Designing for Public Interaction: Extending, Applying and Reflecting on the Principles of "Assembly"

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Abstract

Designing for Public Interaction: Extending, Applying and Reflecting on the Principles of "Assembly"

This thesis explores a practical approach to the design and development of interactive technologies in public spaces derived from the concept of “Assembly”.

Current research is lacking frameworks that can not only evaluate, but guide and structure design practice in developing interactive technologies that can enhance people’s experiences in public spaces. In the thesis, after a review of the literature in Interaction Design relating to the design of interactive systems in public spaces. I propose the re-working of an existing approach – that of “Assembly”- as a basis for such a framework.

To achieve this, I utilise examples from my experience of designing installations for two cultural heritage sites: I outline the significance of the Assembly design concerns by using them to reflect over a first case study, “The Recipe Station”, and I suggest how the framework could be extended to structure and support design for public interaction.

Subsequently, I demonstrate the application of this extended Assembly approach to the full design process of a second installation, “Reminisce”. I describe in detail the phases of this design process showing how they were structured and guided by the extended Assembly framework. Finally, I carry out an analysis of the resulting design intervention and its use by participants on-site, illustrating those of its qualities that particularly enhanced people’s situated activities and how the Assembly framework underpinned these positive design qualities.
Declaration

Designing for Public Interaction: Extending, Applying and Reflecting on the Principles of "Assembly"

By Marc McLoughlin

Supervisor: Dr Luigina Ciolfi

This thesis is presented as fulfilment of the requirements for the degree of Doctor of Philosophy at the University of Limerick, Department of Computer Science and Information Systems, Faculty of Science & Engineering.

It is entirely my own work and has not been submitted to any other university or higher education institution, or for any other academic award in this University. Where use has been made of the work of other people, it has been fully acknowledged and referenced.

Signature

_________________________________
Marc McLoughlin
Dedication

To my parents for their love, support and encouragement.
Where do I start? I suppose with the person who has given me such excellent guidance over the past few years, Dr Luigina Ciolfi. It was a long road but a great experience, I’m not sure if I can thank you enough for your insight, friendship and supervision. I feel honoured to be your first PhD student and without your help I would not be here today.

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1 Introduction

1.1 Summary of research

This thesis is focused on the design of interactive technologies for public spaces and on how design practice can be supported to develop ubiquitous technologies that add value to people’s activities in such spaces. I propose extending an existing approach to designing for public spaces that emerged from the field of Computer Supported Cooperative Work (CSCW), that of “Assembly”. In the thesis I will show how, by extending it, this approach can be applied to design for public spaces. I will offer a reflection on its usefulness in my design practice by presenting an example of its application throughout a complete design cycle.

With the proliferation of technology into public environments and the increasingly ubiquitous nature of personal technologies, there is a need for further exploration into how the field of interaction design can approach the design of public systems. The distinctive nature of public spaces requires particular attention: the fluctuating activities that can take place, the heterogeneous backgrounds of the people who occupy them and the diverse forms of social interaction that can occur. These are but some of the qualities of public spaces that make them particularly challenging environments to design for. Much of the work in the fields of CSCW and Human Computer Interaction (HCI) has provided rich descriptive accounts of interaction in public spaces around interactive systems, but not as much on proposing and evaluating frameworks that can support design.

The motivation for this work originates from my earlier experiences in designing interactive technologies in public spaces where I found very little guidance on how to
reflect on and guide design practice outside of the well-established and general User Centred Design themes. I am particularly interested in design approaches that help structure design, so that design practice is not only focused on technical design or modalities of interaction but also on the experiential aspects of an evolving design and of its use, and whether the experience it promotes enhances people’s situated activities.

Thus my research questions are:

*Are there human centred frameworks that can aid design practice in developing interactive technologies that support and add value to people’s activities in public spaces?*

*Can an extension of the Assembly approach (Fraser et al 2003) help structure design practice so the emphasis is put on the affects of a design on people’s situated activities?*

*How can the Assembly framework be grounded on an appreciation for people’s situated interactions?*

I analyse existing literature in the field and highlight the lack of frameworks that can subtly structure design practice\(^1\) so as to emphasise adding value to people’s activities in public spaces before technical design. In order to fill this gap, I propose extending the “Assembly” approach (Fraser et al, 2003), and I suggest how it could be used within Interaction Design through articulating its appropriation in the design and development of an interactive installation. This installation was situated in a cultural heritage site that I will discuss in greater detail in Chapter 4.

In the early 1990’s Mark Weiser proposed the vision of “Ubiquitous computing”, or “UbiComp” (Weiser, 1993), that envisioned a future where people would be in a flux of interaction with computational technologies that would be embedded into everyday artefacts and in our environment. This introduced a major shift in the ways we

\(^{1}\) I am aware that there has been a long philosophical discussion in many different disciplines on the meaning of the term “practice” (Schatzki, 2001). I do not attempt to contribute to this debate in this thesis. I will use the term “practice” when referring to the practical activities that constitute the design process.
conceived interaction with computing systems and the role they take in our activities, in contrast with the traditional metaphor of interacting with a desktop PC during isolated “episodes” of interactive experiences. The focus for design is now on understanding how interaction can be supported in the ever-increasing circumstances where technology plays a significant role in people’s lives.

Of course moving design away from the traditional metaphors of interaction introduces new challenges for designers to find new ways to understand and design for these situations. This introduces also new concerns for the circumstances of interaction and the ways in which people encounter technology during their activities. Much of the research into Ubiquitous Computing has focused on the technical infrastructure that underlies Ubicomp installations and on the socio-scientific studies of their use by participants, but relatively little research has been carried out on how to support the design towards enjoyable experiences for people.

Reversing this trend is the core focus of my research. In terms of “experience”, I agree with the view on the concept that is advocated by McCarthy & Wright (2004), whereby human experience is viewed as “constituted by continuous engagement with the world through acts of sense making at many levels” (Wright & McCarthy, 2005 p. 11). Thus I feel that the role of designers is to design to support this sense making.

My research has been carried out through my involvement in two research projects within the Interaction Design Centre at the University of Limerick. The two case studies I present in this thesis are part of work I carried out on these projects over the past 4 years. The first case study, “The Recipe Station”, was developed as part of the Shared Worlds research project (Bannon, 2005). Shared Worlds was a four-year project that investigated the development and use of novel interactive artefacts and environments within public spaces to encourage participation and community building. The second case study, “Reminisce”, was developed as part of a project that focused on exploring the utility and potential of technology to enhance visitor experiences of cultural heritage sites. This project was carried out over two years, and a more detailed description of the project is available in Appendix B.

My experience on these projects has led to the development of the research questions
I explore in this thesis. Although the work on both projects was collaborative, in the following chapters I will highlight in detail my particular role, and also the specific perspective I bring to the projects. Additionally, a list of publications emerging from both projects can be found in Appendix A.

1.2 Interaction Design in cultural heritage settings

The domain of both case studies I describe is broadly that of cultural heritage settings: places of historical, cultural and artistic value to a local community and to visitors and stakeholders (Giaccardi, 2011). Museums, cultural heritage sites and exhibition spaces have been favoured settings for the HCI, CSCW and Interaction Design communities to explore the design and use of ubiquitous systems in public spaces, and the research that has emerged has been often at the forefront of Interaction Design research.

Museum and cultural heritage settings have been early adopters of novel forms of interactive technologies, such as - for example - mobile, context-aware applications, touch-based interaction and auditory interfaces, with the main goal being to explore how technology could aid visitors in comprehending what they encounter in these settings in ways that are engaging and sensitive to their circumstances.

Cultural Heritage sites are particularly challenging environments for Interaction Designers given the educational, curatorial and social concerns that must be taken into account when approaching them. This gives rise to a greater concern for what the role and value of interactive installations should be. Therefore research in these domains has emerged from the Interaction Design field as some of the most significant research that encourages a “human centred” approach focused on enhancing people’s experiences, rather than driven by technological development only. Leading research from this area has looked at how interactive technology can support sense making and how through interaction visitors can find meaning in what they encounter, where technology is seen as means of mediation (Hindmarsh et al, 2002, 2005; Pierroux et al, 2007; Bowers et al, 2007).

Although my main goal with this thesis is not a direct contribution for cultural
heritage professionals, but rather for interaction designers, the research that has emerged from cultural heritage settings has been a substantial influence on what I present here. I feel that given the challenging nature of designing for museums and cultural heritage sites, they are excellent settings for researching the design of interactive systems in public spaces.

1.3 Thesis outline

In this section I briefly outline what I present in the following chapters so to provide an overview of the thesis.

In Chapter 2, I discuss the literature from the fields of HCI, CSCW and Interaction Design that concerns the design of interactive systems in public spaces, and particularly heritage sites. I define the area in existing literature that requires further research, specifically frameworks that can structure and orientate design, and the approach I adopt in attempting to contribute to it.

In Chapter 3, an analysis of the Assembly framework is carried out, through examples from my own design practice. I outline the significance of the Assembly design concerns and consider aspects of the framework that require further study. I then present my hypotheses on how the Assembly approach may be extended to provide a more fully developed approach that can be appropriated to structure and support design activities.

Chapter 4 presents the setting for my design work – an open-air cultural heritage site, Bunratty Folk Park. I describe the site and outline the unique qualities that it offers to visitors. I then describe how the design approach I adopted guided me in conducting field studies in the Folk Park and structured my analysis of the field study data to inform the rest of the design process.

In Chapter 5, I describe in detail how the extended Assembly framework was used to support the design of the Reminisce installation for Bunratty Folk Park. I describe how the Assembly concerns structured conceptual and technical development.

In Chapter 6, I carry out a detailed analysis of the interactions that occurred with and
around Reminisce. I emphasise the salient issues relating to the appropriation of the Assembly concept and show how the inclusion of place-related concerns enhanced the concept and led to a positive augmentation of the visiting activity at the site.

In Chapter 7, I return to my research questions and reflect on whether my work answered them and to what extent.
2 Examining Interaction Design for public spaces

2.1 Introduction

The goal of this chapter is to explore the breadth of research regarding the key issues of this thesis: public interaction, Ubicomp systems design in public settings and particularly interaction design for cultural heritage sites. Despite the significant amount of existing research, there are gaps in literature concerning how design practice can be supported to ensure that the multiple aspects of people’s experience of public installations is supported by a coherent approach to design and development. Indeed, from the literature review we can see that very few frameworks have been developed that can provide a structured approach to both conceptual and technical development, and that can specifically focus on design and also support reflection on the role and value of technology in supporting people’s activities in public spaces.

Initially this chapter will focus on people’s situated context; how it can be understood in terms of the human actions and behaviours occurring there, and the influences of the physical environment on human activities. I will give an overview of the significant research that attempts to discuss the role that the physical context has on how people interact. Moreover I will illustrate how an understanding of people’s situated interactions can aid designers to develop interactive technologies that can support these situated actions, so that design is centred on the multiple dimensions of a space affecting interaction.

I will then provide an overview of work that focuses on the design of interactive systems in public spaces. Firstly, I will critique research on participants’ engagement
with public systems and on the forms and styles of interaction that can occur around public installations.

From there I move on to look at research that analyses the role and importance of social interaction in human activities in public spaces and the need for design to take this into account so the many forms of social interaction can be supported adequately.

I then examine a selection of case studies that are focused on the design of ubiquitous systems in public spaces through the development and evaluation of prototypes and that have drawn overall design concerns (e.g. design “implications”) from it. Particularly, I focus on interactive systems for the museum and cultural heritage domains. I conclude on this topic due to the extensive work carried out examining interactive technologies in museums and the focus that much of this research has taken on the role of the technology in meaningfully supporting people’s experiences.

I conclude my discussion by pointing out an existing approach for designing technologies in public spaces that is particularly relevant to my research.

2.2 Appreciating the physical setting of people’s experiences

Interaction is always situated within a physical context, and there is always a multifaceted relationship between what people do and the spaces they inhabit. Appreciating this relationship is important for design attempting to enhance and support people’s situated activities.

Several approaches outlining the importance of gathering insight into the circumstances in which people interact have emerged from the interaction design literature (Suchman, 1987; Harrison & Dourish, 1996; Dourish, 2004; Ciolfi, 2004). Some examples of this work (Ciolfi, 2007a; Messeter, 2009) have shown the benefits of actually using these approaches when designing technologies in public spaces. This thesis does not attempt to contribute to the discussion on these approaches, but rather I present this work to outline the conceptual and methodological notions that have influenced my research and on which I situate my contribution.
Suchman (1987) discusses “situated action”, whereby rather than separating people’s activities from their circumstances, she shows how they are intrinsically linked to the material and social circumstances people they find themselves in. She emphasises studying how people use their circumstances to “achieve intelligent action” and how this should be used to inspire design practice.

Dourish (2004) argues how the context of interaction cannot be modelled or designed into ubiquitous technologies, as it is intrinsic to an activity. So instead of attempting to model it, context must be seen as a dynamic interactional process where people “evolve systems of practice and meaning in the course of their interaction with information systems” (Dourish, 2004 p. 28). He proposes the idea of “Embodied interaction” (Dourish, 2001) where meaning is created through action.

The paper by Harrison & Dourish (1996) on the role of “place” in understanding people’s situated experiences has been a significant contribution. They discussed the need introduce greater consideration for the context of interaction in a way that is more in tune with human activities rather than the “geometrical” perspective of space: they suggest focusing on how we act in “place”, the lived environment which has rich meanings that shape our interaction, rather than the empty three-dimensional geometrical notion of space where actions occur relative to position and orientation. Doing this we can gain a better understanding of activities and how design can support them. Harrison and Dourish focus their discussion on virtual and digital environments, rather than physical ones. Dourish (2006) later revisits the concepts of space and place arguing that they cannot be treated as distinct: they are both “products of social practice”.

Ciolfi (2004) and Ciolfi & Bannon (2005) examine the role of place in interaction design and have offered a comprehensive approach to understanding people’s situated circumstances. Unlike previous research (Harrison and Dourish, 1996) they focus on how the concept of place can be actually used to design ubiquitous systems that enhance physical spaces. Based on the “experiential perspective” developed within the field of human geography (Tuan, 1977), they define “place” as the “lived” attributes of an environment that is grounded in physical “space”: thus “space” is the
structural and material dimension of “place”. They discuss the role of place at the theoretical level and significantly to support design practice at the methodological and conceptual levels. They state that to gather a thorough understanding of how people experience place and to produce a design that adds value to it, the personal, social, cultural and structural aspects of place must be understood and analysed. They outline how in practice methodological approaches can be orientated towards appreciating these elements of place experience to inform design. This approach focuses on analysing the features of place that shape people’s interaction: the locus of interaction with technology must be sensitive to their presence in a physical space so human activity can be sufficiently supported. They also talk about the need to design for “interaction flow” and the dynamic nature of interaction in spaces and the role of technology in responding to these interactions.

Ciolfi (2004, 2007a) also provides practical examples of how a place-centred perspective can be used in the design of an interactive system. She shows how adopting the place-centred perspective opened up new possibilities for interaction in a museum and in an airport, whilst facilitating and supporting existing aspects of people’s experiences. She outlines how the methodological approach to informing design was orientated around understanding the different dimensions (personal, social, cultural and physical) of place experiences in the settings, by employing methods that elicit each of the dimensions such as observational studies, sketching, photographic documentation, informal interviews and conversations.

Hornecker (2005a) also examines the notions of space and place in her work on developing a framework for the design of tangible interaction. She focuses on the interrelation between space and place and she discusses the role of geometric space and the importance of “structural relations” as these affect how we experience place and the interactions that can occur there. In the context of the tangible interaction framework, Hornecker (2005b) proposes the theme of “Embodied Facilitation” to describe how tangible interaction systems can embody structure that orientates people’s situated actions. She discusses how interactive systems provide spaces or structures to act and move in, and how these structures foster experiences and shape people’s situated circumstances. For example within the theme of Embodied
Facilitation she specifies the concept of “Tailored Representations”, where interaction is built on representations of people’s own experiences that connect and empower them to the use of a system. She exemplifies this through her study of the “Tangible Image Query” (Matkovic et al, 2004), a system that offered inspiration to architects based on serendipitous searching through collections of images. She found that the attitude of participants towards the system depended on their relation with the images and their “ability to find value in being inspired and surprised”. Given her interest in tangible interaction, Hornecker’s work is very much focused on the artefacts that support interaction and how modalities of interaction can be formed that play on aspects of people’s circumstances rather than offering a holistic perspective on how we can appreciate these circumstances in design.

Messeter (2009) introduces “Place-specific Computing” as a new “genre” of interaction design. Leveraging off existing research (Suchman, 1987; Harrison & Dourish 1996; Ciolfi, 2004; Dourish, 2001) he gives examples of design interventions whose design embodied and supported interaction with aspects of their environment. He touches on field study methods, such as observations and interviews, and on design tools such as mood boards, which inform design practice of the “identity of place”. However, he does not build on this to offer any greater insight into how an appreciation of people’s emplaced interaction can be conveyed into a full design cycle.

I have presented above some significant perspectives from the field of interaction design that centre on appreciating the spatial circumstances of people’s interaction and on how it can inspire design. Most of these perspectives focus on understanding the setting for interaction as not only a spatial container but as lived environment that holds rich meanings for the actor at personal and socio-cultural levels. This is a common argument made by all authors.

I this thesis, I assume this perspective on lived environment, particularly as outlined by Ciolfi & Bannon (2005) for inspiring design practice, so that design is sensitive to people’s place making and thus more likely to create interactive technologies that support them. Its focus on the experiential aspects of people’s situated activities in
physical spaces and its focus towards providing conceptual and methodological processes to appreciate these experiential aspects has made it the most significant contribution into understanding how the concept of place can be appropriated into the design of ubiquitous systems in public spaces.

### 2.3 Design for public spaces

Having provided a first introduction to the issues of design in a physical context seen as the setting for activities and experiences, I will now move nearer the domain of my own designs, and concentrate on research attempting to inform the design of ubiquitous systems in public settings.

Before carrying out an extensive analysis of the literature relating to my thesis, I will demonstrate the detailed review of the literature that I undertook. Table 1 outlines research in the seminal conferences and journals in the area. From an exhaustive review of these forums, from 2005 to 2011, this table presents all the relevant articles identified. But I feel that these articles do not warrant an extensive review in the same manner as the research that I will present in following subsections.

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<tr>
<td></td>
<td>“From interaction to trajectories: designing coherent journeys through user experiences”, Benford et al (2009)</td>
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<td>“Supporting the creation of hybrid museum experiences”, Koleva et al (2009)</td>
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<th>Event</th>
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<tr>
<td>ACM international conference on Ubiquitous computing</td>
<td>“Designing sociable IT for public use”, Kristoffersen and Bratteberg (2008)</td>
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<td>“Bricolage and consultation: addressing new design challenges when building large-scale installations” Hazlewood et al (2010)</td>
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<td>“Designing marketing experiences”, Mailund and Halskov (2008)</td>
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<td></td>
<td>“ec(h)o: situated play in a tangible and audio museum guide”, Wakkary and Hatala (2006)</td>
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*Table 1 Review of literature*
Some of this work has outlined challenges in designing specific types of media for public spaces (Dalsgaard, and Halskov, 2010), other research has looked at engagement with interactive technologies in public settings and attempts to understand the organisation and patterns of engagement (Terrenghi et al, 2009; Benford et al, 2009). More technically focused research has looked at design approaches to supporting interaction with specific types of technologies (Kuznetsov et al, 2010; Kuznetsov and Paulos (2010)).

The majority of this work has produced design implications specific to the design cases from which they emerged (for example Cosley et al (2008)) and interesting but quite abstract design recommendations (for example Kjeldskov & Paay (2010) and Wakkary & Hatala (2006)) so it is unclear how they could be appropriated into design practice. The body of research outlined in Table 1 is interesting and provides unique insights into supporting design in public settings. However it still falls short of providing any frameworks that can subtly focus conceptual design on adding value to people’s experiences and support technical design to understand how an intervention can support people’s situated experiences. In the subsequent sections I will explore in more detail significant research dealing with design in public settings.

Some researchers have carried out detailed examinations of situated interactions with public installations to inform future design practices. Much of this work has looked at conducting studies of interaction around a system and, from these, at proposing implications for design. In summary:

- Classifying in-detail the features of people’s engagement with public installations
- Examining the social aspects of interaction with public installations
- Developing design concerns through case studies to inform future designs
- Creating interactive technologies for museums and cultural heritages sites that enhance visitor’s experiences of them.

In the following sections I will present this research around these specific themes.
2.3.1 Public engagement

Much work has looked at classifying in detail the interactions that occur around public installations through documentation by ethnographic fieldwork. Based on the analysis of empirical findings, many have attempted to provide design recommendations for future systems.

Brignull & Rogers (2003) examine the conduct around a large screen display, the “Opinionizer” that was designed for supporting community and social activities. Based on previous research in the area of public large screen displays they argue that a resistance by people to interact is prevalent, they suggest that this is due to social embarrassment. They carry out a study to understand this “social resistance” and the “affective aspect of the user experience” that impedes interaction. Through analysis of levels and types of engagement around the public display they develop a theory of conduct, the “Honey Pot Effect” (Brignull and Rogers, 2003) and a conceptual outline of user engagement that is divided into “distinct activity spaces”. Based on these concepts, design implications are drawn on how to “motivate” users to cross the threshold between these “activity spaces”. These implications are mostly concerned about positioning of displays and practical considerations that would entice people to interact. This work shows some of the detail that affects interaction with public systems most notably the effects of social awareness. But the authors’ analysis and design implications are more focused on physical orientation and offer little to inform the process of designing interaction in public spaces.

Reeves et al (2005a) examined the conduct with and around an augmented reality installation, “One Rock”, with the goal of providing a resource to understand the forms of interaction around similar installations. In a bid to further the analysis of conduct around public exhibits outlined in work by Vom Lehn et al (2001) they outline several distinct levels of engagement from “Augmented user” to “Bystander”, and emphasise the importance of collaboration across and transitions between these levels to the user experience.

Similarly, Reeves et al (2005b) explore interaction between performers and spectators in public environments and formulate a classification of interactions around public
interfaces. They propose that spectator engagement with a public interface can be described in terms of the extent to which spectators view other people interacting with an installation and the effect this has on the spectators’ own engagement. Though they offer little insight into how the performer’s experience of the spectator can shape interaction and the constantly evolving relationship between performer and spectator, this work offers some understandings that inform design when attempting to create relationships between people who are interacting with an installation and those people in the vicinity of it. However, outcomes from other studies (Vom Lehn et al, 2007) have illustrated the shortcomings of developing such taxonomies.

Vom Lehn et al (2007) investigates the interaction with two installations, the “X-Ray Examination” and the “Drawing Activity”, in a museum. The authors focus on the way space is configured around the installations to offer opportunities for interaction and on how people discover the exhibit. The authors found that engagement is a complex process where social interaction is core and where complex social configurations have an immense effect on shaping people's interactions. Regarding the taxonomy outlined by Reeves et al (2005a), Vom Lehn et al show from their studies that properties of interaction are not so static or straightforward. They emphasise, on the contrary, that properties of interaction are highly variable and dynamically configured.

This body of work has presented an intensive analysis of the styles of interaction that occur around public installations, and most of the authors attempted to organise these interactions to produce classifications that could aid design. But reflecting on the work by Vom Lehn et al (2007) the benefits of these classifications for inspiring design is doubtful. Vom Lehn et al shows how focusing on “designed in” properties of technological artefacts do not alone support people’s interaction. They emphasise understanding and designing for the highly dynamic circumstances of public spaces in which people find themselves and use this as a basis for design.

I presented the above work to show the large body of research in public spaces that has focused on classifying people’s interaction and drawing implications to inform design practice on the specifics of interaction from these classifications. I find the
value of these design implications to inform or aid design practice to be uncertain, my view is more in line with that of Vom Lehn et al (2007). I feel the focus must be on developing more holistic frameworks that concentrate design on gathering insight into the nature of people’s interaction in public spaces and orientating design practice around how the important aspects of this situated interaction can be supported.

2.3.2 The role of social exchange in public engagement

Studying the role of social interaction in the engagement with interactive systems and the value of supporting social exchange in public installations has been subject to a large amount of research. One of the strongest contributions is the work of Von Lehn et al (2001) and Hindmarsh et al (2002, 2005) who as a group developed several design interventions in public spaces specifically to engender social phenomena and to extract design concerns.

On the basis of by their previous work (Vom Lehn et al, 2001; Hindmarsh et al, 2002, 2005), they carried out a detailed examination of collaboration and social conduct around two low-tech installations in an exhibition setting, the “Ghost ship” and “Deus Oculi”. They outline how several designed aspects of the installations triggered interaction among visitors. Specifically the placement and arrangement, ordering and organisation of an array of artefacts, an “Assembly” - a collection of interrelated interactive components that coherently support peoples’ experiences -, and the embodying of aspects of the visitors “live” experience into the exhibit and sharing this can be particularly successful in involving visitors. This worked on two levels allowing visitors to make sense of the exhibit (“Progressive Discovery”) and engendered collaboration and participation through creative engagement, as mentioned previously Vom Lehn et al (2007) examined engagement and outlined the role of high variable forms of social interaction in facilitating engagement. The authors call for more emphasis on the different forms of participation, how to deal with “fluctuating numbers of people” in interaction and to emphasise the content of an exhibit over the interaction with it. Significantly, Hindmarsh et al (2002, 2005) outline “design sensitivities” that can be used to “structure the design and evaluation” around collaborative technologies for exhibition spaces. These sensitivities focus on
how interaction and co-participation can be sustained through the organization of an “assembly of objects”. This is of particular interest for my research as it offers open and relevant themes to reflect on relating to technological support for activities: organising “action points” and “view points” in the “assembly”, “interconnecting aspects of the assembly”. This is something that is at the core of my research in Ubicomp, where designed artefacts should be considered within the whole ecosystem of interaction with important interactional relationships between them, rather than individual components with isolated heterogeneous points of interaction.

Izadi et al (2005) explore how large screen displays can engender sharing and social exchange in non-work environments through the design of “Dynamo” a large screen display that provided some adaptation to situated activities. Through ethnographic studies they found that digital information from personal devices provided a rich resource to spark conversation and co-operation among the people interacting with the display and those within the display's vicinity. As with the work presented previously, the embodiment of aspects of people’s personal experiences into the interaction with the installation supported social exchange. They found that interaction around personal information “enticed” social interaction causing others to be drawn in, similarly to the Honey Pot Effect idea (Brignull & Rogers, 2003).

