected through the interviews, on the other hand, after transcribing the recordings of the comments made by the users during the tour, we realised that the use of a recording device to record comments during the tour was not always effective. Often after the trial, users would report that they forgot to talk into the recording device or that they felt awkward doing it while walking in the streets. Furthermore, from the transcripts we noted that the same comments were often repeated later in the interview. In fact, it is in the semi-structured interviews after the tour that most of the information that was extracted fr analysis for the studies was found.

From the users comments combined with the questionnaire data we inferred that the system was successful as a *place enhancer*, in that it drew interest to a space and conveyed the atmosphere of that space through the fragmented narrative structure. All the users found the

LAMS concept very engaging in general, and only two users out of the 50 sampled participants from all the MPL studies reported that they would have preferred to have a real person or a book guide to take them through the neighbourhood. Everyone liked the idea of having a similar system to get to know other cities and areas of Dublin. From the local community reactions we conclude that the MPL worked both as a *memory and stories catalyst* and a stimulus for the locals to learn some new stories and facts about their own neighbourhood. A sense of pride of being from the neighbourhood emerged during the tour, and although it was not created by the MPL experience, the MPL definitely uncovered it.

From the interface and interaction point of view, the system was very easy to use. The graphic interface was easy to understand, but not always as informative as it could have been. The way that stories were signalled through the appearance of icons on the map was generally perceived as cluttering the screen; and users remarked that it was not very useful in terms of what story had already been seen, where to go next and at which position on the map the user was situated. More problems were encountered by people who were not familiar with the technologies used and with the neighbourhood topography. That worked against a smooth use of the system while roaming the neighbourhood streets.

The comfort of the user with the place, the technology, the disposition of the users towards interactive and fragmented stories structures, all influence their perception of the MPL as an *immersive* system. We can therefore conclude from the data analysis that the *immersive feeling* perceived by the users is a complex parameter to measure. It is clear how feelings of immersion in LAMS can depend on many factors, from familiarity with the neighbourhood to the appreciation of alternative modes of storytelling, such as the modular one adopted for the MPL system for example. In any case, the use of physical navigation of the real space stimulates the participants in exploring the neighbourhood and feeling immersed in its atmosphere.

In any case, we found that all the users who engaged with the system had a positive experience with it; that many of them forgot the sense of time as they were experiencing the MPL; that some of them stayed longer than they had planned to; and that some of them explicitly mentioned that they did feel immersed in the MPL, as if in a bubble, forgetting the

fact that they were followed by the researcher as part of a user study, and feeling oblivious to what else was going on around them. All of the above suggests that the system has potential as an immersive experience, by combining real places and stories.

From the aesthetics point of view, the graphic interface was reported as being pleasurable, despite not always being very efficient in conveying information about the stories. The audiovisual stories were generally appreciated, but the link with the location was not always obvious. While on one hand, this at times generated confusion in the users, on the other hand, when the link with the location that the story related to was discovered, it always generated a sense of achievement and pleasure. We take this as an indicator that this is one of the most interesting aesthetic qualities of the system, which can contribute to fostering a sense of immersion in the narrative world in the audience's minds. The suggestions and guidelines collected from the MPL participants during the whole evaluations process, on how to improve the connection of the real place with the narrated audiovisual stories, are some of the main values of the study.

In summary, the combination of exploration of a real space in the search for narrative content and the overlap of the story settings with the explored territory has proved to be a successful strategy for *immersion* in the narrative, as a *place enhancer* strengthening the sense of place in the audience's minds and as a *catalyst for further stories and memories* for local residents.

7 CHAPTER *DESIGN GUIDELINES*

In this chapter we present a set of guidelines for the design and production of LAMS, which we have distilled from the experiences of our research and the design, production and evaluation of our projects. We first would like to point out that developers and designers of LAMS systems should look at other related disciplines in adjacent domains such as Human Computer Iinteraction (HCI), film, and in particular documentary film making, although a detailed discussion of these practices and their findings is beyond the scope of this chapter. In this chapter we rather focus on summarising our practice in the development of each LAMS project separately and we then present the set of general guidelines, which are intended to be immediately applicable to designers working with LAMS, as a contribution to the field of LAMS design.