These authors show the importance of taking social exchange into account when designing public systems, furthermore they specify the role of social exchange in supporting how people engage with and make sense of their interactions with public systems. They outline how embodying social elements into the interaction with public systems can support engagement. Though this work is insightful, especially the research by Hindmarsh et al (2002, 2005) that provides a framework for the structuring of artefacts to support situated interaction, it still falls short of offering approaches that can structure design practice on the development of experiential features that can add value to situated activities.
2.3.3 Ubicomp installations in public spaces: informing design

This body of research focuses on developing design ingenuity through the design, deployment and study of prototype interventions in public spaces. Much of this work has focused on specific application domains and deriving design concerns rather than conducting the in-depth analysis of interaction such as that carried out by the research presented in sections 2.3.1 and 2.3.2.

Some work has focused on the real-time sharing of experiences in public spaces. Brown et al (2003, 2005) and Brown & Chalmers (2003) examine how people share experiences through remote collaboration facilitated by mobile devices while exploring a physical space. Brown et al (2003) carried out ethnographic studies of visitors in a museum, and they categorised the social context of people’s visits and the collaboration occurring between groups during a visit. They used this study as a basis to inspire the design of a system to support the visitors’ collaborative actions, emphasising how the visitors’ social interactions can shape their actions in a museum.

Building on work by Brown & Chalmers (2003), Brown et al (2005) then examine how people can share their experience of a public space with a remote user while supporting active collaboration between both the local and remote location, pointing out how this can shape how the space is explored. The “George Square System” allowed visitors to explore a city space whilst using a tablet PC and to share what they encountered there with friends over the Internet through mapping their coordinates, sharing photographs, sharing recommendations of sites and through voice communication. The project illustrated how collaboration between the local mobile and remote agents served to support engagement with the space for both sets of users. Brown et al (2005) develop design implications to inform the design of future collaborative systems for leisure activities, for example “collaboration around photo taking”, “using the past for filtering and collaboration”. Though it is difficult to see how such precise design concerns could be appropriated to support design practice in other settings.

Game play has been a frame for interaction that some projects for public spaces have
explored (O’Hara et al, 2008; Benford et al, 2006). Benford et al (2006) look at performance and game play in an urban setting. “Uncle Roy All Around You” was a game where players navigated a city environment looking for shady characters. They were given clues about where to find these characters and remote online players assisted or interfered with their quest. The authors introduce a framework to guide designers on how fictional game play could be interleaved with real-world public settings, and how participants could cross “the boundaries of normal behaviour” in a public setting. Again similar to the work by Brown et al (2005), the framework that the author produced is quite strict and intrinsically related to the case from which it was drawn from. Thus its applicability to other cases is questionable as each design case can bring about different issues or concerns.

O’Hara et al (2008) also studied collaborative game play, but around a specific technology, a large urban screen part of an installation called “The Big Nose Game”. From their study they isolate key concerns regarding the people’s engagement with large screen installations, the role of the physical space in shaping interaction, the influence of the social context in defining people’s behaviour and the interaction that occurs between the game players and audience. Their insights are very much about the design for this particular technology, and therefore not easily adaptable to other scenarios.

Paay & Kjeldskov (2008) utilise the concept of place to understand and conceptualise physical and social contexts within a public space, Federation Square in Melbourne, Australia. They tried to understand the everyday social interactions that occurred in the space based on the knowledge that people gathered from their surroundings, the episodes of social interaction, the situations they find themselves in and their motivations for being in the space. From this, they created a design intervention that supported users’ reflective reasoning around activities in the space based on social and physical aspects of the space conveyed to them via a mobile device. The authors emphasise the specific concerns for designing to support social interaction in public spaces through mobile devices; allowing people to share past personal experiences with others so as to guide existing experiences, finding paths through spaces by referencing familiar points in a space and inferring knowledge about activities and
people in a space.

Chang & Goodman (2004) reflect on people’s relationship to their locale and on the role of urban games. They show how a regard for how people use public space and individuals exploration into their local space can lead design in supporting them to become more active and engaged with their surroundings. Though they offer an interesting perspective on how design can help support activities in public spaces it is centred on specific aspects of game play and they offer little in terms of how this perspective could be appropriated into design practice.

In the above research many cases are based on following a standard User Centred Design process to develop design interventions, whereas others based their design work on slightly different approaches. Many develop valid design concerns from their explorations to inform future design in public spaces:

- Design implications for collaborative leisure activities (Brown et al, 2005)
- Modes of interaction for supporting social exchange in public spaces (Paay & Kjeldskov, 2008)
- Concern for empowering how people inhabit public spaces (Chang & Goodman, 2004)

However little insight is given on the value of these concerns to design practice and how these concerns could be appropriated into the design process in other cases.

### 2.3.4 Interactive systems for museums and cultural heritage sites

Though some research on interactive systems in exhibition spaces, museums and cultural heritage sites has been mentioned in previous sections of this literature review (Hindmarsh et al, 2002, 2005; Brown et al, 2003; Ciolfi, 2004; Vom Lehn et al, 2007) other relevant literature still exists on the subject. In particular the interesting themes that have emerged from this research concern how technology can support meaningful engagement through novel forms and modalities of interaction.

Focusing on sense making, Falk & Dierking (2008) try to understand how “well
designed” digital technologies in a museum setting can improve the visitor experience. Utilising the “contextual model of learning” which they have developed (Falk & Dierking, 1992) they outline how designing digital media that allows people to make connections between their personal, socio-cultural and physical experiences and the museum content can lead to a richer museum experience for the visitor. They emphasise that supporting meaning making during the visiting experience is more important than exhibiting interaction techniques and innovative technologies per se. Sense making will only be enhanced through technologies that can build on the experience that people have of the setting. Pierroux et al (2007) show examples of how in museum settings visitors meaning making and, in particular, learning experiences can be augmented through the use of digital technologies. Their approach is based on using human activity as the analytic unit. This approach entails “bridging” (or overlapping) two distinct activity contexts: the visitors’ activity contexts and activity contexts implicitly contained in the museum artefacts. They point out the role that digital technology could play as a tool in re-contextualising museum artefacts, rendering explicit and accessible to the user the latent contexts associated with the artefacts thus augmenting the visitor experience. They provide cases of hybrids of digital/physical and mobiles devices as examples.

Gammon & Burch (2008) discuss the application of mobile digital devices in museums. These are issues mainly concerned with visitor take-up of technology, digital technology's effect on the museum experience, its effect on social interaction and usability concerns. The key to resolving these issues according to Gammon & Burch is mobile digital technology that is well designed and that is based on understanding the user experience (“Visitors' needs, wants, expectations, and behaviours”), and that enhances rather than hinders existing activities in the space.

Several authors have focused on innovative formations of technologies and modes of interaction to support sense making in museum environments. Gottlieb (2008) discusses how guides for museums visitors are moving towards a mix of mobile, stationary, virtual or augmented reality and Internet technologies, specifically mentioning how hybrids between portable guides and immersive installations could offer interesting solutions for the interpretation of objects and the mediating of
knowledge by crafting technology around visitors situated activities. This allows for the freedom to explore and navigate augmented, virtual and immersive museum spaces. Parry (2008) presents the potential of portable handheld technologies in museum settings, which, though far from novel in a museum setting, have the ability to meet heterogeneous needs required for supporting visitor experiences. Parry points out that to some extent the functionality and modalities of portable media has been studied, but that this has also revealed how much more work is needed to explore and understand how digital handhelds might be used to increase visitors engagement. Parry also outlines the need for a set of recognised standards for the design and application of digital handheld systems in museum settings. Similarly but utilising mobile phones, Walker (2007) examined the role of portable technology in a museum for constructing educational contexts. Specifically this work looks at how a mobile device can be used to capture learning experiences by supporting collaboration and the coherent construction of representations that allows people to reflect on their own personal learning experiences.

Other work has shown how of mobile technology can be used to support innovative methods of social exchange in museums. Aoki et al (2002) explore the role of electronic guides in museums; they try to address the issue of social isolation that occurs with many museum guide systems. They attempt to overcome this by using a guidebook system that pairs museum visitors and allows them to “eavesdrop” on the content that each are listening to. They found that this strengthened the interaction between the pair of visitors when using the guides and increased their awareness of the museum exhibit showing how designing to support innovative interactions can augment visitors’ experiences. O’Hara et al (2007) examine the role of location based content “collecting” in at London zoo using a mobile phone application. They discuss that aspects of bookmarking and socially sharing relevant milestones during their visit, they outline the important of these shared visitors experiences and the role of collaboration in adding value to the experience.

Some research has shown that meaningful interaction can be support not only through the means of “high tech” systems but the role of low-tech artefacts can also be significant. Fleck et al (2002) describe a tool for capturing visitors personal
experiences of a museum visit called “Rememberer”. This tool incorporated RFID tags into portable artefacts that visitors carry with them throughout their visit. The tags were recognised by the Remember system as visitors came in contact with exhibits, this allowed these exhibits to be bookmarked, and an account of the visitor experience recorded. This could be then accessed during or after their visit these records consisted of web pages about exhibits. Hsi & Fait (2005) utilise RFID tagging to allow museum visitors to record the museum exhibits they encounter during their museum visit. The system allowed visitors accumulate exhibit specific content (web pages & photographs) through the use of unique visitor identification tags. Visitors could then review the specific content they collected after their visit the museums homepage. Similarly using low-tech artefacts, Fraser et al (2003) and Bowers et al (2007) present two examples where low-tech portable artefacts were at the core of interaction with a set of interactive displays. They describe exhibitions in two separate spaces, Nottingham Castle in Nottingham, United Kingdom and the Hunt Museum in Limerick, Ireland, that were developed around the “Assembly” concept where an Assembly of artefacts was used to mediate visitors’ interaction with the exhibits. This “Assembly” of interactive technologies directly relate participants’ everyday practices of assembling knowledge around their situated activity to engage and understand experiences. They outline how the portable artefact provided coherence between the “Assembly” of artefacts, “gluing” the experience together. Interestingly, Fraser et al (2003) and Bowers et al (2007) offer a “design scheme” centred around five principles of Assembly. These principles or concerns are quite unique in that they touch on both experiential elements of how an installation can add value to people’s activities (“define an overall activity in which visitors can be engaged in” and designing a “common information space”), and the structuring of the technical components to support this (“an assembly of interactive displays” supporting the overall activity and “common or related interaction techniques”). They argue how these principles are in-keeping with their view of Ubiquitous computing as multiply-located computing, that comprises of “multi-located” loci’s of interaction that support specific purposes but linked together to support the over human experience. As I mentioned previously, other work by Hindmarsh et al (2002, 2005)
employ the concept of “Assembly” to support sense-making and to promote sociability in museum and gallery environments. They focus on how an Assembly of interactive installations could engender collaboration and participation so visitors could make sense of what they experience. They see the “Assembly” as an assembly of actions rather than an assembly of objects where the design challenge is to carefully organise that assembly of actions. They emphasise sensitivity when it comes to design “action points” and “view points”, where people make the effect and where they can see the effect, and understanding how the configuration of these actions and effects can support sense making.

These examples from research on the role of technology in museums has provided significant themes relating to the design of interactive technologies in public spaces, specifically:

- The emphasis on sense-making over modalities of interaction
- The development of innovative artefacts that embody interaction with digital functionalities
- The role of the low-tech components in supporting interaction.

Based on my research questions, the most interesting work to emerge from this area is the research carried out by Fraser et al (2003) & Bowers et al (2007) that is centred on the concept of “Assembly”. I find that these concerns touch on important aspects of design regarding how we can add value to people’s situated activities through determining experiences that can support sense making and structuring technology to support them.

2.3.5 Discussion

In the previous section I have shown the breath of research that has dealt with the design of installations in public spaces. In chapter 1, I outlined the research questions that I investigate in this thesis, my initial research question was:

*Are there human centred frameworks that can aid design practice in developing interactive technologies that support and add value to*
people’s activities in public spaces?

The body of work that has examined engagement with public systems has focused on extracting styles of interaction with and around them. With much of this research, the insights it offers to design are not so clear: it does inform us about the nature of people’s interaction and does allow us to reflect on modes of interaction with public systems and the effect this has on the social context, but it is not quite apparent how the design implications drawn from this body of research could be appropriated into design practice.

Activities in public spaces are extremely social and this plays a major role in interaction. The research examining social context of interaction has shown its importance in supporting engagement and providing a platform for interaction, specifically the work by Hindmarsh et al (2002, 2005) on structuring an “assembly of artefacts” to support interaction. Though it still only offers design sensitivities on the formation of interactional elements and does not offer a more comprehensive framework that outlines how design can be orientated around experiential aspects of people’s interaction.

Much of the research concerning the design of interactive installations in public spaces has been based on developing concerns and “implications” for design from specific case studies. It is very difficult to see the role of the design “implications” that emerge in helping to inspire and structure design practice. They relate to quite specific domains and modes of interaction so the question still remains how can design in public domains be focused on adding value to people’s interactions.

The work on interaction design for museums and cultural heritage is quite interesting as more emphasis is put on the importance of the visitor experience supported by the interactive system. Most of the research in this field has explored how technology can add value to situated activities, by examining how the experience can be augmented in ways that engage visitors and by developing interactive systems in tune with these activities. This field has also been notable in developing novel forms of interaction through innovative artefacts.

From my review of the literature the most prominent research that has emerged from
this area and that relates most closely to my research questions is that of Fraser et al (2003) and Bowers et al (2007). Their framework centred on the concept of “Assembly” offers a structured approach to conceptual and interactional development. This provides open concerns that stimulate reflection on how people make sense of their situated activities through interaction with ubiquitous technologies.

In the next section I will discuss this framework further and I will present the aspects of the Assembly approach that makes it particularly suitable for supporting design practice.

2.4 The “Assembly” framework

The approach presented by Fraser et al (2003) is focused on designing an Assembly the basis of which is the definition of a core activity that can be supported over numerous points of engagement and allows people to make sense of the context they find themselves in.

The concept is based around the authors’ research into designing physical/digital installations in museums. They conceptualise the museum space as an arrangement of displays representing the points of engagement with the museum content, which forms the core of the visiting activity. To increase visitors engagement with the knowledge embedded in each museum display, they propose the need to define an overall meaningful activity that helps visitors to actively gather knowledge as they progress through the points of engagement. Embedded in the activity is an arrangement of interactive artefacts that support and facilitate interaction with the points of engagement. Fraser et al suggest principles for designing an Assembly of technologies that mediate specific parts of the museum experience: by understanding how to support the flow of the visit over numerous points of engagement, assemblies enable visitors to progressively make sense of the context they find themselves in.

Their approach does not focus specifically on designing arrays of ubiquitous technologies, but provides guidance on how the whole experience could be flexibly formulated so participants can develop an understanding of what is happening.
A “duality” exists within the Assembly framework. In one sense it relates to the activities that people carry out to understand the situation they find themselves in, they “assemble” together sources of knowledge to make sense of what they encounter in a space. In another way the term can be associated with an array of technologies that can support this sense making. I find this particularly interesting as it provides a nice separation between conceptual design and technical design. Design practice can easily get caught up in technical design that is developed based on a limited idea of its effects on human experiences and activities. Thus the design intervention can become detached from the particular needs it attempts to support and its value to people’s situated activities can be diminished. The fact that the Assembly framework provides a separation between these aspects of design and focuses it on the establishment of a well-founded activity and information space that can engage the visitor before technical details are fully developed provides a greater emphasis on how the intervention supports a situated activity. Fraser et al plays on this “duality” to focus and guide design, this is evident when examining the principles of the Assembly approach.

Fraser et al (2003) outline five design principles that need to be taken into account in the design of such Assemblies.

1. The definition of a unifying overall activity that people can engage in;
2. The design of an underlying information space that contains a variety of interrelated items that can be revealed as the activity progresses;
3. The Assembly of interactive displays with each display supporting a particular part of the common information space;
4. The use of common interaction or related techniques to promote the coherence of the experience across the different displays;
5. The role of a portable artefact to accumulate a record of their visit and/or support identification as they move around the space;

The principles begin with establishing a situated activity, a scenario, that visitors participate in and with constructing a knowledge space that is intertwined with the
activity. These are composed in a way that—through participation in the activity—people can progressively gather and connect knowledge. The focus then turns to the design of an Assembly of inter-working artefacts that can be used support this activity, focusing on how people encounter and interact with the knowledge embedded in the activity.

These points offer a structure that can orientate design solutions around helping people make sense of their situated actions and providing appropriate ways to mediate this sense making that encourage engagement. Reflecting on the perspective of experience that I adopt (McCarthy & Wright, 2004) we can see how the principles hit on salient points of how people’s experiences should be supported.

“In a meaningful and satisfying experience each act relates coherently to the total action and is felt by the experiencer to have a unity or wholeness that is fulfilling” Wright & McCarthy (2005 p. 11)

I feel that by extending these principles they could be used in design to help shape interactive installations around people’s needs thus I adopt this approach as a basis to investigate my research questions.

### 2.5 Conclusions

The review of literature presented in this chapter has isolated two main points regarding design of ubiquitous technologies in public spaces:

- Interaction in public spaces is always situated within a physical context thus appreciating people’s circumstances of interaction is salient when designing installations that add value to people’s situated activities;

- Further research is needed to investigate design approaches that can structure design so that the focus is on developing the experiential and human-centred aspects of an intervention and the interactional qualities that can support human activities.

I started my reflection examining literature related to understanding the circumstances of people’s interaction and its role in design. Many authors have
explored and described the rich relationships people foster with the space they inhabit. These authors outline that appreciating this relationship is fundamental to inform design so that a design intervention can add value to people’s situated activities. However, very few of these authors have illustrated how understandings of people’s situated circumstances could be introduced into the design process. Ciolfi and Bannon (2005) do outline how a methodological approach focused on appreciating the different dimensions of people’s situated experiences can help form “design sensitivities” that inspire design practice. This is a perspective that I argue that should be taken into account during design practice. Relating to my research question, their work does provide a general platform for informing design, but I feel that it does not offer any structure/themes that can help stimulate reflection on how design concepts and interactional qualities can add value to people’s situated activities.

After reviewing the literature on the design of interactive technologies in public spaces, I concluded my exploration by discussing the Assembly approach outlined by Fraser et al (2003) and Bowers (2007). I feel that this is the most insightful approach to emerge from literature that could support design practice. It offers a structure that can orientate design in creating interventions that help sense-making and support this sense making through appropriate interaction. However, I feel the Assembly approach is still lacking in terms of how it can be appropriated into other design processes, and I feel that the role and nature of the design principles need to be made clearer. Also the Assembly approach does not offer any notion about how the design concerns could be informed about situated activities.

In the following chapter, I will examine the Assembly concept further in order to elucidate its significance in supporting the design of interactive systems in public spaces, and to isolate issues that arise regarding its appropriation into design practice.
3 Reflecting on and extending the Assembly approach

3.1 Introduction

In this chapter I present a further analysis of the Assembly framework developed by Fraser et al (2003). I will reflect on the framework and examine how the themes of Assembly relate to my own design practice by showing how they correlate with features of a specific design case. Through critical discussion of the framework, I will articulate the significant issues that arise when considering its appropriation into design practice.

Using this case as a point of reflection, I will illustrate the significance of the Assembly design concerns and consider aspects of the framework that need further study. I will present my hypotheses on how Fraser et al’s approach may be extended to provide a more fully developed approach that can be appropriated to establish and support design activities for public spaces.

The specific design case was developed as part of the Shared Worlds research project (Bannon, 2005). Shared Worlds was a four-year project carried out at the Interaction Design Centre and funded by Science Foundation Ireland. The aim of the project was to investigate the development and use of novel interactive artefacts and environments within public spaces. The project comprised of the development of two design cases, one of them examined how technology could support people’s social activities in a historic farmers market in Limerick city centre. I participated in the project and in this particular case, “The Recipe Station”, with the role of interaction designer and software developer.
The case culminated in the “Recipe Station” installation, it was developed as part of the larger Shared Worlds Project, and the Assembly framework did not guide its development. But through my review of the framework and my experience of analysing people’s interactions during this case study, I correlated significant features of the intervention with the principles the Assembly framework promotes. The fact that the activity and array of artefacts that made up the installation successfully supported people’s activity in the space led me to investigate Fraser et al’s approach further.

In the next section I present this case study set in Limerick’s Milk Market, featuring an interactive installation that consisted of a set of designed components supporting people in gathering together knowledge around what they encounter in the space. As I mentioned earlier, although the Assembly framework did not explicitly guide the design of this installation, many of the characteristics of an Assembly can be recognised in it. Therefore, I use this study as a concrete way to reflect on my interest in the Assembly framework and to outline the significance of its design concerns to design practice that aims to add value to people’s activities in public spaces. Based on this I use the case study to reflect on issues that emerge regarding how the Assembly concept can be appropriated into design practice.

3.2 Reflecting on an Assembly in a public space – “The Recipe Station”

The “Recipe Station” was an interactive installation designed to support people’s activities, particularly social activities, in the Milk Market, a historic farmers market in Limerick city. The installation allowed Market patrons to gather together knowledge regarding foodstuffs in the Market. Through this case I will show how the design concerns espoused by the Assembly framework resonated with salient features of this installation. I will also outline what aspects of the framework need further elucidation in order to practically apply it: specifically the process of applying it, the methods used to inform it and issues that relate to some of the principles.

In the next sections I will retrospectively analyse the case and how the principles
Chapter 3 – Reflecting on and extending the Assembly approach

relate to it. In order to make this understandable, I will briefly outline the Recipe Station design case: the Market space it was developed for, how the Station was designed and how people interacted with it in situ.

### 3.2.1 The Milk Market

![The Milk Market](image)

*Figure 1: The Milk Market*

The Milk Market is a 150-year-old farmers market located in the centre of Limerick city. The Market takes place on Saturdays from 7AM to 2PM, and sells a wide variety of produce: cheeses, breads, confectionery, fresh vegetables, garden plants, etc. Many of the goods that are sold are traditional to the area but there are also numerous other goods and produce that would be novel for many of the patrons. Within the semi-enclosed Market space there is also a number of cafes and seating areas where patrons can relax and enjoy the atmosphere. It is a popular event in Limerick city life: people are attracted to the Market for a number of reasons, from
buying novel goods to meeting and socialising with friends, and to just strolling through and enjoying the atmosphere.

The Milk Market underwent a major re-development in the last 16 months, and its structure and appearance are currently quite different from what was the backdrop to the Shared Worlds project. However, my description here refers to the Market as it appeared at the time of the project and as it was approached by myself and by the other members of the project team.

The project began with in-depth field studies of the Market, its inhabitants (stall-holders, shopkeepers, Market staff) and the Market patrons who visited the space. The research team used a mixture of qualitative and quantitative methods to understand how people experienced the Market and the activities they carried out there. The methods used included:

- Naturalistic observations of people’s activities
- Video recording and photographic documentation of the space and how people used it
- Conversations and informal interviews with people in the space
- Analysis of the flow of people through the space
- Documentation of the layout of the space
- Collection of data on the stalls: location, owner, length of time in Market, type of produce.

The methodologies were combined with other methods commonly used in architectural and urban design, in order to capture the many dimensions of the environment (Desphande, 2007). In the following section, I will use excerpts from conversations with Market patrons taken from the empirical data to give a better sense of the qualities of the place.

The Market is a central node of the city on Saturday mornings, and plays a large part in the history of the city. The traditions that the Market upholds resonate with the people and culture of the city. Though the goods and produce being sold within the
Market is constantly changing and becoming more multicultural the core traditions of buying and selling are still a salient feature of the Market.

“The traders in the Market have been coming for many many years, many of them, or their parents before them. There’s an old tradition there, old buying and selling.....It has actually extended to more exotic products, like cheese and French food” Desmond²

Many patrons are attracted by the relationship that the traders have with their products and they know that many traders produce the goods that they sell.

“The guy who sells the cheese, you get to know the man who actually makes the cheese in his own house, in his own farm. You know, there’s real connection, which I think is very different from going to a supermarket” Sinead

The social interactions that occur within the Market are one of its most salient features: particularly, interaction between stallholders and shoppers, between shoppers and interaction among stallholders. The “content” of the Market (what is sold there) forms an intrinsic part of many of these interactions, the novel and the

² All names are fictional
constantly changing variety of produce that is available in the space gives visitors the opportunity to discover and learn. This discovering and gathering knowledge about the produce that is available is a significant activity that infuses many of the interactions taking place among the inhabitants of the space, and for many this sharing of knowledge is a large part of their positive experience of it.

“We speak about their actual products, maybe how they are made, like the girls of the chocolates: their stall is very nice and the girl is very nice and friendly, and she’ll chat you about how she makes her products” Aine

Such convivial atmosphere has a profound effect on the patrons as they become immersed in the sounds, smells and movements in the Market. The sounds of conversations and of people interacting resonate throughout the place promoting an atmosphere where people can interact socially.

“Coming here is like coming to a carnival, I love being part of this space, it’s maybe friendly and maybe warm, not warm physically, but good. It’s a great opportunity for people to socialise and to meet” John

For many visitors, the physical structure that encloses the Market creates a space that is secluded from the surrounding landscape of tall buildings and noisy streets, and creates an atmosphere that is opposite to the sterile nature of other spaces in the city. Many have strong feelings towards the space and treat any changes to it with a degree of scepticism. Many patrons find that the Market space allows them to stop and relax, offering a different atmosphere that allows more opportunities to interact with others compared to the urban streets in the surrounding area.

“I think maybe people are more a kind to stop inside...when you are outside you are on the street and the street is going somewhere or you know. Whereas when you are inside you are actually in that, in the Market space.” Ian

The physical space has an effect on people’s activities within the space. The physical structure forms routes that guide patrons past stalls and in contact with other Market patrons. Most stallholders occupy the same space all year round; many of the patrons’
visits to the Market are shaped by their expectations of where they will find specific stalls.

“It’s not the higgledy piggledy, but actually a space where the Market is going to be held....I think it makes easier for people to go there, and for people to buy goods, and for people to walk around, and for people to stop the people.” Liam

Though the physical structure of the Market encloses the space, the Market space is open air and has no covering. Users find it to be a very natural space and the weather conditions play an important part in the atmosphere. The stalls structures, seating areas, cafes and covered areas of the space provide users respite from the natural conditions if the weather is bad.