7.1 Hopstory LAMS

Our first experience with LAMS was the design and production of the Hopstory. Two versions of the Hopstory were designed and implemented, using the same story content but two different sets of interaction strategies, interfaces and technologies. In chapter 4 we described the design, the production and the informal evaluation of both projects.

The Hopstory project marked our initial steps into the LAMS domain. It had been an important learning experience in terms of how to design and implement LAMS systems. On the basis of the considerations made through the Hopstory experience, we have derived a series of building blocks to apply to future LAMS projects. Primarily, we have learned how to use classical narrative elements such as characters, settings and plot for the construction of distributed and site-specific multiple point-of-view stories and how to weave them together with the characteristics of the real place. Secondly, we have identified that the process traditionally used for non-site-specific content also allows the production of site-specific content, which is particularly relevant to the set of the film. In fact, every framing of the action has to be carefully studied in order to work with the surrounding real space where the LAMS is going to be experienced. Experience from the practice of film and documentary making provides important background and key insights into the production of LAMS

audiovisual content. Furthermore during our practice we have been able to identify the different components that need to be developed concurrently when designing a LAMS system. These components are: story design and production, interaction and interface design, software architecture and implementation and finally testing and eventual reiteration of the process. LAMS development can benefit from adopting the practices of related disciplines such as HCI, Interaction Design, User Centered Design and Software Engineering. Finally story design, development, production of the media content, interaction and interface design and implementation need a team of professional experts that have to be coordinated by a person functioning as a LAMS director in order to be able to conceive, create and manage a successful LAMS project.

7.2 Media Portrait of the Liberties LAMS

With the MPL project we extended the notion of a LAMS to outdoor spaces. We combined a modular, non-linear narrative structure with the use of a real place, providing a navigation strategy for the narrative fragments and community-related real stories that represent the content of the project. The project was described in detail in Chapter 5.

By using the real space as a navigable structure, and by overlapping the audience's exploration of the real space in search of stories with the story world where the stories are set, we improved the feeling of immersion in the narrative experience. In addition, such a collection of neighbourhood stories can play an important role in capturing the sense of community and the atmosphere of the place. The effect on its audiences can be twofold, depending on the audience's relationship to the place. On one hand, with the MPL, for example, we saw how the LAMS stimulated memories and stories of recollection in the local community within the Liberties. We envisage this process eventually feeding into a general sense of awareness of the community itself; with such awareness empowered by the re-appropriation of the local, social and personal stories, and furthered through the narrative process and its distribution. On the other hand, visitors to the neighbourhood, have a chance to see the area in a different way, getting beyond the negative impression of the Liberties created by the disadvantaged conditions of the area and instead to connect with its rich history and traditions.

During the LAMS design process, the author should also keep in mind that while dealing with real stories about a community of people, artistic manipulation of the stories can raise interesting discussion points, such as those relating to privacy issues, ownership, copyright, etc. These issues can open possibilities for further research in many different disciplines such as art, social sciences, anthropology, etc.; but these are beyond the scope of this thesis. In the case of the MPL, the project relies on the author or artist's interpretation to facilitate the community's reaction to and feedback on the neighbourhood stories.

7.3 Design Guidelines

In the following sections, we present the set of distilled guidelines for designing and producing LAMS, paying particular attention to the real space, the experience as a whole and the narrative process.

7.3.1 The Use of Real Space

The space in which the LAMS takes place plays a fundamental role in the design of the application. The space has to be used at its best in order to produce a seamless experience for the audience. The designer must pay attention not to overload the user with too many inputs and tasks to perform at the same time.

- Consider whether the LAMS is to take place indoors or outdoors. Indoors space is easier to control. This factor influences both the designer's choices and the user's state of mind. For example, indoors, the user might feel more protected; whereas outdoors, the user might feel more alert but more easily distracted by events that are beyond the designer's control.

- Consider the familiarity of the user with both the space and its topography. This factor plays an important role in the cognitive load required to experience the LAMS sytem.

- The space should be researched and considered in terms of its well-known and evident landmarks. These special locations naturally attract the audience's attention,

and this can be used to reduce the feeling of overload reported at times by users trying to take in the real space, watch a videoclip and locate the story it describes in the sourrounding space, all at the same time.

- Participants reported a pleasurable feeling, as of being on a treasure hunt, while experiencing the LAMS. Consider *hiding* the content in the sourrounding space as a possible strategy to stimulate the audience to look for the story and to foster a treasure-hunt atmosphere during the experience. This strategy should be clearly communicated to the audience, to avoid frustration arising from a failure to find the story location.

- Make sure the story is clearly connected to the real place surrounding the audience. Filming techniques should be considered in order to produce visuals that clearly reflect the sourrounding targeted space or narration. Another possible strategy is to give directions to the audience regarding where to position themselves, or to introduce the story settings and context before starting the movieclip.

7.3.2 Orchestrating the LAMS Experience as a Whole

The experience of stories fragmented and distributed in a real place depends on multiple design choices from the designer's point of view, as well as a demanding multi-tasking experience from the audience's point of view. A designer of LAMS should consider the following points while designing a LAMS system, in order to produce a pleasurable experience for its audience.

- Pay attention to the orchestration of real space inputs, content form (audio, video, haptic LAMS outputs) and the interface used to deliver the content to the user. Users experiencing LAMS can be overwhelmed by performing multiple tasks, such as navigating the space, following the narration, looking at the videoclips and relating them to the sourrounding space, simultaneously. All these elements should work seamlessly together, and should enhance and support each other in order to deliver a pleasurable experience.

- Pay attention to the balance between the amount of time users must spend looking around the real space and looking at the device's screen. A feeling of frustration can arise when the user does not have the time to take in the features of the sourrounding space and feels forced to look at the screen all the time. Allow users to walk around and be alerted when some content is in range. Make sure they feel free to look around before and after the story has been viewed.

7.3.3 The Narratives

The choice of *how* to tell the stories that feature in the LAMS is not always obvious. The difference of a LAMS experience from a more traditional type of storytelling lies in the multi tasking performance of the audience. In the cinema, the audience sits still; while reading a book, the reader is not presented with a visualisation of the story, but constructs his or her own internal images of it; during a street performance, the audience is led and stimulated in a more structured way compared to a LAMS interactive system. In general, the more traditional ways of storytelling place less demand on the audience's decision-making abilities and awareness of the space while experiencing the story. These differences ought to be taken into consideration while designing the LAMS story experience.

- The fact that portable devices have small and low-definition screens has to be taken into consideration. LAMS designers should be aware of a range of different story-delivery methods (such as video, graphics, photography, audio only) and should use them with the goal of making the user feel confortable with the multiple range of taks he/she has to perform (such as navigating the real space, listening to the story and looking at the screen as well as at the sourrounding space).

- The visuals of stories shown on location in some cases can be overwhelming. If the audience is not familiar with the place, extra attention is required to absorb the sourrounding landscape. Users can feel overwhelmed by the totality of the visual imputs they have to process.

- Care should be taken in relation to the choice of the images and narration reflecting and indicating the location to which the LAMS story relates, in order to avoid the audience feeling frustrated if they are not able to locate where the story relates to in the real space.

- In certain situations, when the environment is very rich in visual stimuli already, like in a courtyard, or in front of a monument, audio-only narration may be more appreciated, as it would not interfeere with the audience looking at the striking features of the real space around them. With the MPL, some users reported that, at times, they felt they were missing out on the real features of the space while looking at the videoclip on the screen. In these cases, audio can be proposed as an option.

- Video stored for later viewing is an appreciated choice in certain situations. In this case, the audience has to be aware that the videoclip had been collected and is waiting to be viewed at their convenience.