“There are stalls and stands and you can actually stand under and be protected from the weather. And I think the Market is a very natural environment” Tom

Reflecting on these insights based on a place-centred approach we can see some aspects of how people experience the place emerging:

- Physical: It’s seclusion from the surround urban landscape providing a place remote from other activities and its open-air nature.

- Personal: The personal relationships that the Market patrons develop with the stallholders and the personal desire of patrons to know more about the produce they encounter in the space.

- Social: The rich interactions occurring in the space between the patrons and stallholders, and between the patrons themselves around sharing knowledge of the produce.

- Cultural: The culture of buying and selling, and sharing of knowledge

Understanding the setting as a place provided me with a basis to analyse whether the design intervention that emerged from this study added value to people’s activities in the Market setting.
3.2.2 The design of the Recipe Station

The Shared World team carried out numerous brainstorming sessions during which design concepts were generated, the design team consisted of people from various disciplinary backgrounds (Computer science, Media Studies, Psychology, Architecture, etc.). During these design sessions, different concepts were developed around key themes such as Tradition, Curiosity, Novelty, Variety and Play that emerged from the field studies.

Based on these sessions numerous design scenarios were developed based on how to support discovery and learning around foodstuffs in the place, the social exchange around food in the Market, the culture of trading produce, and the personal aspects that are attributed to the content of the Market. Suggested scenarios ranged from a mobile game to encourage people to explore the space, to providing a resource linking the Market experience to other areas in the city.

The final design that emerged from these sessions provided an activity and a knowledge space for patrons to engage in, it allowed Market users to access and share their favourite recipes based on produce from the Market. The basis was that
knowledge of foodstuffs could be shared between Market patrons. The technical installation that emerged consisting of an assembly of interactive components: a website where recipes could be posted to, an interactive station, the Recipe Station, physically located in one of the Market stalls and “produce cards” tagged with RFID chips that were distributed among the stall-holders.

Market patrons could contribute recipes to the station either remotely through a dedicated website, or by posting specially designed postcards that were handed out in the Market over a number of months. When contributing recipes either via postcard or through the website, Market patrons were asked to personalise their recipes by attaching their names to them, all these recipes were then stored in the station’s database.

The Recipe Station occupied one of the stall spaces in the Milk Market; its position within the Market locale was kept in mind throughout the design phase so as not to interfere with how people currently experience the place. The wooden structure of the Recipe Station was placed in a marquee similar to the shelters that the stallholders use, in keeping with the customs in the Market (see Figure 4).

The Recipe Station's wooden structure incorporated two touch screen displays, two RFID readers and a thermal printer, and could access the database of recipes provided by the Market patrons. Its housing was constructed with wood, a natural material in
keeping with the setting, and its colour scheme correlated with soft and vibrant colours that are evident in the Market. Its shape allowed people to gather around it, and the two touch screens allowed many users to simultaneously interact with it.

The “produce cards” (see Figure 5) comprised of specially designed cards that represented produce sold in the Market and contained information about the stallholder. Each stallholder was given cards corresponding to the produce that they sold. The cards had integrated RFID tags with identifiers unique to the particular foodstuffs. During the interactions between the Market patrons and stallholders, the patrons could receive cards based on the produce that they were interested in. As patrons carried out their shopping they could collect the produce cards, they could then bring them to the Recipe Station where they could use them to retrieve recipes from the database based on the produce cards they had collected. They could view recipes for a specific product, dish, the ingredients and preparation methods, they could also see which Market patron contributed the recipe. If they found a recipe for their produce of interest, they could print out the recipe (see Figure 5) and take it home with them to use in their cooking.

![Figure 5: Postcards, Produce cards, Recipe Printout](image)

We can see how the different qualities of the installation emerged from the rich
appreciation of the patrons’ interaction in the space gathered during the field studies. The installation was designed to augment existing activities of discovering and learning around the foodstuffs and local produce that are fundamental to people’s experiences of the place. It offered a novel way for patrons to relate to stallholders, their produce and what can be done with it. The station attempted to maintain the rich social environment associated with the place by allowing for both stallholders and patrons to participate, and by providing people with novel possibilities for collaborative interaction. From a physical point of view, the Assembly of technologies (Station and cards) took forms that integrated with the Market aesthetic thus not disrupting the existing atmosphere.

### 3.2.3 The Recipe Station: supporting the sharing of knowledge around foodstuffs

The installation was placed in the Market every Saturday for five weeks. How people interacted with and around the installation was documented through video and audio recordings; interviews were also carried out with patrons and stallholders to get their insight into their interaction with the installation. In this section I present some of the interactions that occurred and I emphasise two main themes:

- **The way the Recipe Station did actually add value to the activities that were already occurring in the space.** Thus giving substance to my argument that this is reasonable case for me to explore the applicability of the Assembly framework outside of Fraser et al’s (2003) work.

- **The favourable features of this interaction that resonated with Assembly framework’s design concerns.** Through a series of examples, I will outline how features of the installation that had a direct bond with the Assembly framework inspired engagement and interaction, illustrating how the Assembly design concerns are wide-ranging concerns to be considered in designing for public interaction.

The interactions with the installation and among people around the installation were quite rich. We can see many instances of visitors searching for recipes for specific
produce and printing them out to take away with them. For example in Transcript 1 we see Liz and her son Tom combining ingredients into the Recipe Station. Another participant, Ruth, is close by:

Transcript 1

Ruth: That sounds great.
Liz: Mmmh (...) Boiled Seat trout, how do I select that?
Ruth: Just touch it.
Liz: Okay print that, where does the recipe come out?
Tom: There [pointing towards the printing slot, the paper comes out].
Liz: [To Tom] wait a minute Tom, I want to go back, there might be another one.
Tom: Will I go back.
Liz: No, no, hang on. Now, put them in there.
Tom: Okay, search, chocolate chip pancakes.
Liz: Honey curried chicken, mmmmh.
Tom: No mum.
Liz: Chocolate chip muffins
Tom: Chocolate chip muffins!
Liz: Print recipe, good man.
Tom: Can I make another one?
Ruth: Wow you’re still [to Liz and Tom] on chocolate chip pancakes, wow that's yummy, maybe I should put chocolate in as well.
[Liz and Tom leave]

From transcript 1, we can see their actions at the Station were organised around the exploration of combinations of ingredients and the discovery of possible recipes. In keeping with the rest of the Market food is the topic of conversation, Liz and Tom are looking for recipes together discussing the ones that should be printed and brought home with them. Throughout their visit they collected the produce cards that represented produce in which they had specific interests. These could then be used to
interact with the Recipe station through which they could acquire more knowledge on their produce of interest and then print out recipes to bring home. This correlates well with the foremost Assembly concerns of defining an overall activity for people to be engaged in and the creation of an underlying interrelated information space that can be progressively revealed. We see that, in the case of the Recipe Station, the establishment of an activity and information space for Market patrons to engage with and participate in was paramount to enriching their current activities in the space.

A significant aspect of the activity was that it encouraged active participation by allowing patrons to actively collect produce cards based on their own interests thus facilitating a greater level of participation. We see how they enthusiastically engaged with the information space and actively tried to discover more about how they could use the produce available in the Market. We can also see how it helped people to gather and connect knowledge to support them in making sense of what they encountered in the space thus providing them with greater insight on the Market produce and it’s uses. It was based on existing activities in the space that centred on discovering, learning and sharing knowledge on foodstuffs present in the Market. It enhanced these activities by offering a new and novel knowledge resource for patrons of the Market. Defining an activity and information space for people to engage that augments existing activities would seem an essential concern for design so that it is centred on augmenting human activities. This outlines the applicability of these concerns to design practice as they touch on essential aspects of a human centred perspective for design that focuses on people’s experiences; where they make sense of their encounters from knowledge gathered through many levels of actions.

The process of printing and collecting recipes also provided users with the opportunity to interact socially, and when recipe printouts were received conversations took place about the recipes themselves and about Market produce that was contained in the recipes. Many users shared with others certain recipes they received, and received feedback from people about their choice of recipes. For example in transcript 2, following on from the previous transcript, after Liz and Tom have left, Ruth is still printing some of the recipes she has selected on the Station. Paul and Rob have now approached the Station. Paul selects a recipe and prints it.
When he goes to the printing slot he notices that the recipe waiting there is not the one he has chosen, and he realises that Ruth must have taken his printout by mistake.

_Transcript 2_

Paul: _Is this [recipe print out] yours?_

Ruth: Oh I got mackerel [recipe]..._it that yours?_

Paul: Yeah that's mine.

Rob: [to Ruth] _You shouldn't be picking up recipes, now you've done the course!_

Ruth: Ha, ha... Yeah I know, I'll be back on Monday. [She keeps browsing recipes]

Ruth: (...) _Pear and cheese risotto. That sounds good_ [Ruth goes to the printing slot]

Ruth: _That paella is yours?_

Rob: [Holding print-out from station] _Who owns the paella?_

The exchanges presented here show how the installation fitted into the social nature of the Market; it provided a point of interaction between Market patrons in a way that was similar to the existing stalls in the Market.

This process of collecting the produce cards fitted well with the patrons’ current activities and did not interfere with their normal routine in visiting the Market; the design of this technological component fitted well with its context of use, embodying the patrons’ interest in the knowledge that the installation supported and facilitating a mode of interaction in keeping with their situated activities. For example in vignette 1 we see Tim and Joan visiting the Market and how the produce cards integrated appropriately into their visit.
It’s early morning; Tim and Joan are visiting the Market. They carry out their usual activities, visiting the stalls, buying produce. At some stalls the stallholders have given them produce cards that the stallholders have told them they can use at the recipe station to gather recipes for their of interest produce. They move towards the Recipe Station (A). Initially they walk by (B), but then they notice the Recipe Station stall and turn back (C, see red circle). They approach the stall (D); Tim then takes the produce cards they received from the stallholders out of his pocket (E). Then introduce the some of the cards into the recipe station and print out some recipes (F).

Figure 6: Vignette 1, the role of the produce cards in supporting interaction

We can see how the physical nature of the cards allowed them to integrate easily with the visitors existing activities. We also see how the cards were able to link up the patrons’ interaction with the station and their exchanges with the stallholders and also embody their interest in the foodstuffs they encountered during their visit.

The physical design of the installation allowed patrons to occupy and gathered around the Recipe Station in the same way they would have approached other stalls in the
Market. For example in vignette 2 we see people gathering around interacting with the installation while others wait for them to finish.

![Figure 7: Vignette 2, gathering around the Recipe Station](image)

In keeping with the Assembly prototyping principles, we can see how the components (e.g. produce cards, Recipe Station) of the installation each mediated aspects of the information space (produce of interest and recipes). These components worked together to support engagement and interaction across the activity. From what is shown above, the technical components of the installation supported the activity and mediated the knowledge space to the patrons. Specific aspects of the technical components contributed to this: the appropriate form of the components for mediating specific knowledge to the patrons and their integration with existing activities in the space, the assimilation of the interaction with the components to provide coherent interaction across the activity. The latter Assembly principles relating to the design of the technical infrastructure have quite strong ties to these features.

For instance, relating to the principle of providing an Assembly of interactive displays that each supports a particular part of the activity and information space, we can see how the components were designed to support the different parts of the overall activity and to mediate specific elements of the knowledge embedded in the activity. For example, the produce cards provided a tangible representation of the produce that patrons were interested in, as well as providing information on the stallholder who sells the produce, they integrated appropriately with the patrons’ interaction with the stallholders and could blend with the visitors’ journey around the Market. The Recipe Station mediated the knowledge on the foodstuffs that patrons
were interested in, by displaying recipes and producing tangible representations of them. By situating itself into a stall in the Market it assimilated with the existing activities and its design took a novel form intrinsic to the space providing a departure from standard computing devices. The website provided a portal for patrons to contribute their own knowledge to the information space. They could personalise these recipes with their own name so they could be identified to other patrons in the Market.

The way specific components were designed to promote coherence in the interaction across the activity relates to the final two Assembly principles:

- To promote coherence, common or related interaction techniques are provided across the activity;
- To enhance overall coherence a portable artefact is used to allow people to accumulate a record of their encounters and/or support identification as they move through the space.

In this case we see how the produces cards supported these features. They provided coherence between or connected the patrons’ interaction with the stallholders to their interaction with the Recipe Station, providing a symbolic link that helped mediate their interaction. The cards allowed patrons to collect representations of their produce of interest as they moved through the space, allowing them to accumulate a record that enabled interaction with Recipe Station. Again here we can see that these Assembly design principles are well-founded in terms of designing technical components to support specific activities.

In this section, I presented some examples of the Market patrons’ interaction with the recipe station installation. This was to show how the installation enriched the current activities in the space and the significant features that sustained interaction with it. I have shown how introducing an activity centred on searching for and providing fresh knowledge on the ways of using specific produce enhanced the patrons’ current activities in the Market space. This introduction of an activity and information space developed around a specific scenario of engagement that relates to the main tenets of the Assembly framework.

I have shown how artefacts that are appropriately designed to sustain the activity, by
designing them to work together through the layers of the activity, can successfully support it. This again relates to the latter principles in the Assembly framework centred on understanding how components each mediate the information space and how interaction with and among components is sustained. Based on what I have shown in this section, in the following section I will carry out a critical analysis of the Assembly framework.

### 3.3 Analysing the Assembly principles

In the previous section I discussed the significance of the Assembly design concerns by reflecting on my own design practice. I feel that the Assembly framework is valuable in guiding design practice and that it provides concerns that can stimulate designers to focus on crucial aspects of people’s interaction within a public space.

I do not foresee the framework as being a universally applicable prescription for designing technologies for public interaction. I consider the framework acting as a subtle guide that offers points of reflection that can support design decisions, but I think that the framework needs to be extended and updated to resolve certain issues. In the next sections I will carry out an in-depth discussion around the design concerns and the issues that arise, and I will contribute my own thoughts on how these issues may be resolved.

Based on the dual nature of the Assembly approach I divide the framework into

- Conceptual principles focused on conceptualising activities and information spaces (principles 1 and 2)
- Prototyping principles that guide the prototyping of the technical infrastructure (principles 3 and 4).

### 3.3.1 Conceptual principles

The fundamental element of the Assembly framework is the definition of an activity and of an information space that people can participate in in-order to make sense of what they encounter within a physical space. The nature of the activity and of the information space needs greater discussion and elucidation. The conceptualisation of
both activity and information space may bring into play numerous forms of activities and information spaces for the user to participate in, but I feel that for an activity to support sense making it must encourage more than passive participation. It must enrich people’s situated activities by introducing a fresh layer that can add value to what they already experience by mediating a knowledge space that allows participants to *actively* make sense of the circumstances they find themselves in. I believe that this is fundamental to the Assembly framework where people become involved at the different points of engagement and use the acquired knowledge to “assemble” and make sense of the overall experience. We can see in the Recipe Station case that the discovering and learning through the installation added another layer to existing activities in the space, the conceptualisation of this activity stemmed from a rich appreciation of the activities carried out in the Market space. The active engagement provided by the activity was fundamental in adding value to what was already taking place there. Therefore when defining an activity it is necessary to ensure that it forms a structure that facilitates active participation from which people can construct their own meanings. Embedded in this structure are the interactive artefacts that support the activity.

The conceptualisation process is not something that has been fully outlined in the Assembly framework. It is difficult to see the definition of the activity and of the information space as distinct activities. The means by which people experience knowledge is fundamental to an activity that promotes active participation, knowledge is integral and forms the basis of engagement. Thus these two concerns should be developed in tandem during the conceptualisation exercises.

We can see fundamental issues arising here:

- During the design process, how can reflection on the design principles be informed and inspired by people’s existing experiences of a place?

- Also when contemplating whether a certain activity and/or information space enriches people’s situated activities and promotes active participation, how is this evaluation informed?

Methodological approaches that can aid the conceptual development of an activity
and an information space have not been discussed in Fraser et al's approach, specifically methodologies that can inform both the conceptualisation process and the way designers can evaluate how concepts can support active participation. As we saw in Chapter 2, human activities are spatially situated, the complex array of interactions embedded in a space shapes how people carry out these activities (Suchman (1987), Ciolfi (2004)). Thus developing an understanding of how people experience place, its physical, social, cultural and emotional nature is critical to design, specifically when trying to support active participation.

This would suggest introducing a concern into the Assembly framework that can focus the design process on appreciating people’s circumstances of interaction in a space and the experiential features of it that shapes this interaction. Such a concern should be able to inspire design and to inform designers in a way that allows them to make informed decisions on what activity would engage and support people's experiences in connection with the environment where they are to take place.

### 3.3.2 Prototyping principles

The third principle of designing assemblies introduces the dimension of technological design, for developing an infrastructure of ubiquitous technologies. It focuses on developing a scheme of artefacts that work together to support the mediation of the common information space through the activity. It specifies the development of a set of “interactive displays”, each supporting a part of the overall experience and revealing a subset of the common information space.

This principle provides quite an open interpretation on the forms and modes of interaction of the interactive elements that could make up an Assembly. But I feel the focus on “interactive displays” needs to further consideration. An “interactive display” suggests a two way process of interaction between user and the display (visual, audio, etc) thus limiting the technical Assembly to specific interactional qualities. From the Recipe Station case it is evident that for a component to make up the Assembly does not require this dialogic relationship. For example in the Recipe
Station case the produce cards were not particularly interactive in their own right but in the realm of the whole Assembly the interactive qualities that they provided were quite significant. I suggest redefining this principle so it promotes the development of a set of “interactive components” rather than “interactive displays”. So it takes into account the role of “low tech” technological components in supporting interaction as well as interactive displays in the forming of a technological Assembly.

This touches on some of the issues that arise with the final Assembly principle. Where a portable “low tech” artefact is introduced to provide specific support for people’s activities but is separated from the technical Assembly. The final principle emphasises the role of the “low tech” portable artefact as coupler between the interactive displays of the Assembly. Again this view is quite limiting, given the modalities and support for interaction that portable technologies can afford they can be viewed as powerful interactive components in their own right. I suggest amalgamating this principle with the third principle by introducing specific detail that emphasises that the interactive components need not to only take the form of “interactive displays” but they can also be “low tech” components that contribute to supporting engagement and interaction. Widening the perspective on the development of the “interactive component” suggests that the final principle needs to be consolidated within the third principle.

The prototyped Assembly will always be spatially situated and will have to integrate with conceptualised activity and peoples activities in place. Of course the design of these technological assemblies evolves from the conceptualisation of the activity, and this can contribute a great deal to the technical design in terms of its relationship to situated activities. But the prototyping process must also be informed by an understanding of situated activities to ensure that the components of the prototyped Assembly are in keeping with the locale and the activities people carry out there. This could be accomplished by informing iterations of the technical design through an understanding of the space and how it shapes peoples situated practices ensuring that design is persistently focused on supporting people’s situated interaction.

The fourth Assembly principle is concerned with the interactional qualities or the
forms of mediation that the interactive components support. It emphasises the need for related modes of interaction that can be used to provide a more coherent experience as people negotiate the Assembly of artefacts. Given the multiple components there is a need to understand how people can interact with them, and how the interaction modalities can be inter-worked and supported across components. For example in the Recipe Station case we can see how the produce cards provided a tangible representation of the produce that patrons were interested that fitted well into their interaction with the stallholders and linked this interaction with the Recipes Station. This principle involves more than simply selecting different modes of interaction but must examine how these modes can complement each other as people encounter different parts of the Assembly so participation can stem from this. The idea of “common interaction techniques” requires some further discussion, how these modes of interaction integrate with people’s situated interactions needs further consideration. Modes of interaction may be developed that provide coherence across an Assembly, but if they are not mindful of how people engage within a space, the interaction with the overall activity may disengage participants from their current activities. Thus there is need to reiterate that the modes of interaction must be in keeping with people’s situated interaction. This points to a refining of this principle so it advocates related or coherent modes of interaction not “common interaction techniques”.

Similarly to what I proposed on conceptual principles, this discussion on the prototyping principles points to a methodology that can anchor prototyping on understanding situated experience.

**3.4 Discussion: extending the Assembly framework**

In the previous sections I have discussed the Assembly framework in light of its possible appropriation into design practice. I have isolated some areas of concern that need to be addressed in order for the framework to be used successfully. These centred around the need to introduce an understanding of people’s situated activities and to expand the limited view on the forms of technology that comprise the technical Assembly.
The following are the revised principles that I propose:

1. Define an overall activity that people can actively participate in, informed by the understanding of participants’ situated activities.

2. Based on the overall activity, develop an underlying information space that allows people to actively make sense of their situated experiences. This is structured so it can be revealed in keeping with the situated activity at different points of engagement so people can assemble and construct meaning from it.

3. Develop an Assembly of interactive components that are shaped to support aspects of the overall activity and mediate the information space. These components should be composed to mediate elements of the information space in a way that is coherent and in keeping with the overall activity and its locale. Emphasis should be put on not only developing interactive components to form the locus of interaction, but on developing components that enhance the engagement and coherence of the whole Assembly. Specifically, low-tech components that can offer interesting features for providing engaging interaction and mediating the information space.

4. Provide related modes of interaction across components to connect them and provide a more coherent experience. These modes of interaction must complement each other and be in-keeping with people’s situated interactions.

Extending the process so that it can channel an understanding of people’s spatially situated experiences into the Assembly framework is vital for the future appropriation of it. This understanding must be flexible and discerning enough to inform and transcend the different design concerns. It would have to provide insights into how people experience activities in place, the knowledge embedded in these activities, the arrangement of the physical environment and the people who occupy it.

Based on my review, the framework developed by Ciolfi & Bannon (2005) is the most developed and applicable approach for informing design in a place-centred way. Their approach has outlined significant aspects of people’s interaction in place that
must be captured to fully inform design, and has how these may be channelled into the design process through “design sensitivities”. Also from a practical point of view they have illustrated cases where their place-centred framework has been used to design public installations (Ciolfi, 2007). This framework can structure empirical fieldwork so that the personal, physical, social and cultural aspects of how people experience a place can be appreciated. Forming these aspects into “design sensitivities” provides a means to inform the design process and Assembly design concerns.

In subsequent chapters I will demonstrate how adopting this approach informed the Assembly approach and grounded it in the specific design case presented in Chapters 4, 5 & 6. It guided my approach to the field studies and based on the data collected it helped me development “design sensitivities” to inform the reflection on the Assembly principles. In Chapter 6 it provided a way to frame my analysis of the intervention to ascertain if it did add value to people’s experiences.

3.4.1 Practical application

Cases that explicitly outline how Fraser et al’s approach can be practically applied are limited, specifically; little insight has been given on how it can be appropriated further. Based on the “duality” attributed to the Assembly approach, it can be divided into two main themes:

- Creating a more engaging experience by developing novel ways for people to build a sense of what they are experiencing.
- Focusing on how technological artefacts can create an infrastructure to support these novel activities.

Though they represent the dual nature of the Assembly approach, it is difficult to see these two tasks as mutually exclusive. This would suggest introducing principles into the design process that guide the design of Assembly as a “social accomplishment” and the technical Assembly that supports it.

A natural relationship can be seen between the conceptual principles and the traditional User Centred Design concept generation phase (and activities such as
brainstorming, etc.). On the other hand, the principles dealing with the technical design stem from the conceptualisation phase but focus on the prototyping phase (scenario development, etc), examining how the activity can be supported by a technical infrastructure. This would suggest that the principles act as points of reflection during the conceptualisation and prototyping phases.

In this chapter I have reflected on the Assembly design concerns based on a specific design case. This was to show the interesting aspects of the design concerns and to outline my proposal on how the approach should be extended in order for it to be appropriated into design practice. In the following chapter I will begin describing a design case where I used this extended Assembly framework as basis to guide design work.
4 Understanding the visitor experience at Bunratty Folk Park

4.1 Introduction

In this chapter I present the setting for my design case, Bunratty Castle and Folk Park, an open-air cultural heritage site on the West coast of Ireland. I will describe the site, outline the unique qualities it offers to visitors and I will provide an account of how the people involved with the site interact within it.

This work was carried out during a research project that focused on exploring the utility and potential of technology to enhance visitor’s experiences of cultural heritage sites. This project was carried out over two years with it concluding after the deployment of the installation outlined in Chapter 5. A more detailed description of the project is available in Appendix B.

This account is based on data collected on the site through observations, semi-structured interviews, shadowing and visual documentation of the physical layout of the space. I will show how both the place-centred perspective and the Assembly framework served to guide my approach to the fieldwork and shaped the outcomes that emerged from these studies.

Finally, using the extended Assembly approach, I will show how the outcomes of the field studies were developed to inform the conceptualisation and prototyping phases.
4.1.1 Methodological approach to field studies

The activities of qualitative enquiry and qualitative data collection were conducted as part of the larger research project. The methodological approach to the field studies was guided by visitor studies literature, the place-centred perspective (Ciolfi & Bannon, 2005) and by the Assembly framework. This orientated our field studies around:

- Developing an understanding of the different dimensions of people’s situated activities
- Examining how visitors made sense of the knowledge embodied in the sites to create a meaningful story and to understand aspects of past Irish life and culture.

Overall, the focus was to understand the visiting activity together with the context of that activity. There has been extensive discussion within Museum and Cultural heritage research regarding visitors’ experiences of museums and cultural heritage settings (For example Falk & Dierking, 1992, 2000). Most of this work emphasises employing methodologies that can understand the different aspects of the visiting experience; the physical, personal, social and cultural. The use of video recording and analysis in conjunction with traditional field studies methods has emerged as an excellent way to understanding the details of activities and interaction in museum and cultural heritage settings (Meisner et al, 2007; Gibson et al, 2011). The recording of visitor interactions allows for repeated study and reflection on people’s interactions thus providing a basis to carry out a fine grain analysis.

During the field studies, the physical, personal, social and cultural aspects of the visitors’ experience of the site were looked at; intertwined with these aspects, was a strong interest in how visitors encountered the physical space and in their physical flow of interaction during the visit and the role of these encounters with different sites and dwellings had in engaging them.

The methods employed to study the visitors had a direct relationship with these goals and were influenced by visitor studies research:
• Observations (also by video recording): Initially visitor behaviour was documented at particular sites, mostly notable hubs of activity (such as, for example, the Golden Vale Farmhouse, where most of the animators were based and where they provided baking demonstrations). Also we were particularly interested in observing the animators and their interaction with the visitors.