7.4 General Remarks

Beyond the guidelines arising from adjacent disciplines such as film making, HCI and interaction design, some general remarks arise directly from our research encouraging the LAMS designer to consider to the following points:

- The role of a LAMS designer is akin to that of a film director, where the orchestration of all the elements that compose a LAMS have to be directed and seamlessly blended under the guidance of a single person. Such a person would not possibly be an expert in all the roles needed to design and produce a LAMS but needs to be able to direct and guide a professional team of designers, story authors, audiovisual producers, as well as interaction designers and developers from the beginning to the completion of the LAMS project.

- Consider the familiary and interest of the participants in the technology used. Fear or pre-conceptions against technology can bias the experience.

- User Interface transparency is a desirable characteristic for all LAMS systems. It contributes to balancing the possible overload of simultaneous tasks to be performed by the audience.

- Authored content is appreciated in LAMS. Decades of reflections occurred in the area of filmaking and documentary filmmaking in particular. These refelctions have to be taken into consideration while developing content for LAMS. Consider using traditional screenwriting techniques, professional narrating voices and actors to enhance the quality of the content. Professionally produced content stimulates the audience engagment with and appreciation of the experience.

7.5 Summary

In this chapter, we acknowledge the importance of the accumulated experience from the practice of a number of LAMS related disciplines such as HCI, film and documentary filmmaking, as well as software architecture and user centered design. LAMS systems can benefit enormously by referencing these disciplines. The main part of this chapter though focuses on summarising our experiences while designing and producing the LAMS systems described in this thesis, in order to produce a set of design guidelines for general use by designers working in this new medium.

8 CHAPTER *CONCLUSIONS*

In this chapter we conclude the thesis by summarising our research journey. The chapter first outlines the achievements of the thesis and then shows how they led to the thesis contributions. Next, we present some insight on potential areas for future work within the LAMS research area. Finally, we outline how the particular research projects presented here can contribute to the development of the overall domain of location-aware media.

8.1 Achievements

The research described in this thesis first introduced the idea of using real space and mobile technologies in order to design and produce LAMS. Subsequently, we presented a range of significant theoretical standpoints defining space and place, narrative and its interactive mode, and issues of immersion and navigation concerning interactive stories. Furthermore, we reviewed the state of the art of LAMS by presenting an extensive literature survey that mapped the LAMS research area. In LAMS research, the processes of getting to know the literature and the practical work carried out during the research investigation progress together hand in hand, and interact and feed into each other. The exact position of the work within the overall research area is only found when the resulting work is placed in its real context, i.e., in the real world. What is found in the literature is critical for the researcher's perceptions. For this reason, our research questions were refined along with the practical experimentation, production and evaluation of the work. A practical approach is recognises to be the best way to advance research in the experience-design area (Reid 2005), which closely relates to the LAMS research area. We applied this practical approach to the creation locative media narratives.

In order to investigate the field of LAMS, we designed and produced two systems: the Hopstory and the Media Portrait of the Liberties. Hopstory is a multiple point of view fictional story that adopts a "day-in-the-life" story structure to portray a series of different characters as they spend their day moving around the same building. Story fragments are distributed throughout the building space and provide the different points of view on the events that occur during the story. Two versions of the project were developed. The Hopstory

I was implemented with the use of button-size memory storage devices (iButtons) for story fragment collection, and a final projection point where the information on the devices was interpreted and assembled for a public projection. Stimulated by this experience, we designed and implemented a second version of the system making use of handheld, Bluetooth-enabled devices. With Hopstory II we gave the users a digital map interface to aid them in the navigation of the space and also placed visible clues about which character was encountered and where, in order to let them choose which character to follow through their journey. The Hopstory project was a first step in the concept, design and production of a LAMS. After the Hopstory experience we could progress into the design and production of our second LAMS project: the Media Portrait of the Liberties (MPL).

With the MPL project we intended to explore further the possibilities of merging the place with story content. The MPL LAMS moves from a closed, controlled space, out into the open, uncontrolled street-space of a Dublin neighbourhood: the Liberties. To add to the challenge, the neighbourhood is renowned for the highly disadvantaged conditions of some of its streets. This element provided poetic inspirational elements and sociologically grounded motivations to the project. The MPL, as opposed to the Hopstory, uses non-linear open story structures, where the narrative is composed of modular fragments that can be experienced in any order. The delivery platform for the MPL takes one more step towards distribution and mobility, making the visual story clips available in relevant locations through a GPS-enabled iPAQ.

Finally, we designed and carried out an extensive user study on the MPL, in order to verify its effects in terms of fostering immersion in the narrative experience, enhancing the place where it is set and stimulating recollection and storytelling in local residents.

Because of the interdisciplinary nature of the work and its artistic approach, we found that evaluating a LAMS system does not lend itself to a similar process that would generally be applied to typical academic work in the humanities or science disciplines. In fact, the methods used to evaluate work in science, engineering and the humanities do not easily allow the evaluation of what is essentially an exploration of a new medium. While evaluating LAMS systems, we also took an exploratory approach to evaluation strategies as well and

conducted a number of formal and informal studies in order to investigate suitable methods to evaluate LAMS. Two informal studies were conducted for the Hopstory, while a more structured set of evaluations was designed for the MPL. From these studies, we have gained insight into the advantages and shortcoming of LAMS systems and distilled a series of guidelines for LAMS designers and developers, which we presented in the LAMS design chapter.

8.2 Contributions

In the following section we reflect on our experience with LAMS and restate the thesis contributions in the context of the achievements of our research.

Most people agreed that the LAMS experiences they participated in worked as a *place enhancer*, adding atmosphere, character and warmth to the space; and the fact that the stories were delivered to the audience in the place were they once occurred did help achieve a sense of immersion in the stories in general. Audience members reported that they moved from one story to another, from one location to the other, totally *immersed* in the experience, forgetting the time factor or that they were being followed or monitored as part of the user study procedure; interrupting the experience only because of technical problems (such as GPS inconsistencies or battery shortcomings). We read these results as signs that the LAMS function as a place enhancer as well as an *immersive experience.*

For community members, in the MPL LAMS in particular, the experience was twofold. On one hand, the system helped them to see their neighbourhood in a new light, by learning new stories and facts about it, a process they found extremely rewarding. On the other hand the system did work as a *story and memories catalyst*. While touring with the MPL, community members were prompted and stimulated to recollect and tell their own stories about the area. Furthermore, on several occasions, conversations and storytelling were prompted from among audience members and locals. From these responses we can see the project successfully functioning as a *catalyst for community awareness and for the recollection of individual memories* that could comprise a rich social history.

As an indication of the overall success of the MPL experience, everybody who participated in the user study expressed the desire to have similar experiences available in other cities or in their own neighbourhood. They generally preferred the MPL experience to a guided tour, as they had the freedom to choose what to explore, where to go next and how long to spend in each location. It is also worth mentioning that the disadvantaged conditions of some parts of the Liberties makes guided tours and the presence of tour guides unlikely in the area.

Furthermore, through the reiteration of pilots and multiple user studies, we have designed a specific methodology for evaluating LAMS systems that we believe to be of advantage for researchers in the area of location based mobile content in general.

Through the design and production of two LAMS projects and the detailed evaluation of one, we have established guidelines for the future of LAMS design that contribute towards *fostering immersive feelings* in the narrative and enhancing the relationship of the audience to the real location where the stories experience takes place. In particular, we found that the LAMS succeeded as a *place enhancer* in positively augmenting the place experience for a wide variety of audiences—such as tourists, foreigners, local residents and non residents—by making stories about the area available to the public in the places in which they happened. Furthermore, community members inhabiting the places where the LAMS were set were stimulated by the system to recollect and share stories and memories. Consequently, we can state that the systems worked as a *memories and stories catalyst* for the local residents.

8.3 Future Work

From the general appreciation reported by our projects' partecipants in experiencing content coupled with real location, and given the increasing uptake of and improvements in mobile devices, we see LAMS as a fruitful area for mobile applications, as well as for location-aware technology research. In the following sections, we present some ideas for future work in the area and in the use of physical space as a design element for interactive narrative .

- User-generated content tools. We envisage that the future of LAMS could involve closer collaborative effort with the local communities, in order to encourage residents

of the targeted urban areas to participate further in the production and design of the content. To facilitate such collaborations, specific tools can be tailored to enable the community members themselves to provide and add new story content to the system.