• Shadowing (video recording and note taking): Selected groups of visitors were followed on their journey through the Park. We were particularly interested in what occurred as they progressed through the Park and what they encountered in the place.

• Semi-structured interviews were carried out with visitors: These formed discussions with visitors about their experiences of the site, what they found interesting and what understandings they developed about the sites in the Folk Park. There were no prescribed questions created for these interviews. The research team isolated important themes regarding the visitor experience:
  - Their motivation for visiting the park?
  - What aspects of their visit did they find enjoyable and engaging?
  - What did they gain from their experience of the park?

The discussions with the visitors were orientated around these themes. The reason for deciding carry out semi-structured interviews around these themes instead of prepared questions was that we wanted the interviews to be orientated around the visitors’ experiences and not by any prescribed notions of how we perceive their experience. We felt that the semi-structured interviews also put the visitors at ease, as they were more like conversations that interviews. This was very much in keeping with the relaxed character of the space.

• Semi-structured interviews were carried out with members of staff: Onsite we discussed with staff members about different subjects relating to the work they carried out, how they interacted with visitors and their perception of how visitors experience the Folk Park. A more detailed interview was carried out with one of the most experienced animators (who took up the role of key
informant (Willis, 2000) to the project, in order to follow up on certain issues that arose after the site visits and to clarify the details of many aspects of how the Folk Park operates.

- Documenting the spatial layout: As the physical context of the sites is salient to the whole visiting experience we carried out a thorough documentation of the physical space through photographs, gathering aerial footage, mapping and analysing people’s movements through the space.

4.1.2 An overview of Bunratty Castle and Folk Park

Bunratty Castle and Folk Park is one of Ireland’s most popular tourist attractions with over 300,000 visitors per year. It is situated in the village of Bunratty, Co Clare, Ireland. It occupies a 26 acre site that consists of Bunratty Castle, originally built in 1425, and Bunratty Folk Park, developed as a “living history” site in the mid 1960’s.

The Castle was in ruin until 1954 when it was restored to its current state and its ownership taken over by the Irish State. The site is currently owned and managed by Shannon Heritage³, a public sector company that develops and manages heritage sites in the Shannon Region of Ireland. In 1963 the castle was developed into a tourist attraction, and around this time Bunratty Folk Park was built on the land surrounding the castle.

Bunratty Folk Park was designed to be a reconstruction of the homes and environments of Ireland from over a century ago to the 1950s. It contains approximately 30 dwellings, including rural farmhouses, village shops and streets and the Georgian Bunratty House. Many of these buildings were relocated from areas around the Munster region and rebuilt brick by brick to the same condition in which they would have been found.

³ Shannon Heritage website: http://www.shannonheritage.com/
One of the main attractions of the Park is its ability to offer a snapshot of Irish life from the past, with each particular building having a specific role in the history of Irish folk life (for example, The schoolhouse, the poor farmer’s house, the rich landowner’s house, the forge, the working mill, etc). Each site has been carefully recreated and furnished as it would have appeared at the time. The artefacts in each house have all been attentively selected on the basis of their fidelity and appropriateness to the particular sites. In some cases, employees animate the activities that would have been originally carried out at the sites: for example, in some of the farmhouses female employees act as “Bean An Tí’s” (Irish for “Women of the House”). They bake bread in the traditional way and tend to the turf fires and oversee the running of several of the houses and of the creamery. The animators also interact with the visitors telling them about the activities they are performing, the context of the site they are in, and so on.

Surrounding the dwelling sites, there are a number of outdoor attractions such as animal enclosures (holding animals that would have been prevalent at the time such

Figure 8: Bunratty Castle (left) and Folk Park (right)
as fowl, pigs, donkeys, hunting dogs and deer), gardens, trees and vegetable plantations, etc. At the Folk Park, the landscape, the buildings, their contents and the activities taking place in them thanks to human animators, are all elements of a complex display that visitors encounter in their wanderings around the Folk Park.

A certain separation exists between the Castle and the Folk Park. There is a historical difference between the 15th century Castle and the late 19th/early 20th century sites in the Folk Park. The physical location of the castle means it is somewhat isolated from the Park. Generally, visitors who are in large groups are given guided tours around the castle but are left to their own devices to explore the Folk Park. Given the distinction between the Castle and the Park we felt that for our study it would be more manageable to concentrate just the Folk Park itself; thus the focus of our study was on the examining the visitors’ interaction within the Park and excluded the medieval castle.

4.1.3 The pivotal sites in the Folk Park

As briefly mentioned in the previous section, the Folk Park presents a variety of buildings and settings, making it a site with a lot of variety in terms of the objects and activities found there. Though all sites in the Park hold diverse features of interest, there are some pivotal sites that visitors favour during their visit to the Park.
The Loop Head House (see Figure 9) is the first site that visitors encounter after entering the Folk Park. The house was relocated from the Loop Head peninsula on the West coast of County Clare, and it reconstructs the dwelling of a fisher-farming family. It has features particular to the locality where it originally stood, such as the thatched roof held down with nets and rope to protect it against the Atlantic gales. Generally in the house there is always one Bean An Tí who tends to the turf fire, bakes traditional “Griddle Bread” in the hearth and informally interacts with the visitors. She shows the visitors how the bread is baked and the implements used to bake it. When the cake has finished baking, the Bean An Tí prepares slices of it with butter and gives them to the visitors to taste. Also at certain times during the day one of the Bean An Tí’s also demonstrates butter making in the creamery on the site. She shows how the butter was made in the traditional butter churn and she gets visitors to take turns at spinning the churn. If visitors wish they can take a sample of the butter.
Another favoured site, the Golden Vale farmhouse represents the home of a rich farmer from the Golden Vale area in Munster and it is one of the biggest houses in the site. The Golden Vale is an area of rich farmland considered to be the best land in Ireland; so many of the farmers who lived there were quite prosperous. The Golden Vale house is a hub of activity due to its size (e.g. there are many rooms to visit and it holds large groups comfortably), moreover the majority of the Bean An Tí’s are stationed here and the house is a hub of activity for them as well: importantly, they demonstrate the preparation and cooking of traditional bread, scones and tarts. This produce is then sold in the Folk Park’s tearooms. Some of the produce that they bake is given out as samples to visitors, and visitors enjoy observing the Bean An Tí’s at work and breathing in the scents of baking in the house’s large kitchen. Visitors have very rich interactions here with the Bean An Tí’s: they ask the Bean An Tí’s questions about the activities they are carrying out. Generally the Bean An Tí’s talks to them about the novel aspects of the house and the artefacts in it.

Figure 10: The Golden Vale Farmhouse
Chapter 4 – Understanding the visitor experience at Bunratty Folk Park

The village scene is a collection of townhouses (including a schoolhouse, pub, drapery, hardware shop, etc.) that would have made up a typical Irish village of a century ago. It forms the centre of the Park and the mid-point in visitors journey around the Park. There are two animators in the village: a teacher in the schoolhouse who instructs the visitors on Irish songs and phrases, and a policeman who patrols the village street and “arrests” visitors. An unusual aspect of the village scene is that commercial enterprises are incorporated into some of the sites, for example actual shops are trading on the premises of the sweet shop, post office and drapery. The “hardware shop” actually sells souvenirs, also in the village there is Mac’s pub which is a licensed bar and serves food and drink to the visitors. For this reason many visitors congregate here to take a break from their journey and roam the village street. They explore the shops, interact with the animators or maybe go for a pint and some food at Mac’s pub. The pub also is open in the evenings when the rest of the Park is closed, and is a socialising spot for local people.
Bunratty House dates back to the Georgian period; it was once home to the family that originally occupied the castle thus it is of great historical importance to the Folk Park. It marks the furthermost region that visitors can explore in the site and it is generally the turning point for visitors to begin to move towards the exit. It is a stately home, and is surrounded by large grounds, a Walled Garden which has been planted in keeping with the period and farm buildings housing a large unique collection of traditional farm machinery known as the Talbot Collection. One animator is stationed at the house: her main job is to take care of the house and to interact with the visitors by talking to them about the house and its history, she has no formal activity to re-enact in the house.

4.1.4 The animators

Currently, all the human guidance and support for visitors as well as the activities carried out are provided by the animators in their roles of teacher, policeman and the Bean an Ti’s. These staff members engage in conversations with visitors regarding the setting and the activities they are engaged in, in order to convey a sense of authenticity and to humanize the visitors’ experience. Only a small set of the sites are manned by animators and only five of the sites have dedicated animators stationed in them. Some animators may periodically check the other sites in the Park to make sure...
sure everything is in order with them (checking the turf fires that are lit in all houses, etc) but, outside these short visits, there are no animators at these sites. The animators’ jobs not only involve interacting with visitors but also many animators have to contribute to the upkeep of the site. Many of the women animators clean the houses in the site, tend the turf fires and supply the turf for them.

![Figure 13: Some of the animators from the Park: (A) Bean An Ti's (B) The policeman (C) The teacher](image)

In the village scene there are two more animators whose main function is to interact with the visitors. These are a policeman called “Constable Dickson” who patrols the village scene and a teacher who is stationed in the schoolhouse. Many visitors get their picture taken with Constable Dickson as he jokingly arrests people and children especially find this particularly engaging.

In the schoolhouse the teacher instructs visitors on Irish language phrases and old Irish songs, frequently persuades them to recite the phrases and to sing with him. Both the teacher and the policeman have very rich interactions with the visitors, they talk to them and answer any questions they may have about the sites in the Folk Park,
about past Irish life and how life has changed in Ireland.

All the animators talk and interact with the visitors giving them insights into the activities they are carrying out, the artefacts they are using and context on the building they are in. Many of these interactions are quite rich and form a valuable source of knowledge about what the visitors encounter in the Park.

4.2 Visiting Bunratty Folk Park

The initial observations sessions began with a journey through the site in the fashion of a “standard” visit. When visitors arrive at the Folk Park they are given a map (see Figure 14) that can guide them around the Park and supply some basic information on the sites.

![Figure 14: Map that visitors receive on entering the Folk Park](image)

On exploring the place, we followed the typical trail that the map suggested to visitors and documented what we encountered at each site through intensive photographic and video documentation as well as by handwritten notes. This allowed us to capture the unique nature of each site including:

- The artefacts displayed
- The historical context that the site recreated
• The information available to the visitor about the site (presence of any additional source of information beside from what conveyed by the map)
• The ways visitors could navigate the site
• The role of the animators at each site

After this initial session our focus shifted to documenting how the visitors encountered the place. A shadowing session was carried out whereby the design team shadowed a group of visitors as they moved through the Park. The session was documented through note taking and video recording; specific things that were noted were visitor conversations and significant details of their actions (such as the things they touched, triggers of conversations, favoured artefacts, etc).

Visitors generally enjoyed their visit to Bunratty: they liked the atmosphere and the exhibits, with many visitors returning to the Folk Park for further visits. We found that the visitors’ experience of the Park was not the same as that of an indoor museum. The degree of separation that typically exists between the visitor and exhibit in more “traditional” museums does not exist here. The fact that visitors can inhabit and have immediate interaction with the material aspects of the site provided quite captivating experiences. This ability of the Folk Park to immersive visitors in a recreation of past Irish life is one of its salient attributes.

Most people visit the Park in groups; the open and informal nature of the site encourages social interaction among visitors and groups, particularly when facilitated by the animators. Discussions among the visitors regarding the buildings and objects on display are commonplace thus showing the engaging nature of the site. Visitors take a relaxed approach to exploring the Park and much of their engagement with the sites, artefacts and activities is spontaneous. It is rare for visitors to come to the Park to view a specific aspect of it. Visitors seldom plan their visits or organise to visit specific sites in the Folk Park, they prefer to wander around using the map as a rough guide and naturally encounter the sites.

The size of the Folk Park can be quite formidable for visitors, we found that the sites furthest from the entrance to the Park are less frequented and the journey to them can be exhausting especially for elderly people or children and when the weather is bad.
We found that when people visited the first half of the site and came to the village scene they would congregate there and only sporadically visited the sites beyond the village. Even though the Georgian Bunratty House is of significant historical importance to the history of the place and holds important exhibits (the Walled Garden and the Talbot Collection - a collection of 19th century agricultural machinery) it is one of the less frequented due to its distance from the entrance and the rest of the sites. The problem is mostly geographical as the sites are placed far from the entrance and visitors have already spent a large amount of time in the more immediate surroundings of the first group of sites and in the village.

Given the open-air nature of the site the weather can have a huge impact on the visitor experience. Visitors are open to the elements, where on sunny days the sun can tire visitors and on wet or cold days the weather can cut visits short or confine them even more to a few of the sites.

Our observations revealed that visitors invested time and energy into exploring and appreciating the sites and artefacts they came across in the Folk Park. We found that
visitors could grasp some understanding of the purpose or role of the artefacts and buildings at the sites through their form and placement in the site (for example, by noticing cooking utensils by the fire, the arrangement of horse collars and saddles in outbuildings to signify the horse stable, etc.). Visitors discussed the role or uses of artefacts and buildings among themselves but from our observations many visitors came away with very little improved understanding of them. For example, during one of our observations a young boy asked his father what the pulping machine (see Figure 16) outside one of the farmhouses was, and his father said it was for washing clothes. This shows how visitors try to derive some meaning from what they encounter but often mistaken interpretations can occur. Facilities that can help guide visitors to the correct mistaken interpretations are sparse, the animators are the best informants but they are few and are present at only a small set of sites.

Apart from the map/guide leaflet (see Figure 14) handed out to all visitors on their arrival, there is only a small amount of information present at each site about the sites themselves and about the artefacts that are placed there. We found that there is a large amount of knowledge about the distinct aspects of each of the Folk Park buildings (for example, the fact that these buildings were originally from different regions of Ireland) that is not presented in any way to the visitors so for a visitor who is not familiar with Irish history and heritage, many sites seemed similar, the differences between the sites that make them unique from each other (in building style,
furnishings and decoration) were not made clear to them. Many interesting facts about the sites which visitors might find engaging are not highlighted, e.g.- the type of stone used in the construction of the houses, and the uses of the different farm machinery, tools and the *Currach* \(^4\) (see Figure 17).

![Figure 17: Features to be highlighted](image)

We found that the information about the sites that is available to the visitors is not presented very well. Many of the signs and information that do exist were positioned in problematic locations where they go unnoticed by many visitors: for example, (see Figure 18) the small placard at the entrance to the Shannon farmhouse describing its relocation due to the construction of the local airport (where it originally stood) is placed at knee-height and obscured by a small bush. In our observations, we noticed that none of the people who entered the Shannon farmhouse while we were on site actually noticed the sign. The lack of informative placards at many of the sites is intentional so the recreated scenes are not tarnished with items that would be out of place.

\(^4\) A *Currach* is a traditional Irish boat made from stretching animal skins over a wooden frame. It is unique to the West coast of Ireland.
As I have mentioned, one of the main sources of engagement and knowledge for the visitors are the human animators, they are an extremely important part of the visitors’ experience of the Folk Park: the Bean An Ti’s, the policeman and the teacher all contribute to creating a vivid representation of Ireland in the past. They are very skilled in engaging visitors in conversations and discussions, as well as presenting interesting information regarding the buildings and artefacts and answering any questions visitors might have about the specific sights. We found that the visitors were keen to engage with the animators and the hands-on activities that they animate were extremely attractive to visitors. These activities carried out by the animators were crucial in bringing the environments and artefacts present in the sites to life for the visitors and relating them to current life experiences.

Bunratty Folk Park attracts many different groups of visitors, varying in age, nationality and group size (see Appendix C for statistical data collected from project partners). From our observations, senior visitors and those old enough to remember certain artefacts and environs from their youth seem to be the group enjoying the Park the most. They are able to recognise the different artefacts, buildings and situations that are presented: their personal memories of visiting houses such as those on display at the Park, or using farm tools, brought the exhibition to life for them in a way that cannot be replicated for younger visitors (particularly non-Irish ones). We found that this contextual knowledge around the sites and the artefacts located in the
sites were important for the visitors enjoyment helping them to engage with what they are seeing.

We noticed that large groups visiting the site affected how the visiting experience, their flow through the site creates problems of crowdedness in some of the buildings, and the existing information resources do not support large group sharing. It is difficult for the members of such groups to appreciate parts of the site when very crowded.

### 4.3 Structured interviews with the visitors

We carried out interviews to discuss the visitors’ own thoughts on their visit to the Folk Park. Before talking to the visitors we outlined the main points we were interested in discussing. These points were orientated around:

- Their enjoyment of their visit and what they found interesting at the site
- The knowledge they acquired during their visit
- The social nature of their visit

These interviews were carried out informally as visitors were leaving the Park. The main points taken from the interview were:

- The main motivations for visiting the site was to experience Irish culture and how people would have live in the past though in more experiential way than traditional instructive learning.

  "I was in the Park two years ago and I loved it and I just think it’s beautiful I just love the fact that they replicated the villages of the past so that we can see where the Irish lived in another time."

- Visitors come to the Park to relax and enjoy the place. Many visitors did not want to procedurally investigate each site, they like the open nature of the site that allowed them the freedom to explore, engage and disengage from what they encountered.

  "They gave us the map but we haven’t really looked at it yet"

Much of their engagement with the sites, artefacts and activities was spontaneous, it was only at certain stages of their visit that they wanted to engage and other times they preferred to relax in their surroundings.
• Many of the visitors found that the thorough recreation of each site inferred a lot of knowledge about how people inhabited them.

“You can envision yourself as it was…… I think it’s very informative”

Visitors seem to be more interested in immersing themselves in the different sites rather than gathering factual information about them, and they felt that receiving this type of information during their visit could be too much.

Tom: “I wasn’t really looking at the years and in relation to how old, just kind of interesting things inside.”
Interviewer: and do you feel you’ve got enough information on the actual sites? Or do you feel you could have got more on the actual artefacts and so on? Tom: No, I’d probably reach information overload. It’s really interesting to look through.

But from our discussions we found that visitors were only able to construct a limited understanding of what the sites represented.

• Visitors were particularly interested in seeing a human presence in all of the sites.

Jane: I’d like to see somebody in each of the buildings but I understand it’s late in the season now, so you don’t have anyone.
Interviewer: You’d like to see some kind of human interaction?
Jane: Exactly! I’m an interactive person. I like the personal touch.

They were also interested in ways that they could relate their experience more to the activities that would have been carried out in houses.

“John: I was thinking it would be fun to like... participate, Do some of the living history.
Interviewer: Get into actually making bread and lighting the fires and stuff?
John: Yeah.”

Visitors seem to be interested in actively getting involved in what they encounter at the sites to make sense of the activities that have taken place in them.

Our discussions with the visitors demonstrated several aspects regarding their
personal experiences of the Folk Park. They have a significant interest in appreciating Irish culture and learning more about what they encounter in the site. They see their journey around the Park as a relaxing experience where they learn and find meaning through encountering the recreated sites in a natural way. They were more interested in understanding how people lived in the sites rather than receiving instruction on the historical context of the sites.

4.4 Interviews with the staff

The staff that work in the Park are an integral part of what visitors experience of it, the animators’ activities give visitors a first hand view of the activities that embodied past Irish life. We interviewed many of the staff during our site visits whilst they were working, we discussed the work they carry out in the Park and the interactions that occur between them and the visitors.

Since we were interviewing the staff during their working hours our time with them was limited. One of the longest serving members of staff agreed to participate more extensively in the project and to act as a key informant (Willis, 2000). Thus we had the opportunity of interviewing her off site and in a more relaxed setting. From now on I will refer to her as “Anne”. She has worked at the Park as a Bean An Tí for over eleven seasons and is one of the senior members of staff. She is a fluent Irish speaker and she would be considered one of the most knowledgeable members of staff on the traditional skills that the Bean An Tí’s must display. She demonstrates both the baking and butter making activities to the visitors at two different locations every day.

Our interviews with all the staff members provided us with significant background on the work the animators carry out, their interaction with visitors and the sites’ organisational structures.

- From the animators’ accounts their interactions with the visitors are rather rich. Many visitors take photographs of and with the animators and of the activities they are carrying out. Many of the interactions have been quite
friendly and sincere; Anne recalled once that on a few occasions previous visitors to the Folk Park have send postcards back to the Bean An Ti’s. The visitors are quite interested in the produce that the Bean An Ti’s are creating and ask many questions about the process of making that produce. To cater for this the Bean An Ti’s give samples of the produce and printouts of the recipes, specifically for the traditional “Griddle Bread” and “Porter Cake”.

• The sites had quite a profound effect on the visitors. One animator recalled that when one Irish American tourist entered the Loop Head House she started crying as the site reminded her so much of the house she grew up in before emigrating to America.

• Anne also noticed the change in technology that people use in the Park: she said that older people took photographs with standard cameras whilst younger people use mobile phones with integrated cameras. This suggests a shift in the types of technologies that people use during their visit and new types of technology are being introduced into the visiting activity.

• Not only are the Bean An Ti’s in the house re-enacting activities they are also supply cakes, bread and scones to the two restaurants and to the shop in the Park. This is on top of their duties as animators. Some animators only work during the summer season, for example the policeman and the schoolteacher only work from May to September, when the Park is busiest. During the winter the number of visitors decline so only four or five Bean An Ti’s are at work. Since the number of visitors is lower in the winter months, the Bean An Ti’s do not have to make as much produce for the restaurants, therefore they are assigned other duties concerning the upkeep of the houses. They clean the inside of the houses, wash the curtains and clean the windows. Anne said she enjoyed seeing visitors come back during springtime as it brought life back to the site.

• There used to be many more animators employed in the Folk Park. These were in different locations to where the current animators are situated, most notably at the “Ardcrony Church” site (an original Church of Ireland building) where an animator used to recreate the activities of a church of
Ireland Rector. But due to the high cost of employing staff the number of animators in the Park was reduced.

• There are foremen employed to look after the animals in the Folk Park, repair damage to the sites and to keep the Park clean. These workers replant all the farm vegetables at the site every year. Every evening they go around to each site to check that all the visitors have left and to lock the buildings up for the night.

• Anne informed us that much of the artefacts in the site have been donated and consciously placed at each site based on historical references. Also she mentioned that even though the site has over 300,000 visitors a year it is rare for any of the items in the site to go missing.

• Anne mentioned that animators have to be very attentive to their dress as visitors quickly notice modern artefacts such as watches, bracelets, etc. Everyday they have to make sure that they dress correctly to preserve the integrity of their activities. This also shows how engaged the visitors are with the animators activities and how important authenticity is to the visitors.

Though visitors come and go, the animators are a constant presence in the site and forming a salient part of visitors’ experiences. Discussing the site with the Animators gave us a unique insight into their interactions with the visitors and the everyday activities that are carried out in the Folk Park.

### 4.5 Discussion

In the previous sections I have described the site and activities in Bunratty Folk Park based on the data gathered on site. The data documents how visitors experience the Park and presents the salient aspects of it. The Park presents a unique insight into past Irish life; the wide variety of sites and their physical qualities are the major aspect of the visitors’ enjoyment of the Park. These qualities were deeply engaging for the visitors, as they could inhabit the spaces, touch artefacts, smell the turf fires and taste the baked bread. But we also see how visitors don’t fully grasp what they encounter at the sites in the Park. The human animators are also extremely important to the visitors’ experience. Their recreation of activities at the sites introduces a “lived”
aspect that forms an important source of knowledge on the traditional activities that brings the sites and the artefacts to life. However, only a limited number of these animators exist and the majority of those have to carry out other duties along with the animating the traditional activities. Thus they can only demonstrate a small set of activities at a small number of sites.

The field study data provided a basis to compose a set of “design sensitivities”. The role of design sensitivities was to work as a vehicle to “suggest relevant issues and inspire creative design” (Ciolfi, 2004) in the subsequent design exercises. These then led to a deeper analysis of how what people encounter and engage with in the site and how they make sense of these encounters.

In the next section I will outline these main design-relevant issues that emerged from the data collected at Bunratty Folk Park.

4.5.1 Design sensitivities

Overall, whatever the nature of a design intervention, the character of the place should not be negatively affected, as it appears to be one of the strong motives of engagement and enjoyment. Through its material qualities, the site captures the visitors’ attention and appreciation, thus any introduction of technology should not compromise the character of the recreated sites.

More specific issues that have emerged from the empirical work and that I feel provide suggestions or “sensitivities” for design include:

- Though one of the main motivations for visiting the Folk Park was to get a sense of Irish culture through the sites and activities displayed there, visitors were only able to construct a limited understanding of what these sites actually represented, and sometimes they misunderstood the use of certain artefacts. Moreover many interesting facts about the houses that visitors might find engaging are not highlighted. The design intervention should strive to support the visitors’ understanding of the sites, artefacts and activities they encounter during their journey. The information available at the different sites in the Folk Park is minimal, and this seems to be an issue although this is
somewhat derived from the need to maintain the character of the recreated scenes and not to add “modern” features to the site. Visitors are given guide maps on their arrival, however these maps provide only a very small and not very engaging amount of additional information. Moreover, the map seems to be mostly used for spatial guidance and visitors rarely use it as reference. The animators represent a rich source of knowledge but they are only stationed at a small set of sites and their interaction with visitors is constrained by other duties. There is certainly a need to provide more knowledge about the sites to visitors. However, given the need to uphold the character of the site and to avoid disturbing current activities, any intervention that does this must be different from more traditional methods of information provision used in museums, such as info display screens or pushing information onto the visitor through a guiding device. This is the fundamental design problem that emerges from the field studies, and correlates with the Assembly framework’s main design goal of supporting people in making sense of what they encounter in a place. The conceptual Assembly principles suit this need for an innovative technique that can impart knowledge to visitors in a novel way.

− Based on their own life experiences, Irish people, and older visitors in particular, have more knowledge surrounding the sites and connect with them more at a personal level than younger visitors or people from different nationalities could do. Older visitors seem to be more engaged with the sites and this makes their visit more enjoyable and memorable. Irish people and older visitors possess a vast amount of personal knowledge on the sites, artefacts and activities presented in the Park that, if shared or highlighted, would contribute greatly to other visitors’ appreciation of the sites. This knowledge space should be taken into account in the design of the intervention, introducing an interesting resource to consider when conceptualizing an information space that can impart knowledge about the sites to visitors.