- Applications for alternative tourism in disadvantaged and multicultural neighbourhoods. LAMS systems could engage tourists and non-residents to visit areas with disadvantaged status and give their local and different voices a chance to speak about their neighbourhood. LAMS could also play a role in portraying multicultural neighbourhoods from each different cultural perspective, with the potential for fostering integration of community members from different backgrounds and for providing interesting perspectives on the neighbourhood for visitors to the area.

- Outdoors museums. LAMS could be used as guides for outdoor historical and archaeological sites, where the physical ruins of the site are important references for the historical information delivered. Making information available next to the archaeological ruins in connection to a museum database, or tri-dimensional reconstructions of how the site might have looked when it was in use could change and liven up the visitors' experience of the archaeological ruins.

- An auspicious area of application for LAMS is in the field of environmental monitoring, feedback and sustainability. Information about environmental conditions can be displayed in form of stories in the relevant locations. Content in from of multimedia clips on current situations and future solutions of environmental problems could help in fostering awareness and care for the environment.

- Location-based games. As computer games develop, the insertion of story segments during the game play becomes more and more common. Story fragments can be used in computer games to strengthen user involvement in the game: by providing insight into the rules of the game, adding character depth or advancing plot development in the game's storyline. LAMS systems can be integrated in the design of location-based games and can thus improve these games and help strengthen user involvement as noted in terms of story content on location.

- Explore different location-aware technologies. Tagging different types of locations might require different types of technologies. The exploration of Bluetooth, RFID tags, networked sensors (pressure, proximity, infrared, etc.) and how to integrate them in location-aware applications is a promising new area for research for both the technical and the design side.

8.4 Closing Remarks

In this thesis we have described how real space can be used as a design element in LAMS and how LAMS contribute to fostering the audience's sense of *immersion* in the narrative. We have described how LAMS can influence the *perception of the space and can contribute to fostering a sense of place* for community members as well as for visitors to a location. Finally, we described how such a LAMS application can stimulate its audience as a *catalyst for stories and memories*.

The latest technological developments (e.g., GPS phones) open up the possibilities for a whole suite of new location-aware applications. The state-of-the-art mobile phones today (e.g., the Nokia N95) have up to 160 MB memory and built-in GPS, i.e., much better specifications than an average iPAQ device. Technology uptake in the mobile phone domain happens very quickly, because people upgrade their handsets often. For example, it is just a few years since the first camera phones were introduced, but now nearly every phone on the market has one. If the same happens with GPS, there will be a location-aware multimedia platform in everybody's hands within a relatively short time-frame. Our research and findings in the area of LAMS are therefore an important first step towards designing and building application for such mobile platforms. Interaction designers and developers are becoming interested in this new platform, but it is a new domain and there is no established practice in the design and production of location-aware content, and in particular in narrative applications, that takes the real space surrounding the user into consideration as a design element in the mobile experience. The focus until now has to a great extent been on the technology R&D, i.e., on developing the technology and putting it on the market; little work has been done on figuring out what applications are suitable and how they should be designed. This thesis, by focusing on the combination of narrative and location, contributes to

the overall domain of location-aware media by giving designers, developers and content producers a set of practical guidelines for how to conceive of and produce suitable applications for the mobile, location-aware multimedia platforms of the future.

APPENDIX A

MPL Content Model

liberties.dtd File

```
<?xml version="1.0" encoding="UTF-8"?>
<!--DTD generated by XMLSpy v2007 sp1 (http://www.altova.com)-->
<!ELEMENT time_id (#PCDATA)>
<!ELEMENT time_desc (#PCDATA)>
<!ELEMENT time ((time_id, time_desc))>
<!ELEMENT time_list ((time* | time_id*))>
<!ELEMENT theme_id (#PCDATA)>
<!ELEMENT theme_desc (#PCDATA)>
<!ELEMENT theme ((theme_id, theme_desc))>
<!ELEMENT theme_list ((theme* | theme_id*))>
<!ELEMENT location_id (#PCDATA)>
<!ELEMENT location_desc (#PCDATA)>
<!ELEMENT location ((location_id, location_desc))>
<!ELEMENT location_list ((location* | location_id*))>
<!ELEMENT character_name (#PCDATA)>
<!ELEMENT character_id (#PCDATA)>
<!ELEMENT character ((character_id, character_name))>
<!ELEMENT character_list ((character* | character_id*))>
<!ELEMENT gps_y (#PCDATA)>
<!ELEMENT gps_x (#PCDATA)>
<!ELEMENT region_id (#PCDATA)>
```

<!ELEMENT region_description (#PCDATA)>

<!ELEMENT region ((region_id, region_description, gps_x, gps_y))>

<!ELEMENT region_list ((region*))>

<!ELEMENT filename (#PCDATA)>

<!ELEMENT thumbnail (#PCDATA)>

<!ELEMENT content_id (#PCDATA)>

<!ELEMENT content ((content_id, theme_list, character_list, time_list, location_list, region_id, filename, thumbnail, gps_x, gps_y))>

<!ELEMENT content_list ((content*))>

<!ELEMENT top (#PCDATA)>

<!ELEMENT bottom (#PCDATA)>

<!ELEMENT right (#PCDATA)>

<!ELEMENT left (#PCDATA)>

<!ELEMENT user_filename (#PCDATA)>

<!ELEMENT map_filename (#PCDATA)>

<!ELEMENT project_name (#PCDATA)>

<!ELEMENT radius (#PCDATA)>

<!ELEMENT theme_rels (#PCDATA)>

<!ELEMENT location_rels (#PCDATA)>

<!ELEMENT character_rels (#PCDATA)>

<!ELEMENT time_rels (#PCDATA)>

<!ELEMENT system ((project_name, map_filename, left, top, right, bottom, theme_rels, character_rels, time_rels, location_rels, radius, user_filename))>

<!ELEMENT media_portrait ((system, character_list, location_list, theme_list, time_list, region_list, content_list))>

APPENDIX B Questionnaire Template

NAME :

AGE :

OCCUPATION:

NATIONALITY:

Only for audience members that are not of English mother language:

How do you rate you knowledge of the English language?
Please describe below, with a number in a scale from 1 to 10:

THE TECHNOLOGY
Please feel free to explain your choice further if you feel like the question can't be summarized in the given options.

1. Do you like Technology?
Please describe below, with a number in a scale from 1 to 10:

2. Are you familiar with it?
Please describe below, with a number in a scale from 1 to 10:

3. Have you used an iPaq (handheld mobile device) before ?
Please thick relevant answer:

yes no

INTERACTIVE STORY
Pease feel free to explain your choice further if you feel like the question cant be summarized in the given options.

4. Do you like stories in general?
Please describe below, with a number in a scale from 1 to 10:

5. Would you say that you know what an interactive story is?
Please thick relevant answer:

yes vaguely no

6. Do you like the idea of stories being interactive?
Please thick relevant answer:

yes no

7. Have you experienced an interactive story before?
Please thick relevant answer:

yes no

NAVIGATION

Please feel free to explain your choice further if you feel like the question cant be summarized in the given options.

8. Are you conformable with using maps?
Please thick relevant answer:

yes average no

9. Are you conformable with orientations tasks?
Please thick relevant answer:

yes average no

10. Do you know the Liberties area?
Please thick relevant answer:

yes average no

AFTER THE TRIAL:
Please feel free to explain your choice further if you feel like the question cant be summarized in the given options.

11. Would you do the experience again ?
Please thick relevant answer:

yes no maybe

12. And if it was updated with new content regularly?
Please thick relevant answer:

yes no maybe

13. Would you do a similar experience in other cities?
Please thick relevant answer:

yes no maybe

14. Would you like to have this system active for the area where you are currently living?
Please thick relevant answer:

yes no maybe

15. Would you feel conformable sharing your own stories through such a system?
Please thick relevant answer:

yes no maybe

Thank you so much for taking the time for filling this brief questionnaire.

APPENDIX C DVD

APPENDIX D DVD

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