− The animators are integral to the enjoyment of the visit; they are very skilled at engaging the visitors in conversations and discussions, facilitating many
social exchanges. Visitors enjoy the social interaction with them and the way they can perform interesting activities and impart knowledge on the sites in a friendly manner. These social interactions are integral in engaging the visitors with the experiences they encounter and in providing them with a platform to facilitate learning and discussion about the sites, artefacts and activities. Many of the visitor interactions with the animators become quite rich with quite genuine relationships being developed. When designing the intervention, the role of staff in providing this added value must be taken into account to ensure that the intervention does not have a detrimental effect on these existing interactions. The intervention should be sensitive to the duties that the animators have to carry out: it should not add to the animators existing workload and should attempt to aid them in their duties.

- Visitors tend to follow the paths that converge on the main street, neglecting to walk toward other interesting sites, such as Bunratty House with its gardens and The Talbot collection. The design intervention could encourage people to engage with these less-visited parts of the site.

- The journey around the Park is long and can be tiresome for some visitors, and many visitors do not actually explore the entire Folk Park specifically the Northern areas of the Park. The design intervention should not add to the visitors’ physical exertions.

- Most people visit the Folk Park in groups, and any design intervention should support group experiences as well as individual ones. Literature (Heath et al 2002; Hindmarsh et al, 2005) has shown that social interaction among groups is salient to visitor experiences. This sensitivity and the previous one are salient when considering the Assembly prototyping principles.

- The open-air nature of the visitor experience means that it can be affected by the weather conditions. The weather can a have salient affect on how people structure their visit as they may neglect to explore parts of the Park based on the weather conditions. The design intervention must be able to adapt these conditions.
Visitors come to Bunratty to relax and enjoy the sights; much of their engagement with the sites, artefacts and activities is spontaneous. Thus the design intervention should not strive to constantly and heavily take the users’ focus but interweave with the informal and loose nature of their visit.

Given that the sites in the Park are taken from different areas around Ireland, and particularly the Mid-West, the Folk Park has a rich relationship with the people and the culture of the region in which it resides. It brings together the different aspects of Irish culture from the past that formed the roots of modern-day life, thus it provides an understanding on the culture for the region. The intervention should attempt to relate the sites in the Park to their regional origins to give the visitors a greater sense of Irish culture.

Though a cultural heritage site, an underlying business culture (that is prevalent in most tourist sites these days) is also noticeable. Shops selling souvenirs are located at the exit of the Folk Park; also several other commercial outlets are dotted through the Park selling Irish jewellery, Irish woollen products, souvenirs, etc. When designing the intervention this must be taken into account so the invention does not adversely affect the current commercial activities.

These issues I have chosen to highlight portray important aspects of the visitor experience. Significantly, the main issue that emerges from the fieldwork corresponds with the main concern that the Assembly framework attempts to address. I will address these in more detail in the following sections.

**4.5.2 Assembling knowledge of Ireland in the past**

The main reason visitors come to the Folk Park is to experience Irish culture and to understand how people would have lived in Ireland in the past. They achieve this by “assembling” or gathering together sources of knowledge that they encounter in the Park. From our observations these sources vary from their interactions with the quite factual representations such as the map provided on entry or the signs attached to some of the sites to interactions with the more immersive experiences that the sites themselves present and the animators provide. But based on the analysis of the field
data and the important issues emphasised through the design sensitivities this knowledge gathering process requires further support. But before conceptualising ways of supporting this, a deeper analysis of how people make sense of what they encounter in the Park was carried out.

Each of these points of engagement provided the visitors with different processes to make sense of what is on display but not all had the same impact.

- **Map**
  From our study the role of the map that visitors are given as they enter the Park varies as the visit progresses. The map provides small amounts of contextual information on each site, mostly focused on the background of the building. Many visitors as they go around become so engaged with the sites that they forget about the map only referring to it at stages when they would like to look for some more information on the sites and when they were trying to figure their position in the Folk Park. Though the map provides only a limited amount of information and tends to be ignored by visitors for most of their visit it still provides a vital underpinning to the visiting activity. It provides them with a point of reference that reassures them and helps to orientate them on their journey through the Park.

- **Signs**
  Some sites have signs (but most do not) with some contextual information on the building that is similar to what is provided by the map. Although they could be useful, many visitors do not notice these signs at the sites and when they did the signs offered little to engage them with the sites. The role of the signs is quite obscure. They seem to add very little value to the visit and their role in helping people understand more about what they encounter at the sites is quite limited. And though they are quite inconspicuous, they are still not in keeping with the style of the sites.

- **Sites & Artefacts**
The recreated sites themselves are predictably - the most engaging aspect for visitors. By exploring the sites, they can get first hand experience of aspects of past Irish life. The sites’ reconstruction allows visitors to progressively make sense of what everyday life was like in the past: the organisation and placement of artefacts in the houses indicate the activities that went on there and the class of people who would have lived there. As each site represents a different element of past Irish life visitors progressively build up a representation of it. But of course just coming in contact with the material aspects of a site cannot fully convey how people would have inhabited it, thus visitors are left with some gaps and curiosity relating to the people and the activities coupled to the sites. Many visitors felt that they would have liked to develop a greater relationship with the human activities that would have taken place at the sites. Of course in some sites the animators re-enact some of these activities but in the majority of sites this is not the case. Therefore a significant aspect of the “recreation”, the acting out of activities that contributes to the visitors understanding of what they encounter, is not fully supported.

Animators

The animators fill some of these gaps by bringing the sites and the artefacts in them to life. In the sites where the animators are situated the visitors developed richer understandings as they could view the animation of the activities and then discuss with the animators. These representations of “live” characters are integral to visitors sense making and enjoyment of the site. However, as I mentioned previously, there are very few animators when compared to the size of the Folk Park and the number of sites. From our discussion with Anne, a senior animator, we can see how their interaction with the visitors is constrained by their other duties and is in some cases only possible at certain times. Thus at the majority of sites in the Park visitors are left without this valuable aspect of the visit.

Overall, the elements of a “living history” site such as Bunratty Folk Park provide a captivating experience that visitors can relate to in a way that is quite different from
traditional museum and exhibitions.

In this chapter I presented the field studies carried out at Bunratty Folk Park. Through thematic analysis of the data from these studies I developed a set of design sensitivities and illustrated how people make sense of the knowledge they encounter in the place. In the design process, this provided a platform for subsequent design exercises. In the next chapter I move on to discuss the design work that followed, outlining the conceptual and technical design phases and the role of the Assembly framework in supporting them. I will show how the analysis presented in this chapter informed these phases of design.
5 Designing “Reminisce”: applying the Assembly approach

5.1 Introduction

In this chapter I will describe how the Assembly approach was used to structure and guide the design of the Reminisce installation for Bunratty Folk Park. I will explain how the Assembly principles acted as subtle points of reflection that directed the conceptual design, in order to provide support for the visiting experience in a way that added value to the visitors’ current activities. Then building on this conceptual development I will show how the concerns provided a basis to develop the technical design.

I describe how these extended principles were used to form a structured approach to conceptual and prototype development. Specifically, I show how they can be appropriated to act as tools for reflection on how the visitor experience is supported.

Reflecting on the “duality” that exists in the Assembly approach, I will outline how its implementation first concentrates on employing the guiding principles relating to the conceptual development. Then, once the conceptual basis has been established, I will move on to utilising the prototyping principles to develop a set of technologies to support the conceptual work. Though dual in nature, these activities cannot be seen as mutually exclusive: I show how the prototyping principles are used to develop technical ideas that emerged from the conceptual development, and how the prototyping process can introduce new ideas for how the visitors’ interaction in place can be enhanced.

Table 1 gives an overview of the process of designing, developing and deploying the
Reminisce installation.

Table 2: Overview of design activities for Reminisce

The process began with open brainstorming sessions to envisage creative design for the place, moving on to scenario development and refinement, then prototyping and finally deploying the intervention on site.

5.2 Developing the conceptual assembly

Defining and understanding activities - and implicitly information spaces - that add value to visitors’ experiences of the Folk Park requires open-ended discussions around features of the current experiences that visitors have of the place. Therefore brainstorming workshops were carried out: these sessions focused on the empirical data collected through fieldwork and on the set of the design sensitivities drawn out during data analysis, as described in section 4.5.1.

The Assembly framework was not introduced to participants during the early brainstorming: it was felt that these sessions should encourage the thinking about activities, information spaces, technologies and modes of interaction in an open way so as not to hinder any creative processes. The first workshop focused on generating keywords relating to the visiting activity and then developing design concepts that would enhance it. The second workshop concentrated on refining these concepts. The
Assembly framework was introduced at the end of this second workshop to shape the brainstorming results into sketches illustrating design concepts.

After the brainstorming sessions, I reflected on these illustrations through the lens of the conceptual Assembly principles to see how these design concepts could form an activity and information space that allowed visitors to progressively make sense of what they experience at the site. I now describe the design activities in more detail.

### 5.2.1 Design brainstorming workshops

![Table 3: Brainstorming workshops December 2009](image)

The design brainstorming workshops took place on over two days with a three-hour workshop each day. The participants included researchers from the project design team and other researchers who were not directly involved in the project but with experience in Interaction Design practice and an interest in cultural heritage, all participants had visited Bunratty Folk Park at least once. These participants were chosen based on their backgrounds, they were accustomed to comprehending field study data and using it as a basis to develop and analyse design concepts. They were experienced in developing innovative design scenarios, which was a core aim of the brainstorming. Also as interaction design researchers they were all open to new examining new approaches to design thus they could appreciate the use of the Assembly framework in this case.

The discussion revolved around the design sensitivities and selected data excerpts from the field studies, and then evolved into design concept development: the brief was that of proposing ideas for a novel installation that would encourage visitor participation and sense making at Bunratty Folk Park.
A meeting space was prepared for the brainstorming workshops (see Figure 19) with data collected during the field studies displayed around the space, including:

1. Aerial images of the Park
2. Images of the sites, artefacts, animals and activities in the Park
3. Samples of the map given out to visitors to the Park and samples of the school worksheets given to school kids when visiting the Park on school tours
4. Excerpts from the interviews with the visitors, transcribed and printed in large fonts
5. Data from the questionnaires: Statistics on the nationality of visitors and age groups of visitors
6. Video taken of a walk around the Park was shown to visitors and left running in the background during the brainstorming
7. Printouts of the design sensitivities

*Figure 19: The workshop space*

The first workshop started with a discussion of the fieldwork results and of the design sensitivities: this discussion was prompted by the design team who provided some descriptions of the background to the site and its features, the profiles of the visitors and the empirical research carried out. This was interspersed by questions and
discussions from the participants relating to the site. Subsequently, each of the design sensitivities was presented to the participants: these usually prompted participants to ask the design team questions. A summary discussion thus followed.

After this, the session moved on to brainstorming activities: each participant was asked to use the paper cards to generate keywords/concepts relating to the site and to how technology could support the visitor experience. These were then pooled together in the form of an affinity diagram and displayed on a board (see Figure 20) in the space so participants could discuss the concepts and develop links between them.

The keywords / concepts that emerged were:

*User experience, joy, activity flow, Interactivity, variety, game, collect things, multilingual, multimedia, portable, digital information, multisensory, video, archival, visitor generated content, geocached, augmented tweets, time machine, layers, lack of information, guidance, guiding, improve navigation, different routes recommendation, shelters (information), event location (Is something on? Where? When?), follow a path, marked ways, The day of a fisherman/farmer/etc, Irish one day life, Irish culture, Irish, foreign, international links, Architecture, objects that tell a story, object (what am I, where am I from), tell its story / history, artefact how to use it, how tools created, seasons, time, timelines, everyday life, recall memory, animals, interact with animators, visitor involvement, participation, promote group interaction, fishing, old visitor, touch it, build up a personal codex.*

*Figure 20: Discussion and concept board*
From an early stage it could be seen that the concepts that people put forward could be related to the different levels of the Assembly approach.

- Concepts that provide a foundation for activities emerged such as: *collect things, game, recall memory, geocached, guidance, follow a path, The day of a fisherman/farmer, etc.*
- Different types of information spaces: *visitor generated content, event location (Is something on? Where? When?), a personal codex, timelines, everyday life, objects that tell a story, object (what am I, where am I from), tell its story / history, etc.*
- Types of artefacts: *camera, audio recorder, RFID, mobile phone, etc.*
- Interactive techniques: *touch it, interact with animators,*

Given how people experience the site and the transient nature of the visit between static points of engagement, a key theme to arise from the discussion was that of utilising both standalone installations and mobile technologies to support people’s activities in the place. The participants collaboratively identified three key themes that evolved from the concepts: “Interactivity/Variety”, “Memory/stories” and “Collecting things”. The participants then divided into pairs, each taking a theme to work on and develop into a specific design concept. After spending time working on the design concepts, each pair presented their concept to the entire group. The three concepts consisted of:

*Interactivity / variety* – In this concept (see Figure 21) visitors were envisaged using a mobile device that presented a variety of different information to them, depending on their interest in specific aspects of the Park. The information would be in the form of brief snippets of textual, graphic and audio data with the option to get more detailed information if they so wished. Before beginning their tour of the Park visitors could state their information preferences and their trip through the Park would then be guided based on them. A map would be incorporated in mobile device
would help guide them around the Park.

![Figure 21: Interactivity / Variety concept, see Appendix D for larger image](image)

The device would have augmented reality functionality whereby - using the camera on the device - visitors could point to specific things around them in the site and view more information on specific points of interest through the camera's viewport. On their journey through the Park they would receive prompts on other items on their path based on the interests specified at the beginning. This notified them about points of interest that they otherwise might not have been exposed to.

*Memory / Stories* – The core of this concept (see Figure 22) was providing a platform that would allow memories and stories regarding the sites and artefacts in the Park to be shared with the visitors.
Figure 22: Memory / Stories concept, see Appendix D for larger image

Two types of memories or stories would be considered: the visitors own personal memories, and historical archival records represented through photos, film, audio recording and written documents. Visitors could access these at different points in the Folk Park through interactive kiosks, mobile devices, etc. Visitors who have their own particular memories or stories relating to sites and artefacts in the Park could record these through audio recordings, video recordings, writing, etc.

Collecting things – This concept (see Figure 23) involved building a representation of a particular character or element in the Park through collecting items that form individual parts of that representation. The representation, for example, could be a historical image or postcard that is divided into a puzzle that visitors have to piece together by collecting them at different points around the Park.
In order to collect the puzzle pieces, the visitors would have to do certain things like interacting with the animators, interacting with objects, etc. When the visitors would enter the Folk Park they would be given the first part of the clue, which acts as a teaser, they would then presented with a map of the Park that helps them navigate to the collection pieces.

The role of the second brainstorming workshop was to see if any more interesting design concepts could be generated. For this second session only two of the participants remained from the first session and new participants joined: again they were all researchers with Interaction Design expertise and they all had visited the site at least once. Different participants were introduced so that fresh perspectives could be given on the field study data and the design concepts that emerged from the first session. This provided a platform to introduce new design ideas that were not biased by the discussion in the previous workshop and it allowed participants who had no attachment to the design concepts to critically analyse them.

After a brief introduction, the keywords and concepts generated in the previous session were then introduced, participants were asked if they would like to contribute more to the collection or suggest new links between the existing concepts. The participants offered more concepts, some new and some derived from those already in
the collection. Afterwards the focus turned on the design concepts developed in the previous workshop. The design concepts were presented and the whole group collaboratively discussed and reworked them: elements were added to them, connections were made and features were evaluated as to how they correlated with the design sensitivities that emerged from the field studies.

After this group discussion, the participants were asked to break into three groups with each asked to take up one of the design concepts and consider three questions:

- What activity (activities) is at the core of the design concepts?
- What information is embedded in the activity/activities?
- How would different types of technology support the activity in the place?

These questions were derived by the principles of Assembly, and the goal in posing them to the workshop participants was to encourage them to develop the scenarios along the lines of the principles of Assembly.

The participants were asked to define what activities were central to the developed scenarios and to define the information spaces that were embedded in these activities. This provided a blueprint for each design concept to be structured and for its elements to be defined in relation to the Assembly framework. The participants were also asked what technological artefacts could be used to implement the concepts, providing suggestions on how technical elements could support the activity and mediate the information space providing a basis for prototyping. Each group then presented and discussed what they had produced for each concept (see Figure 24).
Figure 24: Illustrations of how the design concepts related to the Assembly themes, see Appendix D for larger images

The outcome of this was a set of design proposals with connections between the design concepts and the Assembly design concerns. The visual materials created during the second workshop provided the design team with inspiration for the activities, information spaces and modes of interaction that could augment the visit to the Folk Park. These formed a basis for an explicit use of the conceptual Assembly principles to guide the development of an activity and an information space.
5.2.2 Evolving the design concepts: applying the conceptual principles

Table 4: Developing the scenario, February 2010 to April 2010

After the brainstorming I took the materials that were developed during the workshops, the sheets that outlined the design concepts and the illustrations of their relationship to the Assembly Framework, and I analysed each of them based on the conceptual Assembly principles and the design sensitivities. The principles and sensitivities acted as lens to analyse the activities and the information spaces embedded in each of the design concepts to see how they would add value to the visitors’ interactions in the Park and actively engage them.

- Define an overall activity that people can actively participate in, informed by the understanding of participants’ situated activities.
- Based on the overall activity develop an underlying information space that allows people to actively make sense of their situated experiences. This is structured so it can be revealed in keeping with the situated activity at different points of engagement so people can assemble and construct meaning from it.

The first scenario was centred on offering a personalised guide providing factual information and prompts. Analysing the first design concept I found that it entailed mostly the visitor passively receiving information about the site. I felt that it would not encourage any active participation on the part of the user or provide any other value to the current visitor activities. Though the information space did provide knowledge that visitors would be interested in, I felt that the form in which it was
presented would not engage visitors, especially since the design sensitivities emphasise forms of knowledge distinct from traditional information pushing.

The second design concept offered quite an underdeveloped idea for an activity, consisting in receiving recorded memories or stories relating to the sites, artefacts and activities that would have been carried out in the sites at the Park. The specifics of interaction were also quite vague and thus it was not clear to see how the idea could promote active participation. Though the activity outlined in the concept was quite generic, the idea of giving visibility to memories or stories related quite well to the site. The information space (historical accounts or personal memories) had a strong bond with the design sensitivities as its form correlated with the existing story telling carried out by the animators and the visitors’ own personal memories that they share among themselves. I felt that visitors would actively engage with this information space and willingly contribute to it.

The activity in the third design concept was also quite interesting. The active search in order to learn more about a particular character of the Park would be engaging, as I felt visitors would could take part in a specific task that would reward them with more knowledge of the people who would have lived at the sites. However some issues arose about how well the “information seeking” task would be received by visitors, given the relaxed nature of people’s visits to the Park: visitors might not be interested in solving a specific puzzle that requires a concentrated effort throughout their visit. So how the puzzle is put together would have to take into account that the visitors might want to disengage from the activity, or follow it in a loose and/or open-ended way. I felt that the information space might not be interesting enough for visitors to engage with: a representation of a character or element of the Park through an image or postcard would be slightly detached from the sensorially rich encounters that they have at the different sites.

After I analysed all the design concepts, the second and third concepts seemed the most interesting, and each had promising aspects to them that could be developed further. Taking this into account, I felt that an engaging activity and information space could be formulated by bringing together the positive aspects from both concepts. Based on this, the activity outlined in the third concept, where visitors
actively seek out site-related content based on clues, was merged with the information space set out in the second concept (memories and stories about the particular sites). Thus the final design I outlined involved visitors actively seeking out memories or stories, scripted using historical accounts or else contributed by visitors, based on clues that they would be given as they progressed around the site. The content would be loosely coupled with the current trail around the Folk Park so that visitors could opt in or out of the activity as they please. The activity would integrate with the current supports for the visitors: for example the visitors would use the map given on arrival to work out the clues. Since the focus was to envision the Assembly around the narrative of the activity a detailed scenario was developed to envision visitors’ interaction.

5.2.2.1 The Reminisce scenario

The chosen activity involved visitors collecting memories about particular activities (e.g. Butter making, Turf cutting, etc) from 19th century characters who would have lived in the sites in the Folk Park: the farmers of the land and the women of the houses. These memories would be placed at different sites in the Park, and as visitors progress through the Park they are given clues about where they can find these memories. Visitors have the opportunity to leave their own memories or comments about the sites or activities and to listen to memories or comments that other visitors have left.

A scenario was created to provide a conceptual basis for prototype development⁵:

Jean is an Irish American Tourist who is visiting Bunratty as part of a guided tour during her holiday to Ireland; her husband and some friends accompany her. The tour brings them to Bunratty Castle and Folk Park. At the entrance they all receive maps of the Park, and they are made aware of the “Reminisce” installation where they can listen to characters who would have occupied the sites in the Park reminisce about life in the last century. Also they could listen to memories from other visitors. Jean thinks that this is something that she would be interested in doing, so the receptionist directs her to the start of the installation where she can choose what characters she would like to know more about. She chooses to learn more about the Bean An Ti (Women of the Houses) and she receives a clue about where first to find memories from a Bean An Ti:

“Beside the harsh Atlantic sea life on the Loop Head Peninsula was hard for this Bean An Ti”

⁵ Given the scale of Bunratty Folk Park and the resources available on the project, it was decided that the intervention would only deployed on half of the sites in the Park.
She is then given a mobile device that she can use to collect the characters memories and to leave her own comments or memories about the specific activities.

Based on the clue and from studying the map, Jean and her companions think that the Loop Head House is the first site where they will find of a Bean An Ti. So they start their journey around the Park keeping a lookout for Loop Head house. When they reach the site, Jean receives an audio recording of the Bean An Ti talking about life on the Loop Head peninsula. She then sees on the mobile app interface that other people have left comments on this memory so they listen to what other people have had to say. As they walk into and around the house, Jean receives several more memories:

1. **Inside at the fireplace they meet one of the Bean An Ti; she tells them about cooking the griddle bread. Jean also finds memories that other visitors have left, she shows them to her co-visitors, they find one of the visitor’s memories very interesting as it talks about how similar types of baking are carried out in Scotland. The animator gives them a sheet with the instructions for baking griddle bread/making butter. At the bottom of the sheet is a clue to another site that contains memories.**

2. **Outside the house at the Currach Jean finds a memory about fishing using the Currach. Then using the mobile device Jean and her husband leave their own memory of seeing men fishing on a Currach in Liscannor in Co Clare during their recent visit to the town.**

3. **Outside at the Creamery Jean finds a memory about Butter making**

She looks at the sheet to find the next clue:

> “Life in the mountains was difficult in the winter”

This must mean that more memories are a located at the Mountain Farmhouse, so they find their way there. They do find several memories at the farmhouse:

- **Outside at the turf pile they find a memory from the Bean An Ti about making turf; they also see memories that other people have left about turf making. This reminds Jean of her early childhood in Ireland so she leaves her own memory/comment about making turf.**

- **Inside in the dining room of the house they find memories about those special occasions when the dining room was used.**

- **In the bedroom they find memories about the sleeping arrangements in the house.**

As they leave the house, they receive the next clue:

> “Cheese making was important in the Shannon area”

This clue brings them to the Shannon Farmhouse where they find memories about baking, the living layout and the religious beliefs of the farm people. When leaving they receive the next clue:

> “The rich lands of the Golden Vale provides the finest wheat for baking bread”

This brings Jean and her friends to the Golden Vale Farmhouse. At the entrance, they find the first memory from the Bean An Ti of the Golden Vale about how living and farming in the area was so prosperous given the rich lands. They are encouraged to go into the house and meet with the animators in the house. They talk to the animators about baking scones, tarts, fruitcakes and bread. The animators give them sheets with the baking recipes as well as some small samples; Jean’s friend leaves a comment about how good the bread was. The animators also tell them that the next clue is on the recipe sheet:

> “Education was important for Irish families”
They conclude that they will find more memories at the schoolhouse, they arrive at the schoolhouse, and at the entrance they find a memory of the Bean An Ti talking about the importance of education. Inside, the animator impersonating a teacher recreates the classroom scene. They watch the re-enactment and then move on to explore the rest of the site.

As I mentioned previously, it is difficult to see the conceptualisation principles and the prototyping principles of Assembly as mutually exclusive. Already during the brainstorming workshops, the design team and design session participants proposed ideas regarding the form of the technologies that could support this activity. These naturally emerged during the conceptualisation process but lacked specification in how they could actually support the narrative of the activity. Likewise, during the technical development, the reflection on the prototype brought up ideas that affected the conceptualisation of the activity and of the information space.

5.3 Evolving the technical Assembly - storyboarding an Assembly of interactive components and coherent interaction techniques

Table 5: Scenario development & storyboarding

With the activity and information space conceived and initial ideas on how they could be technically supported, the focus of the design process turned to prototyping. The prototyping Assembly principles focus on creating an infrastructure of Ubiquitous technologies that supports the activity people are engaged in, and ensuring that these provide affordances for interaction in keeping with people’s situated context and
supports interaction across all the technological components. Again focusing on the narrative of the activity storyboards were used to develop the prototypes. An initial storyboard (see Figure 25) was created from the scenario and the technological foundation outlined during the conceptualisation phase.

![Storyboard 1: The initial storyboard based on the Reminisce scenario, see Appendix E for larger image](image)

The prototyping Assembly principles were used as points for reflection on how the scenario could be supported best.

- **Develop an Assembly of interactive components that are shaped to support aspects of the overall activity and mediate the information space.** These components should be assembled to mediate elements of the information space in a way that is coherent and in keeping with the overall activity and with the context. Emphasis should be put on not only developing interactive components to provide locus of interaction, but on developing components that enhance the engagement value and coherence of the whole Assembly. Specifically low-tech components that can offer interesting features for
interaction that can engage people and mediate the information space to them.

- *Envisage related modes of interaction across components to connect them and provide a more coherent experience.* These modes of interaction must complement each other and be in-keeping with people’s situated interactions.

I analysed this first scenario & storyboard based on the prototyping principles and the design sensitivities, and from this analysis several issues emerged:

- The first storyboard focused on a Mobile Device that had location-aware capabilities so, when a visitor entered an area of the site where a memory was located, their Mobile Device would alert them that they could collect a memory there via a wireless “ping”. This way the site could be marked up without affecting its physical appearance and removing the need for fixed installations at each site. In terms of supporting that activity in an engaging way, I felt that the interactive element was quite limited and didn’t fully support the task of finding and collecting memories. Also considering the design sensitivities I felt that the “pinging” was not in keeping with the visitors interaction in the place. I felt it would disrupt the relaxed nature of people’s visit and that they would prefer more control over when and where they listened to a memory. Thus a new process was needed that provided them with more control over how the memories were mediated to them.

Taking this into account it was decided to create a more physical process to collecting the memories that would require direct physical engagement on the part of the visitor. The idea of “marking up” the sites with specially designed Quick Response (QR) codes then emerged, each QR code (see Figure 26) would represent the presence of a memory from the characters of interest. Visitors could search the sites for these codes, scan them using the camera on the Mobile Device and then receive the memory recording. As well as being a more engaging and interactive process to collecting the memories, this mode of interaction was already similar to existing actions carried out in the place, whereby visitors already used phones and cameras to take pictures.
Another issue that arose with this first storyboard was how the memories recorded by other visitors were communicated to visitors. In this storyboard, visitors accessed the contributions created by other participants through the Mobile Device they used to collect the characters’ memories. I felt that visitors would be presented with too much information that might overload them as they progressed around the site. Again, I was conscious of the relaxed nature of people’s visits to the Park so I did not want to disrupt this by weighing them down and confusing them with content from different sources. So in order to provide a more coherent experience I decided that this process of listening to other visitors’ memories should be separated from the process of collecting the characters’ memories and recording personal memories. Consequently I decided to introduce another interactive component dedicated solely to the content recorded by the visitors. I decided to place such an installation at the last site on the activity trail, the schoolhouse: a technologically-augmented desk that integrated with the character of the place would be placed there. In keeping with the nature of the place, books were placed on the desk. Each book represented a site in the Folk Park, identifying each site that visitors could have interacted with on their journey. Each book would unlock the content recorded by other visitors, when one of these books was opened and placed on the desk, memories from visitors that were recorded at the site that the book represented would be played back.

Whilst carrying out this analysis a new concept emerged that I felt could extend the
activity outlined in the initial scenario: since visitors were putting a good deal of effort into collecting memories and recording their own content, it seemed that they should be able to access this information after their visit. Therefore another component was added to the installation: a Web Resource, where participants could access all the content they collected and recorded during their visit at a later stage and also remotely.

Another storyboard was then developed based on these modifications (see Figure 27). Once again the prototyping Assembly principles were used to evaluate the scenario.

Figure 27: Storyboard 2: Introducing the QR codes and desk, see Appendix E for larger image

Again using the Assembly principles as a lens I reflected on this storyboard:

- I felt that a gap existed between the modes of interaction across the interactive components and I felt that there was a need to provide more coherence between the visitors’ interaction at the sites and their interaction in the schoolhouse. As people journeyed around the Park they would appreciate the sites, use the mobile device to interact with the characters memories and use
the clues guided them to sites. But when they came to the desk they encountered a different form of interaction that had no real relation to what they experienced at the sites. They used books to interact with the desk; these represented the site but had no real relationship to the characters of interest.

To resolve this, a design workshop was carried out focusing specifically on how the interaction with the desk fitted into the overall activity and how the interaction with this node in the Assembly could be assimilated into the visitors overall interaction with the site.

This design workshop involved the design team and other interaction design researchers that were involved in the previous design sessions. The group brainstormed and discussed around:

- How the interaction with the desk could fit into the overall scenario, how the visitors interaction with the desk assimilated into what they already had experienced
- How the visitors could comprehend the modes of interaction and buy-into the installation, and ways in which this buy-in could be facilitated.

In this workshop it was pointed out that the presence of the books was introducing another mode of interaction that was unnecessary and disconnected from the visitors’ previous interactions. The focus turned to how the mode of interaction with the desk could be linked to what the visitors had already experienced, and, as they are a common denominator at each site, the possibility of introducing the clues into the interaction with the desk was discussed.

Inspired by the third Assembly principle that emphasises the role of both highly interactive and low-tech components, the concept of the “Clue Pack” emerged. Rather than embedding the clues onto a specific artefact that the visitors collected, it was decided to create a pack that included the artefact that the visitors could bring home with them as a souvenir, and the clue in which a Radio Frequency Identification (RFID) tag was embedded. Tags were programmed with unique codes that were used to identify each clue. These digitally tagged clues were then introduced into the
interaction with the desk.

During this workshop, interaction with the desk was refined: visitors collected the clues packs as they journeyed around the Park gathering memories and recording personal content. When they reached the schoolhouse, they had with them a selection of Clue Packs from the sites they had visited, and they came across the school desk. On the desk were two books with embedded RFID tags; each representing the two characters of interest (Farmers of the land & Women of the house) visitors could hear memories from. Visitors could use the books and clues in conjunction with the desk to listen back to memories based on the sites where they were left and on the character chosen by the people who recorded the memories. This allows visitors to listen to other people’s memories based on their character of interest thus centring the visitors’ interaction throughout the activity on characters, unlike the previous scenario where the focus of interaction at the desk was the sites and the role of the characters was unclear.

*Figure 28: Sketch of desk, see Appendix E for larger image*
The interaction (see Figure 28 for sketch from design session) involved the visitors placing one of the books onto a specially designed book holder and placing one of Clue Packs into a basket, both of these had an integrated RFID reader. This allowed the visitor to hear memories recorded at the site they where collected the clue and from people who were interested in a character represented by the book.

At this stage, I felt that the scenario was refined enough to start developing the high fidelity prototypes. Each of the interactive components was prototyped over a three and half-month period, and once each component was developed to the level that could support testing a lab evaluation of all the components was then carried out: we recruited colleagues and students to test the high-fidelity prototype that was set up in our lab space, to make sure that each component worked, and also to gather feedback on the design of the mobile application and of the School Desk. In the next section I will describe the final prototype that was finally deployed for full testing at Bunratty Folk Park.

### 5.4 Reminisce @ Bunratty Folk Park

![Table 6: Deployment and empirical evaluation on site](image)

The installation, Reminisce, was deployed at Bunratty Folk Park in August 2010 over three full days. Visitors could try the installation free of charge and the design team provided all the accompanying materials. The installation consisted of an array of interactive technologies each supporting specific parts of the activity and mediating
the information space, which are illustrated in Figure 29 below.

![Figure 29: The technical Assembly](image)

When visitors entered the Folk Park they were directed to a central “portal” (Figure 29, A), here they could create a unique profile where all the content they collected and recorded during their journey would be stored. Here, they could also select a character that they would like to hear memories from, and receive an initial clue about where to find the first memory from this character. The portal was also where they collected the Mobile Device that they used to gather the memories. At the end of their visit visitors would come back to the portal, where they would be presented with a map of their visit annotated with the memories they collected and recorded. Finally, the portal allowed them to share this content with family or friends through email.

At the portal visitors were given a Mobile Device (Figure 29, B), as they travelled around the site they could use a specially developed application to collect memories at specific sites and record their own memories\(^6\). At different sites, QR markers represented the memories and using the Reminisce application visitors could scan the

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\(^6\) If visitors’ phones supported it, this application could also be downloaded and installed on their phones but this was not achievable in the frame of the project.
codes using the camera on the device. Once a QR code was scanned, the application would display the specific memory in the form of an audio recording. Then if they wished, visitors could use the application to record and save in real time their own memories or comments using the handset’s microphone.

The portal provided visitors with the first clue about where to find the memories from their specific characters, subsequently, at each of the memory sites, visitors could collect specially designed packs of tangible tokens (Figure 29, C), containing a souvenir that they could bring home with them and that were connected with each site (recipes, pieces of turf, small hanks of wool) and a clue about the next site where they could find memories. The purpose of thes packs was threefold: to provide the visitors with a memento of their visit, to guide them to the next memories available to them, and to allow them access the memories that other people left at the site. The clues were printed on cards with RFID tags embedded in them. When they reached the schoolhouse, the last site on the Reminisce trail, they could use the tangible tokens as input for the School Desk in the schoolhouse.

In the schoolhouse, the last site on the trail, a School Desk (Figure 29, D) allowed people to listen to recordings that other visitors had left at the sites in the Park. Placed on the desk were books with embedded RFID tags, each of them related to one of the characters that visitors could collect memories from. A book holder and a basket with embedded RFID readers were also placed on the desk. When one of the books was placed on the holder and one of the tangible tokens was placed inside the basket the recordings left by other visitors were played back. These recordings were from the site where the tangible token was collected in.

A Web Resource (Figure 29, E) allowed visitors to share their experience of the site after the visit. Similar to the Central Portal it provided visitors with a map of their visit annotated with the memories they collected from the character they were following and the memories or comments they would have recorded.
5.4.1 The Central Portal

The Central Portal allowed visitors to create a basic profile on the system, this profile consisted of a username, password and their choice of character, the profile allowed the system to recognise the user and to keep track of the memories they recorded and collected.

![Figure 30: The portal](image)

The physical form of the portal (see Figure 30) was similar to that of a kiosk with a pen-based display, visitors could interact with it using a pen to make selections on screen and using a keyboard for text input. It provided the visitors with two options “Start” and “View Your Memories”; the former was used when the visitors were starting their visit to create their profile and the latter when they returned after visiting the Park.

The second option allowed the visitors to review their visit by displaying a map (see Figure 31) of the Park annotated with the memories they collected and recorded, the map graphics were the same as the graphics that were on the map that visitors are given when they enter the Park. The map was used so visitors could relate the content they collected and recorded to the sites they just visited and to their interactions that
occur there. By selecting one of these annotations the visitors would be presented with a dialog box where they could play back their memories through speakers hidden underneath the portal. Embedded in the dialog boxes were images of the specific character that visitors heard memories from. They were also given the options to delete some of the memories that they recorded if they wished.

![Figure 31: Map of visit](image)

Using the portal visitors could share what they accumulated with family and friends through email. The role of this installation was to provide a start and end point on their trail around the Park, providing them with a means to register with the application and a means to review and share what they had collected.

The User Interface (UI) for the portal was a desktop application developed using Adobe Flex that ran on a Windows based PC. A Java Enterprise Server (Glassfish v3.0) was also running on this PC that provided the technical backbone for the whole installation; it stored and retrieved data on demand for the Portal UI, the Mobile Device and the School Desk. It stored all the installations data in a MySQL database.
It facilitated data exchange with the Portal UI using the Simple Object Access Protocol (SOAP) and it also provide data to the Mobile Device using a lightweight Representation State Transfer (REST) styled web service. The portal UI accessed the audio data (collected and recorded memories) through a Flash Media Server instance running on the PC; the media was uploaded to this server by the Mobile Device via a File Transfer Protocol (FTP) server that also ran on the PC.

The Enterprise Server, the Flash Media Server and FTP server were all networked to the Mobile Device and the School Desk via through a Wireless LAN so these components could access the visitors’ content.

**5.4.2 The Mobile Device**

Once they had created an account with the portal the visitors could take one of the mobile phones provided. These phones were touch screen smart phones with the Android operating system installed; a specially designed Reminisce application was installed on each phone (see Figure 32). Visitors could log into this application using the username they created their account with.

Once logged into the phone visitors were given several options (see Figure 32, A) that allowed them to scan the QR codes around the site, review any memories they collected from their character of interest and review the memories or comments they recorded themselves.
By selecting the “Scan a Code” option they could use the phone’s camera to scan the QR codes at the sites (see Figure 32, B), this action was similar to taking a photograph with the phone. Once successfully scanned they were presented with a memory from their character of interest (see Figure 32, C) that they could listen to through the phone’s speakers. The voice of the characters was carefully select so they represented typical accents of people from the Munster area that would be similar to the people who would have lived in the sites⁷. The memories were carefully scripted so that they focused on salient aspects of how people would have inhabited the specific sites. Detailed attention was given to the scripting of these memories so visitors could relate them to sites, artefacts and activities that they encountered at the specific sites. Also the imagery used when a memory was scanned (see Figure 32, C)

⁷ To listen to memories from the two characters see: the farmers of the land (www.reminisce.ie/media/character_1) and the Women of the houses (www.reminisce.ie/media/character_2)
represented an authentic recreation of the specific character that they were listening to. The application noted each memory collected so visitors could review these later and replay them.

The application provided a recording facility (see Figure 32, E) that allowed visitors to record their own personal memories or reflections relating to the character memories they were presented with, the sites they visited, the artefacts they encountered or anything relating to their experience. These were then stored on the phone so they could keep them as memoirs of their visit (see Figure 32, G).

Once they were finished their visit the visitors could log out of the phone application, the memories they collected and recorded would then be saved to their profile. These could then be accessed from the Central Portal at the end of their visit and from the Web Resource after their visit.

The Mobile Device used the Android 2.2 operating system; the application was developed in Java using the device’s SQLITE database to store visitor data. The ZXing library\(^8\) was used to implement the QR code scanning functionality. The application used a lightweight REST web service provided by the Java Enterprise Server over a Wireless LAN connection to gain access to and store visitor data (profile data, collected memory data, recorded memory data). The application uploaded the audio content collected and recorded by the visitors by connecting to the FTP server running on the Portal machine.

5.4.3 The Clue Packs

As visitors followed the clue trail around the Park, they could collect a Clue Pack (see Figure 33) at each site. Each pack contained:

1. A souvenir that visitors could bring home with them. Each souvenir was related to aspects of the visitors’ interaction within the sites; the houses, artefacts, activities and the Reminisce characters’ memories. For instance:

   * @ The Loop Head House: The souvenir was a Recipe for Griddle Bread:

\(^8\) ZXing is an open-source, multi-format 1D/2D barcode image-processing library implemented in Java. [http://code.google.com/p/zxing/](http://code.google.com/p/zxing/)
This was related to the baking of Griddle bread that is carried out everyday at the house by a Bean An Tí.

- **@ The Blacksmiths Forge:** The visitors received bolts and pieces of metal representing the materials the Blacksmith would have used.

- **@ The Mountain Farmhouse:** The visitors received a shank of wool representing the material from which the blankets, clothes, etc in the house would have been made from.

- **@ The Shannon Farmhouse:** The souvenir was a piece of turf relating the sods of turf that were burnt in the fire.

- **@ The Golden Vale Farmhouse:** The visitors received a recipe for a Porter Cake, a traditional fruitcake that would have been baked by the Bean An Tí of the house.

2. A clue that leads visitors to where they will find the next set of memories for their character. Embedded in the clue was a RFID tag encoded with a unique code that identified the site in which it was found in. It mediated the visitors’ interaction with the School Desk in the schoolhouse, providing a form of input that allowed visitors to listen back to other visitors’ memories at the particular site encoded in the RFID tag.
5.4.4 The School Desk

The School Desk was placed in the Schoolhouse; the desk was covered in black cloth to hide the digital technology so all that was presented to the visitors was a basic desk on which the following was placed:

- Character Books: Two notebooks, each notebook represented one of the characters of interest that visitors selected when beginning their journey. An RFID tag was embedded in each book to identify them with either one of the characters. Photographs relating to the characters’ lives were attached to pages in each book.

The choice of notebooks that symbolise the characters’ as mode of interaction with the desk was linked to the School setting: the notebooks represent a typical artefact that would be found in a schoolhouse and thus had a direct relationship with the place.

- A Book holder: A RFID reader integrated into the book holder detected what book the visitor placed on the holder and therefore their character of interest.
• A small blackboard with basic instructions for the visitors concerning about how to interact with the desk. The use of the blackboard was related to peoples’ interactions Schoolhouse, as they are quite prevalent in the space.

• A basket that the Clue Packs could be place in with a RFID integrated into the base of it.

Figure 34: The School Desk

When visitors arrived at the School Desk they could use the Clue Packs they collected to listen back to visitor-recorded content based on the site that content was recorded in. By placing one of the Character notebooks on the book holder and a Clue Pack in the basket visitors could listen back to recorded content from that site by people who had selected that specific character of interest.

5.4.5 The Web Resource

The Web Resource provided a remote portal that allowed visitors to access the content they accumulated during their visit after they left the Park. Similar to the Central Portal it also allowed them to share the content through email. Again the point of providing a map annotated with the content that visitors collected or recorded was to provide them with way to reflect on their journey around the Park and the
interactions that occurred there.

Figure 35: The Web Resource

5.5 Summary

In conclusion, in this chapter I presented the process of designing the Reminisce installation for Bunratty Folk Park. I demonstrated how the extended Assembly framework could be appropriated into design practice and its role in the design process. I showed the ways in which the Assembly framework guided the design process and provided points to reflect on not only the design of the installation but also on how the activity that it supported could add value to existing activities in the place. The design principles inspired and influenced significant decisions relating to the conceptualisation of the intervention and its technical development.

In the next chapter I examine the prototype in situ: I will analyse visitors’ interactions with it and I will discuss how the design decisions taken based on the Assembly framework affected this interaction.
Chapter 6 – “Reminisce”: the visitor experience

6 “Reminisce”: the visitor experience

6.1 Introduction

In this chapter I carry out a detailed analysis of the interactions that occurred with and around Reminisce. I emphasise the salient issues relating to the appropriation of the Assembly concept and show how the inclusion of place-related concerns enhanced the concept and led to a positive augmentation of the visiting activity at the site. I will present examples of the visitors’ interactions with Reminisce to highlight relevant issues.

As I have described in Chapter 5, during the design process of Reminisce, numerous design decisions were made in the light of the Assembly principles and informed by the design sensitivities that emerged from the fieldwork. The main goal of this chapter is to discuss whether the design decisions led to positive outcomes, and to ascertain if the results of applying the extended Assembly framework that incorporated an approach to appreciating people’s experiences in place answered the questions I have posed at the beginning of the thesis:

Are there human centred frameworks that can aid design practice in developing interactive technologies that support and add value to people’s activities in public spaces?

Can an extension of the Assembly approach (Fraser et al 2003) help structure design practice so the emphasis is put on the affects of a design on people’s situated activities?

How can the Assembly framework be grounded on an appreciation for people’s situated interactions?
This chapter focuses on the resulting interactions that occurred with and around the Reminisce installation; in the Chapter 7 I will give my own personal reflection on extension of the Assembly framework and the appropriation of it to support the process of designing of the installation.

The public exhibition of Reminisce was thoroughly documented and the data collected on site can be analysed and discussed in several ways. However, my analysis in this chapter will be focused on the two dimensions of the Assembly concept (described in Chapter 3) - one from the point of view of the user experience: how people engaged with the overall activity; the second from the point of technical design: how the technical Assembly supported this activity.

### 6.1.1 Empirical methods

The installation was deployed in Bunratty Folk Park over three full consecutive days, and during this time visitors were invited to use the system. Given the prototypical nature of the installation, the trials were facilitated to some extent by the research team, by giving visitors mobile devices with the Reminisce application preloaded onto it. This allowed the research team access to all the data accumulated by visitors on the phones after returning them. Before the visitors began the Reminisce trail, they were given an initial quick briefing on its role, general functionality and the opportunities for interaction it would present to them as they progressed through the Park.

Given the scale of the Folk Park and the distributed nature of the installation, documenting the visitors’ use of Reminisce was quite challenging. Two main methods were used to achieve this:

- **Shadowing**: Participants were shadowed throughout their time using Reminisce by one or two members of the research team. Whilst one member of the design team took notes during the shadowing session, another member video-recorded it. Notices informing the visitors of the presence of video

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9 Visitors could use their own mobile devices if they had a device with the Android operating system.
recording equipment and its purpose were displayed at the entrance to the site and at the start of the trail, and the Folk Park management had given their approval of our ethical procedures for collecting data. Though the use of camcorders can tend to stand out in most places, as the Park is a tourist location camcorders usage is quite common, making the presence of the video camera quite unobtrusive. Still photographs were also taken occasionally, especially in dark places where the video camera images would be hard to make out.

• Informal Interviews: After the visit, participants were informally interviewed to gather specific feedback on items that may not have been apparent or explicit through the shadowing sessions, and also to allow visitors give their own insights and comments into the use of the application and their opinion of it.

The recruitment of participants also proved to be a challenging task. In the summer months, Bunratty Folk Park sees several hundreds of visitors per day (a day with 400 visitors pre-booked would be considered by the staff to be “quiet”). Similarly, there are extremely quiet days and part of the day (for example, the morning from 10AM to 12PM) when recruiting participants was difficult. Therefore, our pool of volunteers included both visitors whom we approached at their entrance to the Park at busy times, and volunteers recruited through other channels (for example, the University’s “Events” mailing list, where we advertised Reminisce) and who had contacted us and scheduled a complimentary visit to the Folk Park in order to trial the system. Approximately twenty-five visitors used the installation on their journey around the Park, approximately another fifty visitors engaged in some partial interaction with the individual components of the installation, at the School Desk, around the portal and engaging when other visitors were listening to memories on the Mobile Device at the sites. On average each trial lasted for around forty minutes.

Notices informing the visitors about the study were placed at focal points in the Park; at the entrance, near the Central Portal, etc. These notices informed visitors about the study that we were carrying out and the video recording that was taking place during
the study. They invited visitors to contact members of the research team if they required further information regarding our study and the data we were collecting, and were informed that they could access recorded material relating to them and have it deleted. All members of the research team wore identification badges so to be recognisable to the visitors.

My goal in analysing visitors’ interactions with the installation was to examine two main concerns:

- Did the activity and information space add value to visitors existing activities in a way that was in keeping with existing visitor activities?
- Did the technical prototype adequately support the activity and interaction across it while in keeping with people’s interaction in the place?

Both of these refer to design decisions that were made based on the Assembly framework and the place related concerns that emerged from the field studies. The first concern focuses on whether the activity and information space developed based on the Assembly principles enriched the visiting experience and brought a fresh perspective that supported visitors in making sense of what they encountered in the place. The second focuses on whether the interactional components designed by reflecting on the Assembly concerns were well designed to mediate and support interaction with the information space across the activity. And therefore whether they were in keeping with visitors situated activities. Both of these concerns are implicitly concentrated on how the installation supported people’s emplaced interaction. I will present excerpts from the data in support of my analysis in the form of quotes from the informal interviews, verbal accounts of the shadowing sessions developed from field notes and excerpts from the video recordings in the form of “vignettes” showing the participants’ behaviour in certain relevant moments.

6.2 Emplaced interaction: adding value and supporting sense making

In this section I will structure my analysis around three themes

- Sense making in place
• Sustaining coherence and creating connections

• Sharing reflections

Through these themes I attempt to show how the overall activity of actively searching for and collecting the characters memories, listening to other visitors memories and reflections, sharing and keeping personal memories or reflections actually added value to visitors existing appreciation of the sites in the Park and supported them in making sense of what they encounter during their visit. Also I was interested in how the features of the installation that emerged from the appreciation of the Park as a place affected interaction. In conducting the fieldwork, I was specifically interested in seeing how the participants engaged with the content presented through the activity, and specifically the characters’ memories and the visitors’ own memories, and if this helped visitors make sense of what they encountered in the place, by providing a strong theme throughout.

I will attempt to illustrate how the design of the technical infrastructure and the interaction qualities of Reminisce supported and mediated the activity. This technical side of the Assembly was a product of reflecting on the design sensitivities and the prototyping Assembly principles as discussed in Section 3.3. Thus a main concern is how well the prototyped infrastructure supported the activity, integrated with the existing visiting experience and how visitor interaction was supported across the activity. Each interactive component of the installation supported a particular phase of the activity and mediated particular points of interaction with the information space. How the design choices that were inspired by the Assembly principles sustained interaction is of particular interest.

The data shows many cases of the visitors actively participating in the activity and using what they assembled as a basis to understand what they encountered at the sites, and leaving their own accounts of what they encountered. These cases could be seen through their behaviour and verbal comments. All of the visitors who participated visited every site that the clues led them to, though given it was loosely coupled to the existing trail around the Park this was not entirely surprising. But though the participants visited all sites at some sites they didn’t collect all the
memories that were available. In some cases visitors preferred to explore the sites, listen to the memories they came across and when they were satisfied with what they encountered they had experienced at the site they moved on. Naturally older visitors and Irish visitors recorded most of the memories relating to what they encountered at the site. Other visitors tended to record reflections or comments about what they experienced the particular sites.

6.2.1 Sense making in place

The process of exploring the sites with the possibility of gathering first hand accounts of what it was like to live in them was appealing to visitors. For many of them searching for and collecting these representations became integral to understanding what they encountered during their visit. For example in Vignette 3, we see how the character’s memories guide the exploration of the site. In Vignette 3, Anna, a German visitor living in Ireland, is visiting the Mountain Farmhouse she scans a QR marker near the entrance to one of the bedrooms in the house. She listens to the memory from the character and then examines the bedroom space whilst listening to the memory so to find relationships between the narrative in the recording and the space itself.

Anna chose the Bean An Ti as character of interest. She enters the Mountain Farmhouse. She notices the QR marker over the doorway into one of the bedrooms in the house. Using the Mobile Device she scans the marker.
Chapter 6 – “Reminisce”: the visitor experience

The memory from the Bean An Tí of the house is displayed. Anna then plays the memory. She listens and hears the Bean An Tí reminiscing about making the blankets, sheets and clothing for the household.

While the recording is still playing, Anna explores the site and moves to the bedroom where the blankets and sheets similar to what the Bean An Tí was talking about are displayed.

Anna explores the rest of the site, she then records her own comment: “Its very cold in here I would like to be upstairs in bed” She saves this comment on the Mobile Device and then proceeds with her visit.

Figure 36: Vignette 3 “I would like to be upstairs in bed”

In this Vignette we can see how the memories highlighted aspects of the sites that otherwise might not have been apparent to visitors. For example we see Anna scans the marker and then moves into the centre of the house but then moves back to the bedroom searching for what is mentioned in the memory, the sheets and the blankets. Her interaction with the markers and process of receiving the memories was quite
simple, and did not distract or spoil her appreciation of the site. Her comment illustrates how much she engaged with and was captivated by the place, “Its very cold in here I would like to be upstairs in bed”, she developed a very personal relationship with the place even imagining herself upstairs in bed.

For other visitors the memories were not used for guidance as such, but more as commentaries that provided them with insight on the place. The knowledge embedded in the memories allowed the visitors to gain better understanding of how people lived in the sites. For example in Vignette 4 an Irish family, the Murphys, are visiting the Mountain Farmhouse; the family group consists of a grandmother June, her daughter in law Mary, and her granddaughter Emma and her grandson Paul. They are in the Shannon Farmhouse, and June and Paul are discussing the period in which people would have lived in the farmhouse.

June and Paul are discussing the period in which people lived in the Farmhouse.
June: “Is it in the 1800s?”
Paul: “It’s before, hmmm, it’s after the Famine and before...”
June: ”After the Famine?”
Paul: “Or is it before the Famine”
June: “it can’t be before the Famine....[pauses] It would be in the 1890’s or 1880’s”
Paul [looking at the map]: “I think there is a few different ones”
June: “Is there a year they give you? ‘Cos we’re too young to be talking about the Famine” [Laughing]
Mary: “ What’s this?
Paul [Looking at the map]: “It doesn’t say what year”
They then move to explore the rest of the house
Emma finds a memory marker at the turf box beside the fire. She scans the QR marker to collect the memory.

She then brings Mobile Device to Mary and June so that they can hear the memory.

The house is full of visitors so there is a lot of background noise, so they huddle together around the Mobile Device to listen to the memory. The memory is about bringing home the turf during the summer using the tractor.

When the memory finishes they discuss what they just heard:

Mary: “So it was the tractor they were bringing home the turf in.”
June: “Yes, that’s very new”
Mary: “Not the horse and cart”
June: “That’s modern”
Mary: “Its modern, its much later than we thought”
June: ”Later than we thought, oh well. What do we make of that now”

June: “Were you ever in a bog?”
Mary: “yeah years ago.”
June: “I was too. I remember being in a bog and I remember taking off my shoes. And I have a picture of myself in the bog.”
Emma: “Why did you take off your shoes?”
June: “because they cut the turf, you remember (to Mary), off the brow and it was soft like moss.”
Mary: “it was like a cushion”
June: “Yeah, your toes would, ah, it was lovely feeling. It was like walking on a soft mattress, it was wet. And the ooze would go up between your toes, remember that (to Mary)”
Mary: “oh yeah”
June: “I used to love that walking, and then you used to have a Slane”
Mary: “for cutting the turf”
June: “for cutting down, then you lift it out and you foot the turf. Five and one across.”

June: “I remember how did ye bring the food out?”
Mary: “We had bottles of tea.”
June: “Bottles of tea with a cork on top and lovely break.”
Mary: “the smell of the tea. I can still taste that tea. No matter if you took sugar or liked it black, everyone drank the same. There was no such thing as ‘I don’t take sugar’. There was so much sugar put in for everyone. And the bottle was wrapped in a sock and the sock would keep the bottle of tea hot. There was no such thing as coffee.”

Figure 37: Vignette 4 “It can’t be before the famine”

In Vignette 4 we can see how the memories subtly conveyed to the visitors knowledge that otherwise would be not be apparent. The memories were scripted on the basis of their location at the houses so that the visitors could relate the memories to their interactions in the place and provide a better sense of what they were experiencing. We can see how the Murphys could coherently “assemble” together their experience of the place, with the information available on the map and with the characters memories to understand more about the site. The collaborative nature of the visit with was evident and the way installation supported this. We see Paul and June using the map to find out the period of the house; Emma collects a memory from
the Bean An Ti of the house and brings it to Mary and June for them to listen to. This memory mentions the use of a tractor to bring turf from the bog, from this they deduce the period that house recreates. Then sparked by the mention of the bog they begin a discussion around their own memories of the going to the bog. Their visit was very collaborative with rich social interactions among the participants.

In Vignette 3, we can see Anna recording a reflection on what she encounter in the site. Visitors created their own content relating to what they encountered at the sites. This content varied from reflections on what they found at the sites to reminiscing on their own life experiences. Visitors contributed many rich recordings of them reminiscing about experiences in their own lives. For example, Vignette 5 shows the Murphy family mentioned previously in Vignette 5 at the Mountain Farmhouse. Emma is looking for memories to collect while June rests on a bench in the kitchen. Emma then comes back with another memory on the phone that leads June to reminisce about the use of christening gowns in her family. As she talks, Emma records what she says.

Emma collects a memory about using linen tablecloths during special occasions and brings it to June for her to listen to.

Emma: “Listen to this”
June: “Oh Yes, yeah” (Listening to story),

This prompts June to begin telling a story about how linen was used, and the process of washing and drying linen tablecloths.
Chapter 6 – “Reminisce”: the visitor experience

Emma collects another memory. She comes back and plays it for Mary and June.

The memory is from the Bean an Tí and it is about making clothes, blankets and Christening Gowns

When the memory has finished playing, June tells a story about how her own mother’s christening gown was used to christen her children and grandchildren. As June talks, Emma records what she says.

Mary to June: “Can you remember who’s Christening robe did we have?”

June: “It was my mother’s Christening that I was christened in. Yes. I got it and it christened my two sisters and brother. And it went down in the family then and christened all my children. And it christened my grandchildren; it christened Emma here and Paul. It did it christened all the grandchildren. And it christened other people who got the loan of it in between times, you know. I don’t know how many people it christened”

Figure 38: Vignette 5 “Can you remember who’s Christening robe did we have?”

We can see how the visitors could relate to the memory about the christening gowns that is intrinsic to lives of the people who would have lived in the place and how it provoked reminiscing around their own life experiences. It sparked Mary to think about her own experiences and she inquired about the specific gown she would have used for her children. June then gives a very rich description of role of the christening gown in their family emphasising the significance of the story by including references to both Emma and Paul. We can see significance of the story to Emma as she attentively records it. This also came through at the end of their visit during discussions a member of the research team had with June and Emma.
Researcher: “So did you enjoy your day out?”

June: “I did, I think we had a great time. I’m glad we came over now…
[To granddaughter] Did you enjoy it Emma?”

Emma: “yeah it was good. It reminded me of my primary school in there.
[Referring to the Schoolhouse]”

June: “Did it”

Researcher: “And what did you think about listening to your granny’s memories.”

Emma: “that was good”

June: “Oh she’s sick of listening to me”

Emma: “No I’m not, I love listening to you. You and granddad.”

June: “Granddad is the one. They’re taping his memories. Paul is taping
his memories at home.”

We can see how Emma enjoyed listening to aspects of her grandmother’s life that she otherwise might not have had the chance to discover. The memories not only encouraged gathering knowledge about the sites that visitors are situated in but as visitors could relate to the accounts it spurred them to share related knowledge from their own lives. In vignettes 4 and 5 we see the different roles that the family members take in the use of the artefacts that support the visiting experience. We can see how the Emma acts as the operator of the Mobile Device; collecting memories, recording content and co-ordinating its use so the members of the family could listen to and record memories. This never really changes throughout the visit; her mother and grandmother seem fine with her handling the device. Whilst Emma operates the Mobile Device, June and Paul orientate the group’s interaction with the map discussing it and allowing Emma and Mary to view it.

The recording of memories or reflections by visitors were not only sparked by the character’s memories present at the site but also by what visitors encountered at the sites themselves. Therefore we can see how the overall theme of a memory trail merges well with the broader picture of the visit – including artefacts, places and activities that were not included in the Reminisce prototype. We can see an example of this in Vignette 6.
John and Elizabeth, a married couple, arrive at the Schoolhouse they immediately comment on how similar the Schoolhouse was to where they were educated.

Elizabeth: “Just like my school days”

They then recorded their own reflections on the place and what school was like for them.

Elizabeth: “This is just like my school days, we had chalkboards event still.”

Figure 39: Vignette 6 “Just like my school days”

So in this case the recording of a memory was not associated to the presence of a character’s memory marker, but the participants “bought in” to the activity and took the opportunity to record content even if not directly prompted by the phone app. We can see from Vignettes 5 & 6 how visitors’, especially older visitors, could relate aspects of their own lives to the characters’ accounts and to the place. This correlates with interactions already occurring in the place where older visitors could relate the site and artefacts they encounter to their own lives. As they are of an age where they would have experienced similar scenes in their own lives, naturally they would have rich experiences about the different sites, artefacts and activities that were present in the Park.

Visitors seemed to value the memories they collected and the reflections they recorded and were interested in using what they assembled during their visit as mementos of their visit. They were particularly keen in being able to access them
when they left the Park and being able to share them with others. For instance, when John and Elizabeth who were mentioned previously in Vignette 6 finished their trip around the Park they returned to the portal and logged out of the Reminisce app on the phone. They then began reviewing the memories they collected and recorded. When they found out about the Web Resource and discovered that they could share the content they collected, Elizabeth immediately asked a member of the research team: “Can I show it to my sister?”. She was specifically interested in accessing what they had accumulated in the Park after their visit and in particular to share this content with her family and friends.

Based on the examples outlined above we can see how the installation formed another layer to the visitors’ interaction providing an unique resource that offered a human perspective on what visitors encountered which allowed them to discover and learn more. We can see from Vignettes 3 & 4 how it helped visitors relate more to what they were interacting with at the different sites and make sense of these if these encounters. This resonates with the major issue that emerged from the field studies; the lack of resources that can help visitors gather knowledge about the sites they visit so they can understand how people would have lived in them.

The installation encouraged a salient aspect of older visitors’ interaction in the place; the sharing of their life experiences and knowledge based on their encounters in the Park. We can see from Vignette 5 & 6 how the installation provided a resource for these older visitors to record, document and share their rich insights with other visitors. We see from Vignette 3 that this functionality was used as a resource for other visitors who may not have had memories of the sites to reflect and document their experiences for sharing with other visitors and for taking away with them as a description of their visit.

The role of technical Assembly was to “accompany” the visitors around the Park offering the functions to collect, listen to, record and archive the accounts that visitors gathered as they moved around. From some of the vignettes presented earlier (3, 4, 5, 6), we can see that the support and functionality of the Mobile Device was quite appropriate. The interaction with the Mobile Device to listen to and record memories
seemed to be quite straightforward for most visitors, with them taking little time to figure out how to use the device. Also the attributes of the Mobile Device correlated with the collaborative nature of visitors’ journeys around the Park, the device could be shared easily among visitors and the loudspeaker facility meant that many visitors could listen at once.

The basic task was the searching for and collecting of memories by the visitors, and the combination of the Mobile Device and the QR marker was successful in this respect, providing an uncomplicated mode of interaction that allowed visitors to actively explore the physical spaces for memories. We see that visitors encountered the makers in the natural flow of their visit and this form of interaction disturbed very little of the existing visitors activities. The installation didn’t bring any significant change to the landscape as visitors journeyed around the Park. The physical footprint of the markers was minimal and the Mobile Device merged easily with the visiting activity. It did not interrupt their viewing the sites and artefacts in them nor did it force them to carry out exercises outside of the current visiting activity. Though the markers were placed at prominent locations at the site from our study they did not seem to cause too much disruption to the qualities of the spaces. None of the participants or visitors to the site during the study expressed any negative comments about them. Thus they did not seem to effect the recreation of traditional sites, which is the keystone of visitors’ interaction in the place. Though many visitors who were not participants in the study did express an interest in their purpose.

This process of interaction that was based on the visitors’ own interest in collecting a memory of a character provided visitors with a lot of autonomy over their interaction with the installation. They could choose when and where they would like to hear from the character of interest. This scanning of the QR markers was quite in keeping with the place as the use of phones and cameras to take pictures is something that is prevalent in the place. In Vignette 7, we see husband and wife Danny and Mary, visiting Loop Head Farmhouse with their grandson Robert. We can see how they carry out normal visiting activities of walking around appreciating the site, identifying artefacts and discussing them. They only engage with the installation when they wished.
Danny, Mary and Robert come to the Loop Head Farmhouse and notice the marker beside the entrance to the building. They scan the marker to collect a memory and then they listen to the memory.

They enter the house. They begin exploring the kitchen space and talk between themselves about the artefact and the features of the building.

Mary: “So look that’s where they cooked, in here in the open fire, they had the pot over there. They’ve coals in there. Come over here and feel the heat. [To Robert] Put your hands down there. Do you feel the heat?”

Danny: “It’s a very high roof it must be cold enough.”

They then move into the bedroom space and again discuss what they find there.
They move back into the kitchen space and discover another marker (see circled) by the back entrance to the house. They scan the marker and listen to the memory. They then leave the house…

Outside they begin looking at the outbuildings the surround the house.

Mary then asks her grandson, Robert: “Where’s the next clue?”

Robert: “Its up here!” [Pointing to the entrance to the creamery]

Mary: “Oh, it’s up here, oh brilliant. Do you know how to do it now?”

Robert then scans the marker and the memory of the farmer talking about milking cows is displayed.
Then move into the creamery and listen to the memory while viewing the space:

“We’d let the cows graze in the open fields all year round and we’d milk them morning and evening. If by chance they had eaten turnips the milk would be very strong we’d add salt to mask the taste”

Figure 40: Vignette 7 “It’s a very high roof it must be cold enough.”

We can see in vignette 7, the group could notice the markers quite easily as they moved around the site. But they only chose to interact with the installation at different points based on their own preference. We can see how they could switch their attention to appreciation of the site and how it was up to them whether they collected more memories, offering them a level of control over their activities in the place.

The portal acted as both a start point and point of return for their journey. Here visitors could transfer the content they gathered during their visit from the Mobile Device to the portal so it could be reviewed and shared through the portal and the Web Resource. In the case of John and Elizabeth mentioned previously we can see how interested Elizabeth was in reviewing the memories she collected and recorded during her visit, we can see how the email facility allowed her to email the Web Resource details to herself and to friends so she could access it after her visit. Visitors were particularly interested in using the Web Resource after their visit to access what they assembled.

6.2.2 Sustaining coherence and creating connections

The Clue Packs provided an interesting resource for visitors, giving them tangible souvenirs from their visits to the sites. These souvenirs represented aspects of how people would have lived in them. These tokens could be kept as mementos of the participants’ visit if they wished, providing them with a tangible connection to the
lived in aspects of the place, sometimes this allowed for a relationship to develop between the sites and the visitors’ own lives. For instance in vignette 8, the Murphy family is visiting the Golden Vale house, then Emma finds the Clue Pack with a recipe for “Porter Cake” inside.

Emma finds the Clue Pack opens it and finds a recipe for Porter Cake, a typical cake baked traditionally by a Bean An Ti. She then shows the recipe to her Mary and June.

Emma: “Porter cake!”
Mary: “Porter cake?”

June (to Emma): “ah yeah”
June: “You should make that now Emma when you go home”
Mary: “I’ll make it”
June: “No let her make it, anybody can make that”...

June: “You keep that now and make it, it’s really nice and ‘tis easy make”
Emma: “Ok…We’re going to the school next”

The family then move off to the Schoolhouse.

Figure 41: Vignette 8 "Porter Cake!"

In this case we can see that the recipe provided Emma with a basis to discover more about the traditional cooking activities by prompting opportunity to carry them out that was encouraged by her Grandmother. June knows the recipe but it’s apparent from the way she specifies that Emma should take the recipe and make it that she wanted to impart some of the knowledge that she knew to Emma.

The visitors developed rich sensory relationships to some of the tangible objects and they seemed to really value these as mementos of their interaction in the place. For example in Vignette 9 we see Anna in the Shannon Farmhouse, she collects the Clue Pack that consists of a piece of turf.

Anna examines the Clue Pack.

Anna: “It’s a little piece of turf”
Anna opens the bag and puts it to her nose. She then inhales the smell of the turf.

Researcher: “You can burn it at home”

Anna: “Oh definitely I will”

Figure 42: Vignette 9 “It’s a little piece of turf”

She immediately opens the pack and inhales the aroma of the turf. We can see the deep sensory relationship that Anna develops with the turf, she enjoys being able experience the turf and being able to bring a piece of it home with her that she can use after her visit.

The tangible clues packs were displayed at prominent locations at the houses so they would be clearly noticeable, when visitors entered a house they would be on the look out for a Clue Pack. After spending their desired time at a house, visitors rarely moved on without using a Clue Pack and the map to ascertain at what house they would find more memories from their character of interest. For example in Vignette 10 the Murphy family are visiting the Loop Head House, they collect a memory at the doorway then begin to explore inside the house.

Mary and Emma gather around the freshly baked bread on the table in the kitchen. Emma notices the basket used to hold the Clue Packs on the windowsill behind the table. She then removes one of the Clue Packs and opens it.
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<table>
<thead>
<tr>
<th>Emma: “I found the clue”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary: “Did you? What is it?”</td>
</tr>
<tr>
<td>Emma: “Life in the mountain is difficult during the winter”</td>
</tr>
<tr>
<td>Mary: “So where do we go next then?”</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>June: “Show me”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emma: “Mountain farmhouse No 5”</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>They continue to explore the site. Emma collects another memory from the Bean An Tí of the house talking about making Griddle Bread. She brings it back to June for her to listen to.</th>
</tr>
</thead>
<tbody>
<tr>
<td>June: “Oh yes, yeah”</td>
</tr>
<tr>
<td>From June’s reaction we can see how much she enjoys listening to the memory and could relate to characters memory.</td>
</tr>
</tbody>
</table>
As they leave the site, they discuss about where to go next. Paul and Emma show June where the Mountain Farmhouse is on the map and they move off to that location.

*Figure 43: Vignette 10 “I found the clue”*

We can see how they explored the site as usual but they were aware of the Clue Pack and the fact that it may present them with something interesting. We can see how they walked around the site appreciating the place and yet were still able actively engaged in the activity. Again another example of how the activity provided a subtle layer to the visiting activity that was in tune visitors emplaced interactions. Generally visiting groups would come together to discuss the next site with the map and the Clues Packs as the focal points of the discussion. For example in Vignette 10 we see the family coming together twice to discuss about where to go next. The process of working out clues and searching for memories became a preferred activity for some visitors, especially younger ones. Generally in a group situation one individual would take control of the Mobile Device, seek out the memories and then after collecting them bring them back to the group for them to listen. For instance in Vignettes 5 and 10, the family is visiting the Mountain Farmhouse and Loop Head Farmhouse, in these cases Emma takes control of the Mobile Device, she searches the houses and locates memories which she then brings to Mary and June to listen to. In a similar way she searches for the Clue Packs.

Guiding visitors to sites where memories were located for their particular character was a fundamental feature to be supported by the technical Assembly. The portal and the Clue Pack were pivotal in this process. The portal provided the visitors with the initial clue to direct them to their first site on the trail. After the initial clue, the tangible Clue Packs placed at the houses provided the structure to guide visitors. In
Vignette 10 we see an example of the Clue Pack being used, visitors seemed to understand quickly the role of the packs and their use. Another significant role of the Clue Pack was to provide the visitor with a record of the sites they visited and to represent these specific sites during the visitors’ interaction with the interactive desk. The use of the interactive desk was tightly linked to the Clue Packs thus providing a sense of coherence between visitors’ interaction at the sites and their interaction at the desk. As interaction was based on utilising elements that they already encountered this provided the visitors with a “buy-in” to the interaction with the desk.

The purpose of the Clue Packs was to guide the visitors to characters memories whilst offering them another point of engagement with the site and a tangible keepsake of Reminisce that they could hold on to. The tangible packs also provided a platform to support interaction across the subsets of the activity and the interactive components of the Assembly. The Clue Packs were a coherent factor in the visitors’ interaction with the installation.

### 6.2.3 Sharing reflections

Visitors seemed particularly interested in the content recorded by other participants, their memories, stories and reflections provided different perspectives on what they encountered during their journey around the Park. This content had strong ties with what the visitors had just experienced, for example in Vignette 5 the memory recorded about the christening gown that stemmed from the character’s memory about making blankets, sheet and christening gowns, this meant the visitors could relate quite easily to what other visitors had recorded and thus their interest was sparked. As the Clue Packs acted as keys to playback the recordings from particular sites the listener could select recordings related to particular sites of interest to them.

In Vignette 11, Anna places the Clue Pack relating to the Mountain farmhouse in the basket on the desk. Immediately a recording made at that site is played, the recording is of a male visitor reminiscing about when was younger he used to go picking hops. Anna immediately notices this and leans in more to the table to hear what he is saying.
Anna places the Clue Pack she collected at the Mountain Farmhouse into the basket. A recording is then played of male visitor talking about when he used to go picking hops.

Anna: [To researcher] “That’s the, [inaudible]… is that the Mountain farmhouse?”

Then Anna, leans in more to listen to the next memory a visitor left at the Mountain Farmhouse:

“I still have my wedding dress my mum made it. And keep it up in a box in the roof of our house. I don’t think I’ll ever wear it or have ever worn it again but it was such a special thing that she did that for me and she made all the bridesmaid dresses as well, lovely.”

Figure 44: Vignette 11 “Is that the Mountain farmhouse

Through listening to the memory Anna relates it to the Mountain Farmhouse. We can see that Anna developed a bond with the site, she could associate the activities outlined in the visitor’s memories to what she experienced at that particular site. So
she listens more attentively to see if she can learn more. We can see how the installation “assembled” together people’s experiences of the place as they journeyed around the sites (the houses, artefacts, characters’ memories, etc) with other visitors reflections.

Another example of the interest in other visitors’ reflections and the assembling together of people’s reflections can be seen in Vignette 12; here the Murphy family are at the Schoolhouse. Emma places one of their Clue Packs into the basket to start playing back memories.

| Emma places a Clue Pack in the basket and a memory starts playing. |
| As the memory plays the whole family listen, the memory is from a male visitor: |
| “It reminds me of hop picking in Kent, again hard work but what a lot of fun. Kids from London, kids from Kent we all played together it seemed to last forever six or seven weeks of the summer, lovely” |
After the family leaves the Schoolhouse, one of the researchers talks to June about what she heard at the desk.

June: “Yeah from Kent, a totally different memory I’m dwelling on what I see in the house and say oh yeah I remember that. But he had a different way of looking at it.”

Researcher: “And what did you think of that?”

June: “I thought it was very good, very good. Because it has to be different from another person’s viewpoint and it make it more interesting for me.”

Figure 45: Vignette 12 "He had a different way of looking at it"

We can see that even though June had her own knowledge and had a good understanding of what she encountered in the place she was still interested in what other visitors had to say about things she saw. We can see how the installation supported social exchange between visitors around the site, artefacts and activities that they encountered in the place.

At the interactive desk we can see from Vignettes 11 and 12, that visitors found the ways in which the memories were presented was quite understandable. The visitors’ interaction with the desk was significantly different from the interaction with the Mobile Device. But the chalkboard placed on the desk provided them with instructions on the placement of the notebooks and the Clue Packs. The use of the desk was tightly linked to the Clue Packs collected during their visit around the Park. As mentioned previously the Clue Packs presented visitors with a “buy-in” to interaction with the desk. Given the setting of the desk, it was important for its design to maintain the character of the place. From our observations, visitors did not find the desk out of place in the setting; the elements of it seem to integrate well with visitors’ interactions in the place. For example, the Schoolteacher asked to have a collection of Clue Packs that he could use to let these visitors hear the recordings. On numerous
occasions he used these clues to allow visitors that were not participating in the Reminisce trial to listen to the memories recorded by other visitors.

One particular element that seemed to integrate well with the Schoolhouse and the visitors’ interaction with the desk was the notebooks. The two notebooks each represented a character of interest, each notebook contained archive photographs of either farmers or women whose life experiences would have a direct relationship to the memories developed for each fictional character. In Vignette 13 we see Anna at the desk. She carries out a thorough examination of all the photographs in the notebook of her specific character of interest, the Women of the houses, before using the book in her interaction with the desk.

![Figure 46: Vignette 13](image)

Visitors were particularly interested in the photographs that typify the characters, specifically the individuals and the activities represented in the photographs. They seem to be interested in getting some visual representation of the characters whose memories they would have been listening to. The content of the books tended to spark discussion among visitors within their social groups. For example in Vignette 14, the Murphy family are at the desk; the Emma is showing June the images in the book.
Emma: “Look at this Gran”
June: “What’s that?”
Emma: “It’s a picture” [describe the picture quickly]

June: “Oh yeah I remember seeing that and I remember seeing somebody using one of those” (Pointing at the spinning wheel) “I remember being at somebody’s house and that being done.”

We see how the books added another layer to what people could assemble together to get a sense of the people that would have lived in the sites. Again it shows how the Assembly provided coherent representations by centring the activity on the specific characters of interest.

6.3 Discussion

In the beginning I mentioned I was interested in investigating two main aspects of Assembly:

1. Did the overall activity engage and add value to what visitors already experience at the Park?
2. How well did the prototyped infrastructure support this activity and interaction across it while in keeping with people’s interaction in the place?

In the previous section, I discussed theses through a set of “interactional themes”:

• Sense making in place
• Sustaining coherence and creating connections

• Sharing Reflections

In this section I present three themes around which I examine visitors interactions with the Reminisce installation. The selected themes helped reflect on the decisions that were made during the design process that were guided by reflecting on the themes of Assembly and the appreciation of the Park as a place. The purpose of this was to analyse the worth, to design practice, of the Assembly concept that incorporated an appreciation of people’s situated activities and whether this approach could lead to positive design results. In the previous two sections I have outlined the role of the installation in the visitors activities at the Park and how the technical infrastructure supported it. I have also showed how the appreciation of people’s interactions in the place supported by the design sensitivities emerged through the qualities of the installation.

In this section I will discuss whether the design decisions that were made led to positive outcomes. The need to provide an activity and an information space that visitors could actively participate and reflecting on the design sensitivities shaped the scenario that emerged from the Brainstorming workshops. We can see from the previous sections by employing a well thought-out activity for people to engage in, the broader visit was augmented: participants dedicated time and attention to elements of the houses that were not explicitly involved in Reminisce, showing how the theme of the activity served as a means of engagement beyond the installation. Visitors who were not directly testing the installation were curious about the presence of the technology, which did not interfere with them but tickled their curiosity on the theme and content. Moreover, Reminisce acted as another layer to the visitors’ activities bringing aspects of the sites to the fore through the point of view of a human character, albeit fictional.

The visitors actively participated in the trail and engaged with the knowledge embedded in the characters memories and the reflections recorded by other visitors. These accounts provided them with a greater appreciation of what they encountered during their visit. To some extent we can see how the activity addressed the issues
outlined through design sensitivities, specifically the need to provide visitors with a greater understanding of what they encountered at the Park.

The principle of having an array of interactive components each supporting a part of the overall experience provided a basis that guided the prototyping phase during the design process. The other prototyping Assembly theme emphasised providing forms of interaction that complement the visitors’ situated actions and that assimilate with each other. Along with the design sensitivities these themes guided design decisions made during the progressive development of the technical Assembly.

For example, a core interactional quality of the installation was the searching and collecting of memories using the Mobile Device and the QR markers. Initially during design conceptualisation the scenario for collecting memories involved the visitor having a Mobile Device “pinged” with an alert when they entered a location where a memory existed. But when reflecting how this form of interaction mediated the characters memories to the visitors it was decided that a more active form of interaction was needed more in keeping with the visiting activity. This was then changed to a more physical process that engaged the visitors more with the physical space, moving close to artefacts of interest and beginning to associate QR markers with relevant contextual information. We can see that this mode of interaction did engage people in exploring the space and the process of naturally encountering the memories seemed to be more in tune with the visitor activities rather than passively waiting for digital cues that could disturb their visit. Also given the onus was on the visitors to collect the memories, they had more autonomy over the interaction.

In the initial design scenario rather than having the interactive desk in the schoolhouse, it was to be the Mobile Device that offered a facility for participants to listen to the content that other visitors had recorded. But reflecting on the interaction that was occurring with the Mobile Device as visitors moved around the Park the decision was made to separate this functionality. This was to prevent visitors from being overloaded by content from the Mobile Device during their journey and to provide a separation between the two genres of memories and the two types of interaction (dealing with the characters and dealing with peers).
Also when reflecting on the prototyping principles a new concept emerged to add the overall activity: the notion of providing a resource that could allow visitors to access the content they created after they left the Park. We can see how visitors found this particularly good as most wanted to access the content afterwards to review it and to show family or friends.

Again through reflecting on the Assembly themes associated with how interaction could be supported and assimilated across the installation an issue emerged based on interactional separation between how people interplayed with the character memories at the sites and how they interacted with the visitor-recorded content at the school desk. Further design decisions were made to change the form that the clues were given out in. The concept of the tangible Clue Packs then emerged: their primary role was to bring together the visitors’ interaction that occurred progressively at the specific sites, and finally their interaction at the desk. The separation seemed to work well: visitors could understand the role of the desk in mediating the recorded content and it fitted well into the Schoolhouse environment. From my observations the visitors found the use of the Clue Packs to interact with the installation to be quite coherent and served to bring together the two loci of interaction.

From this analysis the way the Assembly concept guided the design process and the points of reflection that it introduced did provide favourable design results. The appropriation of the concept focused design practice on offering ways that visitors can assemble knowledge during their visiting activities and how technology can support this.

### 6.3.1 Issues for critique

Some issues arose around the clues concerning their accumulation as visitors progressed around the Park specifically single visitors and small groups. Visitors gathered Clue Packs at each site, the packs themselves were not very large or burdensome but when it came to handling them in conjunction with the Mobile Device and the map they could become quite a handful. For example in Vignette 15 we see Anna at the Shannon Farmhouse using the Mobile Device to save a memory she just recorded whilst having to hold the map and a Clue Pack. She then has to put
the Mobile Device on the table in the farmhouse kitchen to be able to open the Clue Pack. Then we see her move on to the Golden Vale Farmhouse where one of Reminisce team members had to help her in handling the Clue Pack.

![Images of visitors with Clue Packs]

**Figure 48: Vignette 15 handling the Clue Packs**

Certain usability issues arose with the operation of the Mobile Device. The keyboard displayed on the devices touch screen was quite small some visitors had problems in using it to annotate the memories they recorded. Visitors had difficulty with the volume control on the device. It was positioned at the side of the device along the edge where visitors would hold it so some time they would press the volume control by mistake. In many cases lowering the volume without knowing thus making the memories inaudible.

Another audio issue arose at the School Desk, the volume of the audio that the desk produced was sufficient. But since the School House was an old building it had extremely solid and thick stonewalls that reflected much of the audio around the room causing some difficulty for visitors in listening to the recordings.
The observing and shadowing of the study participants involved two members of the research team accompanying them as they journeyed around the park using the installation. A main objective for the research team was to cause as little interference as possible to their visit. To ensure their use of the installation was observed in the most natural way possible we tried to make sure that they were relaxed and were not overly aware of the research team. But of course in such a study it is very difficult for the participants to ignore the research team’s existence and it is difficult for the research team not to interact with the visitors at some level. Thus some amount of interaction occurred between the research team and the participants during the evaluation.

For example, at some stages when participants were using the mobile device to scan a QR code they could be in a site with very low lighting, or daylight could be reflecting on the surface of the QR code making it difficult to scan the code. If visitors could not successfully scan the code a member of the research team that was observing would step in and provide directions about the angle of the device, the distance between the QR code and the device, etc. This would generally rectify the problem. Another example, relates to the issue outlined previously in Vignette 15, where participants visiting on their own would find it difficult to handle all the Clue Packs at which point a member of the research team would intervene to assist them. Reflecting on these interactions, I do not believe that they unduly affected the research study. Once participants understood the interaction with the installation and given the engaging nature of the site they became unconcerned about the existence of the research team, focusing more on what they encountered as the moved around the Park.

As a researcher it is difficult when you are involved in a project for a long period of time to remain free of your preconceived ideas about how the system should be appropriated and used, and the ways visitors should interact and perceive its use. In both studying the visitors and analysing the collected data I tried to be aware of this influence and be as open minded as possible concerning how people used the system. I was very much immersed in the both the design, the evaluation on site and the analysis of the data. So during the study and analysis I tried to introduce researchers
who were not as deeply involved in the design case and the design approach, so an objective view could be taken on what occurred during the study.

When carrying out the study a key member of the observation team had no part in project up to that stage, and she was involved in the majority of the observations. Also during my analysis of the field study data, I carried out the analysis in collaboration with a senior researcher who did play a significant role in project but was not as acutely involved in the design and development as I or as connected to the design approach. This helped me to take a more open perspective on the observations and analysis of what actually happened in the site.

Given the scale of the installation and the resources available to recruit participants, it was not always possible to get visitors who were visiting the site on the days of the study to participate. There were numerous reasons for this, time constraints, language difficulties, etc. So it was necessary to recruit participants outside those who would genuinely be at the site on the days of the study.

So a significant amount of participants were scheduled to visit the site and partake in the study, these participants mostly consisted of university staff and students who had some awareness of the research team’s goals and in some cases had working relationships with the research team. This may have influenced their interaction with the installation and their engagement with the site. But again I feel that given the way that these participants engaged with the Park and the installation that this relationship with the research team did not excessively interfere with their visit to the Park and their use of the installation.

A description of the design brainstorming workshops is presented in chapter 5 section 5.2.1; these workshops formed the basis for developing the design concepts that were focused on adding value to the visitors’ activities. A key aspect of these workshops was to gather together as much insight into the visitors’ experiences of the Park and what was occurring there, and then use this as a basis for design. All participants had visited the Park and had first hand experience what it was like. Of course a group that would have given us a huge insight into what would add value to the visitors’ interactions in the Park would have been the animators. They have direct contact with
the visitors; from our field studies and interviews with the animators we found that they’re insights were very valuable. Though we were able to talk to the animators on site and have an in-depth discussion with a senior animator off-site we were unable to get an animator involved in the brainstorming workshops. This was due to the timing of the workshops and the availability of the animators. I don’t believe that this had an adverse effect on the final design but it meant a group stakeholders who would have made a valuable contribution were not involved in the design process.

The Park itself is arranged in the form of a trail that is interweaved around numerous paths in the Park. The map that visitors receive when they enter the Park illustrates this trail and the paths; each site in the park is represented on the map and numbered. So this forms a logical trail that most visitors follow as they journey through the Park. Of course some visitors also follow their own paths through the Park encountering the sites in a more ad-hoc fashion. The installation, through the Clue Packs, served to orientate the visitors to the specific sites where memories were located. This may have caused them to strictly follow the trail set out by the Clue Packs so they may have neglected some sites that were set out on the map trail. Thus the installation may have taken away from their appreciation of the site and compromised the character of the Park itself.

A key aspect of the final installation was the separation between how visitors listened to the character memories, using the mobile device, and the reflections and memories recorded by user visitors, through interacting with the School Desk. This separation was a key design decision to make sure that the installation would not take away from their appreciation of the sites and cause them to disengage with the installation by overloading them with content at the sites. This separation also provided visitors with a perceivable separation between the scripted recordings from the characters and the visitors own recordings.

But this separation may also have had an affect on the visitors’ appreciation of the recordings made by other visitors. Visitors interacted with the content at the schoolhouse rather than the sites where the content was recorded. So visitors may not have been able to fully relate to what was said in the recordings as the visitors’
reflections generally had a strong association with the sites where they were created.

From my study I have shown the worth of the assembly approach for helping to structure design around import aspects of designing interactive components that enhance people’s experiences in public spaces. Specifically how the Assembly principles can focus design on understanding the activities that people are engaged in and developing technologies based on the elements of these activities that require support. The Assembly framework is particularly suited to situations where design is focused on understanding of how people’s activities can be enhanced at an activity level, it is an open approach orientated around interaction rather than technologies.

Specifically understanding how an array of interactive devices may be formed that can mediate interaction in a way that adds value and is in keeping with a situated activity. If design is focused say, on developing a single standalone installation, the Assembly principles might not be as applicable as the form of interaction is already prescribed. Thus the focus is not on the activity that people are engaged in and understanding how interaction can be distributed to support it but on the design of an individual interface and the technology. This negates any concerns that attempt to structure interaction in a way that fits with people’s activities as the form of interaction is already prescribed. Thus the Assembly approach is most suited to cases where an open approach is taken to design. Design that is not technologically focused but aims to understand how people’s activities in a public setting can be coherently supported by interactive technologies.

The Assembly framework is very much linked to the well-established User Centred Design (UCD) process. The framework acts as a new layer to this process, providing a new structure to reflect on important aspects of an evolving design. An issue concerning the appropriation of the framework is how to make sure that adequate time is given to reflect on the principles in junction with the established UCD activities. The UCD activities are quite demanding thus introducing another layer to the process might add to the workload. But based on my application of the approach I found that framework had quite a logical relationship with the UCD activities and so should not have an adverse effect on design activities. The conceptual principles are
very much linked to the conceptual phases, activities such as brainstorming and concept generation, whilst the prototyping principles are very much linked to reflection over the prototyping phase, activities such scenario development and storyboarding.
7 Reflections and Conclusions

In this thesis I explore the Assembly framework: I have demonstrated how through its extension and application it can support design practice to develop ubiquitous technologies that add value to people’s activities in public spaces. I have attempted to show the relevance of the Assembly framework in structuring design practice so that it is concentrated on supporting people’s activities and creating an interactional infrastructure that is in tune with their emplaced interactions.

In the introduction of this thesis I outlined a set of research questions:

*Are there human centred frameworks that can aid design practice in developing interactive technologies that support and add value to people’s activities in public spaces?*

*Can an extension of the Assembly approach (Fraser et al 2003) help structure design practice so the emphasis is put on the affects of a design on people’s situated activities?*

*How can the Assembly framework be grounded on an appreciation for people’s situated interactions?*

I will now present some concluding reflections and remarks.

### 7.1 Summary of the thesis

In Chapter 2, I provided a review of existing literature on the key themes and issues relating to design of interactive systems in public spaces. Examining the design frameworks that emerged from this work I identified a need for further research on framework that can help structure design practice so the experiential aspects of a
design intervention can be emphasised over technical development. I then described in detail the approach proposed by Fraser et al. (2003) for supporting people’s experience in museums centred around the concept of “Assembly”, which I adopt as basis for my contribution.

In Chapter 3 I analysed the Assembly framework on the basis on my own design practice. Through reflection on previous experience of designing an interactive installation for a public place, I outlined the significance of the Assembly design concerns. I proposed the extension of the Assembly framework to provide a more fully developed approach that can be appropriated to structure and support design activities for public spaces.

In Chapter 4 I introduced my main design case – Reminisce at Bunratty Folk Park. I described the site and presented the unique qualities that it offers visitors. I then described how the Assembly concept and the place-centred approach that I adopt for appreciating people’s situated experiences guided my approach to the field studies and served to inform my design activities.

In Chapter 5 I described how the extended Assembly framework was used to support the design of the Reminisce installation for Bunratty Folk Park. I described how the extended Assembly concerns were used to form a structured approach to conceptual and technical development. Specifically, I showed how they could be appropriated to help structure and guide how the visitor experience is supported.

In Chapter 6 I carried out a detailed analysis of the interactions that occurred with and around Reminisce. I illustrated how the installation augmented people’s situated activities and the role of the installation in supporting people in making sense of and finding meaning in what they encountered. I examined the qualities of the installation that were central to this augmentation and I illustrate the how the Assembly framework served to support the development of these qualities.
7.2 Thesis Conclusions

In this thesis, I explored the extension of an approach to support Interaction Design practice in designing for public interaction; I have carried an in-depth analysis and critique of the Assembly framework to illustrate its significance in supporting the design of ubiquitous computing technologies. In my conclusion I will reflect on the research questions that I presented at the beginning of this thesis.

Are there human centred frameworks that can aid design practice in developing interactive technologies that support and add value to people’s activities in public spaces?

At the beginning of this thesis, in Chapter 2, I examined the literature concerning the design of interactive technologies in public settings. This body of research touched on a wide range of subject matter; in-depth studies of people’s interaction in public spaces, design implications for public interactive systems, and the design of interactive systems in cultural heritage sites. Though there was a large amount of research that provided interesting insights into public interaction and outlined challenges and concerns for design, very little work has looked at more holistic design frameworks. Specifically approaches that could orientate design practice around supporting designers to reflect on how an intervention enhances people’s experiences of a public space.

My review of literature presented only a small amount of work that developed such a framework; this was the work by Fraser et al (2003) and Bowers et al (2007) who focused their work on the concept of “Assembly”. Their work was unique in that it offered a structured approach to both the conceptual and interactional development by providing open design principles that touched on both aspects of design. Initially, the principles outlined by Fraser et al focus on establishing a scenario interaction that visitors could participate in, to make sense of what they encounter within a public setting. Once this is established the principles turn to developing an Assembly of interactive artefacts that can support this scenario. This approach offers open points of reflection on both conceptual and technical development, which is something that I
did not find in other research that I reviewed. Thus in terms of frameworks that can aid design practice in supporting and adding value to what people do in public spaces, I found that this approach, centred on the concept of Assembly, the most insightful to emerged from my review of literature.

However when reflecting on the Assembly framework I felt that it needed to be developed; to refined and extend its principles, to understand how could it be appropriated into other design processes and how process of applying the framework could be informed about people’s situated activities. This lead to the development of my second research question:

*Can the Assembly framework (Fraser et al 2003) help structure design practice so the emphasis is put on the affects of a design on people’s situated activities?*

In this thesis I present two case studies of design interventions in public spaces to ascertain if the Assembly framework can aid the design practice. I used both of these cases to carry out empirical research to:

1. Analyse the applicability of the Assembly framework, critique it and to develop hypotheses on how Fraser et al’s approach may be extended to provide a more fully developed approach.

2. Examine the application of this extended framework by reflecting on whether the intervention that emerged did add value to people’s experience in the setting and whether the design decisions that were made by reflecting on the Assembly concerns contributed to this.

The first case study presented in Chapter 3 demonstrated the need to extend the Assembly framework. This extension centred on refining its core principles and introducing an approach that introduces an appreciation for people’s emplaced experiences into the framework.

The second case study presented in Chapters 4, 5 & 6 demonstrates the application of this extended approach. The results from my analysis of this study demonstrate how structuring design practice around the four extended Assembly design concerns led
(conceptually) to a design intervention that promoted sense making and (technically) to the development of an Assembly of interactive components that were appropriate to emplaced interactions. The “duality” of Assembly framework allowed for an initial focus on the experiential aspects that can enhance existing activities and evolving into the design of interactive components to support it. The examples of participant interaction I have illustrated in Chapter 6 show an array of interactions featuring personal reflections, emotional responses, fun and identification with the site and its character. Through these cases I build on the literature presented in Chapter 2, my contribution demonstrates the significance of open design frameworks that structure and support reflection over design activities in a coherent way.

I mentioned in Chapter 1 that this research emerged from my experiences of designing interactive technologies in public spaces. At the end of this work, I still believe that there is no “quick fix” design framework that will provide the perfect recipe for creating design interventions in public spaces, but I feel that there is a need for open design approaches that can structure practice so that the focus of design is human-centred rather than technologically orientated.

An advantage in appropriating the Assembly framework was in the openness of its concerns and it how they oriented (and not prescribed) design practice around not just designing interactive technology but on how human activity may be understood and technically supported. I found that rather than offering guidelines or concerns that could constrain design, the Assembly concerns offered subtle yet salient points to reflect on as the design process evolved.

The duality of the Assembly approach was a key feature: from my experience the “structuring” effect the approach had on the design process was fundamental, it allowed me to focus on developing the human centred aspects of the design, the scenario and the knowledge space, before moving on to technical development; the interactive components and coherent interaction. This was a crucial positive element, due to duality of both creative design practice and technical development in these sorts of developments. A salient aspect of the Assembly principles was their openness and their ability to be applied to difference design cases. But this gives rise to the
chapter 7 – reflections and conclusions

question:

*How can the Assembly framework be grounded on an appreciation for people’s situated interactions?*

A key aspect of the extending the Assembly framework was understanding how the reflection on the principles could be grounded in specific design cases. In Chapter 2, I examine literature on understanding the circumstances of people’s situated activities. The majority of this literature focuses on understanding the setting for interaction as not just a spatial container but as a lived environment. The most prevalent work to emerge from this body of research was that by Ciolfi & Bannon (2005). Their research provided the most developed approach to appreciate people’s interactions in public settings. Their place-centred perspective was significant in informing my reflection on the Assembly concerns. The approach of introducing the place centred “design sensitivities” into the design process proved an excellent foil to the Assembly framework: As the Assembly design concerns were open, thus applicable to many design cases, this place-centred perspective served to ground the reflection on the Assembly principles in the Folk Park design case study. My analysis in Chapter 6 showed how this appreciation for people’s situated interactions emerged through the design of “Reminisce” to actively engage and add value to people’s activities in the Park.

**7.2.1 Future work**

I am aware that given the time and project constraints I could not investigate in detail all the issues relating to the extension and application of the Assembly framework. Thus there are still aspects of the Assembly framework that needs further exploration. For instance exploring different methodologies that can be used to support the application of the framework. Specifically approaches that support the conceptualisation of activities, knowledge spaces and interaction, and approaches for evolving the prototype development whilst reflecting on the Assembly concerns.

When applying the Assembly framework to the case in Chapters 4, 5 & 6, I carried out most of the application of the framework and reflection on the design principles
on my own. A significant feature of design work in Interaction Design is collaboration and discussion during design activities. Therefore it would be interesting to analysis the role of the Assembly principles in supporting reflection on design practice in group design sessions and its role in supporting collaborative reflection.

This research was situated in the domain of interaction design in public settings and thus the application of the framework was only investigated when applied to public settings. But there are a vast amount of domains where the framework could be successfully appropriated to support design, specifically other types of public spaces, workplaces, domestic environments, etc. Investigating the usefulness and effectiveness of the framework when applied to these different domains is an obvious evolution of this framework.

The study of “Reminisce” illustrated interesting aspects of the visiting experience relating to the collection of personal reflections and memories recorded by people on site. Investigating how these reflections and memories engage people with exhibits and the management issues concerning this content brings up interesting themes relating to visitor created content and the curation of it. These could warrant further research to understand how best to deal with visitor-contributed content and its role in allowing others make sense of what they encounter in museums and cultural heritage sites.
References


Infrastructures and Applications for Smart Environments. Springer, Heidelberg. LNCS 4500


Tuan, Yi-Fu, (1977) Space and Place. The Perspective of Experience, Minneapolis: University of Minnesota Press.


Appendices
Appendix A - References to publications based on this doctoral research


McLoughlin, M (2008), “The Recipe Station: technology facilitating social

Appendix B – Descriptions of research projects

Shared Worlds Research project

The Shared Worlds research project, funded by Science Foundation Ireland, investigated the design, development, deployment and evaluation of novel interactive artefacts and environments in public spaces to encourage social interaction and participation. The research carried out during this project had a strong focus on design practices that supported community participation and iterative design process.

The project was carried out over a four-year period in which two public installations were developed. The approach to the design of these installations focused on community participation involving observations and interviews with a range of stakeholders. The first installation, the “Shannon Portal” was designed for Shannon Airport in county Clare, Ireland. The goal of this installation was to allow users to share their experiences of the West of Ireland. The installation took the form of a portal dolmen inspired by local history and landscape. It allowed visitors to use their own photographs or public ones to create “e-cards” that they could annotate and share with others through email. The portal provided a resource that entertained and engaged passengers.

The second installation, the “Recipe Station”, was developed for the Milk Market in Limerick city centre. The Milk Market is a 150-year-old farmers market popular among citizens for its produce, atmosphere and social experiences it nurtures. Understanding the nature of the space and how people experience it was central to the design. The recipe station installation allowed Market patrons to collect RFID tagged “ingredient cards” from stallholders that represented produce which they purchased. These cards could then be used to search the Recipe Stations database of recipes contributed by Market patrons to print out paper copies of the recipes to take home and use. The design and development of the Recipe Station supported interests and
activities that exist in the Market in a novel way. Specifically the social exchange around foodstuffs that is traditionally present in the Market was enhanced significantly. The station served to link patrons to other patrons and stallholders through embedding the peoples own content in the installation, placing the installation naturally in to the Market space and encouraging social interaction among the public.

Utility and potential of technology in outdoor exhibition sites project

The Reminisce case study that was presented was developed under two projects.

• The field studies carried out in Bunratty Folk Park were conducted as part of a feasibility study for the introduction of Information Communication Technologies at museums and other visitor attractions funded under a Failte Ireland\textsuperscript{10} thematic grant. An integral part of the project was the investigation of current visitor experience at Bunratty Castle & Folk Park, and the development of design recommendations and scenarios. The project was conducted in partnership with business/marketing experts and telecommunications engineers. The role of the design team from the interaction design centre was that of bringing human-computer interaction and interaction design sensitivities into the case study, examining the nature of visitor movements, social interaction and participation in the visit, and introducing issues of technological augmentation into the project. The project’s initial timeframe of twenty months allowed for a substantial amount of empirical fieldwork on site, in the Folk Park.

• A follow-up project funded by the University of Limerick Seed funding grant sought to examine the utility and potential of technologies such as smart phones, augmented reality and location-based services in outdoor exhibition sites. This project funded the subsequent design activities that lead to the development and deployment of the Reminisce installation on site.

\textsuperscript{10} Failte Ireland is the national tourist development authority of Ireland
Appendix C - Questionnaire Data

**Pilot Study (~50 people)**

**Visitor profile**
62% female; 63% over forty years of age
Nationality: 50% US; 25% Ireland, 8% UK + Remainder
For 83% of people this was their first visit

**Motivation for visit**
80% to experience Irish culture
70% learn about Irish History and appreciating the architecture

**Information needs**
73% would like more information on the history of the site

**Mobile phone use by visitors**
94% owned their a phone, 50% used them on holiday

**Main study (~200)**

**Visitor profile**
51% male 49% female, Majority were aged between 30 and 60 years of age
Nationalities: 37% Ireland; 24.5% USA, 16% UK, 14% other (83% of these were from Austraila & New Zealand)

**Service elements:** 21% Not satisfied with quality of information

**Information:** 74% would like additional information

**Comments:** The main motivations for visiting centred around experiencing Irish culture, Guided tour of castle sufficient, but level of information for the rest of the site falls short, 60% noted how additional information could enhance visit
Appendix D - Concepts and illustrations from brainstorming workshops

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- **Recording**
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  - Audio recorder
  - Mobile phone

- **Written document**

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  - Image
  - Drawing

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- **Access**
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Concept 3
Sketch 1
Sketch 2
Sketch 3
Appendix E - Storyboards

Storyboard 1
Storyboard 2
Storyboard 3
Storyboard 4
Storyboard 5
Sketch of desk
Appendix F – Reminisce: technical implementation

The Reminisce installation comprised of five main interactive components. In this section I will describe the technological implementation of these components.

The Central Portal

The User Interface (UI) for the portal was a desktop application developed using Adobe Flex that ran on a Windows based PC. A Java Enterprise Server (Glassfish v3.0) was also running on this PC that provided the technical backbone for the whole installation; it stored and retrieved data on demand for the Portal UI, the Mobile Device and the School Desk. It stored all the installations data in a MySQL database. It facilitated data exchange with the Portal UI using the Simple Object Access Protocol (SOAP) and it also provide data to the Mobile Device using a lightweight Representation State Transfer (REST) styled web service. The portal UI accessed the audio data (collected and recorded memories) through a Flash Media Server instance running on the PC; the media was uploaded to this server by the Mobile Device via a File Transfer Protocol (FTP) server that also ran on the PC.

The Enterprise Server, the Flash Media Server and FTP server were all networked to the Mobile Device and the School Desk via through a Wireless LAN so these components could access the visitors’ content (see Figure 49).
The Mobile Device

The Mobile Device used the Android 2.2 operating system; the Reminisce application was developed in Java using the device’s SQLITE database to store visitor data. The ZXing library\(^{11}\) was used to implement the QR code scanning functionality. The application used a lightweight REST web service provided by the Java Enterprise Server over a Wireless LAN connection to gain access to and store visitor data (profile data, collected memory data, recorded memory data). The application uploaded the audio content collected and recorded by the visitors by connecting to the FTP server running on the Portal machine.

Clue Packs

Each Clue Pack contained a clue and a souvenir (piece of turf, Griddle Bread recipe, etc). Embedded in the clue was a RFID tag encoded with a unique code that identified

\(^{11}\) ZXing is an open-source, multi-format 1D/2D barcode image-processing library implemented in Java. http://code.google.com/p/zxing/
the site in which it was found in. This allowed the Clue Packs to be used at the School Desk. Through the use of a RFID reader the desk scanned the RFID tag and collected the code from the particular Clue Pack, the desk then played back memories based on this code.

**The School Desk**

The School Desk was implemented on a Windows based PC. The desk had two RFID readers one placed underneath the basket for the clues pack and the second embedded in the book holder onto which the character books were placed. The desk recognised the Clue Packs by reading the code off the RFID tags embedded in the clues and recognised which Character book was placed on the book holder by reading the RFID tags that were embedded in the book. An Adobe Flex application gathered the data from the RFID readers and based on this data retrieved the memories recorded at the particular site by people who chose that specific character as their character of interest.

**The Web Resource**

The Web resource was hosted on a remote server. It consisted of a web application developed in Adobe Flash that implemented the same functionality as the Central portal. Similar to the central portal the web application connected to a remote Glassfish enterprise server that stored and retrieved the visitor data on demand for the application via SOAP. A remote Flash Media Server served all the media that was collected and recorded by the visitors to the application.