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OÉ Gaillimh
NUI Galway

***'Here. Now. Ours': interrogating the use
of situated Augmented Reality electronic-
literature to increase awareness of a
city's green, public spaces***

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"The value of information does not survive the moment in which it is new. It lives only at the moment; it has to surrender to it completely and explain itself without losing any time. A story is different. It does not expend itself. It preserves and concentrates its strength and can release it even after a long time."

Benjamin, Walter. "The Storyteller", in *Illuminations* (New York: Schocken, 1985) p.90

"We are also bound to seek perspective from those points of view, which can never be known in advance, that promise something quite extraordinary, that is, knowledge potent for constructing worlds less organized by axes of domination."

Haraway, Donna. 'Situated Knowledges...', in *Feminist Studies* (Haraway, 1988, p. 585)

"...we assert here that the digital humanities should not be only understood as the application of digital tools to the archival materials of the human past, but as a humanities that engages directly with the challenges of the present."

Rettberg, Scott. "Addressing Significant Societal Challenges Through Critical Digital Media", in *Electronic Book Review* (2020)

Abstract

The aim of this practice-based research is to investigate the use of *situated Augmented Reality electronic literature* (eLit) as a new way of increasing awareness of a city's green spaces in its citizens. Its hypothesis is that both its situated nature and the embodied nature of its Augmented Reality (AR) can make it effective in increasing awareness of those green spaces – as well as increasing *agency & civic will*. The use of new Augmented Reality (AR) technology combined with situated eLit brings an innovative approach to raising public awareness while also highlighting ideas about urban psychogeography, play, public and private ownership of urban environments, and surveillance capitalism. This hypothesis can also be formulated as the question 'Can eLit and AR increase awareness of the reader's shared public, green spaces and increase their civic will that, in turn, they act on?'

To answer that question, this research includes both a written theoretical component and the development, testing, and meta-reflection of a smartphone-based AR app, *Here. Now. Ours*. The app was designed to increase awareness of urban green, public spaces and was put to the test in a Case Study with participants.

As an interdisciplinary and intermedial piece of research that saw participants becoming an *Augmented Wandersmänner* across a city, the methodology had to be generative, phenomenological, ambient, epistemic, ethnographic, examining digital power structures, and critiqued sharply – a Critical Reflection chapter, after the Case Study Results, critiques the work and details the difficulties it faced. Participants in the Case Study were debriefed and interviewed with both quantitative and qualitative questions which gave the research its results.

The results of the case study can be put simply as: *in the majority, participants stated they were more aware of their city's green spaces through the use of situated AR eLit*. The significance of this investigation is demonstrating that *situated eLit* has a place beyond the screen and in enabling people to understand the street, better, while also demonstrating that tools can be created to actualise agency.

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Introduction

This thesis investigates the use of *situated Augmented Reality electronic literature* (eLit) as a new way of increasing awareness of a city's green spaces in its citizens. Its hypothesis, to be interrogated, is that both its situated nature and the embodied nature of its Augmented Reality (AR) can make it effective in increasing awareness of those green spaces – as well as increasing *agency & civic will*. This hypothesis can also be formulated as the question 'Can eLit and AR increase awareness of the reader's shared public, green spaces and increase their civic will that, in turn, they act on?'

Hypothesis of *Here. Now. Ours*

In order to answer the question 'Can eLit and AR increase awareness of the reader's green, public spaces' a piece of software combining literature and AR had to be created. This led this PhD towards practice-based research, the reasoning for which is detailed in Chapter 3. The name of the software created for the research is '*Here. Now. Ours*'.

The central hypothesis of *Here. Now. Ours* is that AR eLit can indeed increase awareness of a reader's shared public, green spaces, but only through ensuring the AR eLit is *situated* thus creating situated knowledge – the text and the software must be localized, voiced in such a way as to leave open the possibility of meaningful coincidence to the participant, and the text must be steeped in the history of its locale while the software must provide a subtle enough experience to inspire a form of *agency and civic will* in the participant.

The experience of *Here. Now. Ours*, itself

Here. Now. Ours is an AR experience that invites users to walk around Galway and scan the walls of the city to reveal AR poetry which will lead them to nearby public parks. There it will tell them if there are any planning applications nearby and encourage them to go to the city planning information portal and challenge it, should they want to.

In a little more detail, participants of *Here. Now. Ours* will have an on-boarding process that guides them through the operation of the software and then they are then free to take as little or as long a time as they desire with the experience. The AR poetry guides them to a green space (via their GPS) and (by recalling data from the City's data portal) the text on screen then lets them know how many planning applications were filed with the city for that area; participants can roam over the majority of Galway City and find new green spaces, alongside experiencing the architectural fixity of the AR poetry (that was written, specifically, to reflect Galway's history). When a participant finds a

green space, they are notified of the number of planning applications nearby and encouraged to contact the City Council to find out exactly what the planning applications around that space are.

A technical explanation of the history and development of AR is given in Chapter 2 but a contemporary review of the field, at the time of writing in early 2020, is also necessary to introduce AR and the experience of *Here. Now. Ours*. Of course, AR is a rapidly developing technology and a constantly changing business environment so this can only serve as a snapshot, not a predictor.

There is now a steady user base for AR platforms built by big technology companies like Facebook, Apple, Microsoft, Snap Inc, and Google. Simple AR animations or 3D models that add digital content to the real world are applied to effect a fun but fleeting intervention; Facebook and Snap (through the Facebook range of smartphone apps and Snap, respectively) are now globally known for their AR “face filters” which can apply digital content on top of users’ faces or can transform users’ faces and backgrounds on the screen of the smartphone; Apple and Google have worked more on creating 3D model content such as animals, historical creatures like dinosaurs, or reconstructions of heritage sites. The software and hardware engineering behind these is not simple but the visual effects are, thus far, constrained by the limits of smart devices and thus the majority of popular, non-military AR uses in 2020 are still considered fun but non-essential consumer entertainment. There is also, however, a growing use of AR in industrial manufacturing and business environments.

AR found its contemporary cultural breakthrough in two things: the wearable technology of Microsoft’s HoloLens and *Pokémon Go*. Microsoft’s HoloLens is a head-worn technological device that layers digital models over our physical world by projecting onto a visor; *Pokémon Go* is a computer game specifically made for smartphones that layers digital models of the titular Pokémon creatures over our physical world and enables players to both explore our world and capture the creatures from the digital world, located as they are throughout our world. Both were initially geared toward gamers, primarily. Though Google released an experimental AR wearable Google Glass, this failed to capture the imagination of the public in the same wayⁱ. Both Google and Microsoft have now taken their initial AR wearable products and made them into Business and/or Enterprise models in Google Glass Enterprise Edition 2 (Statt, 2020) and HoloLens 2, specifically for integration into industrial practices,ⁱⁱ but only Microsoft has maintained their availability both to industry and to the general consumer (Hayden, 2020). Microsoft uses the terms ‘Mixed Reality’, MR, or MX interchangeably but AR encompasses those and is widely recognised as one of the principal terms in the field; ‘eXtended Reality’, or XR, is also now gaining recognition as a term but this PhD focuses on (and so will use the term) AR. Just recently, Google has purchased the company North

who make Focals, cheaper and relatively successful AR smartglasses because they are “building towards a future where helpfulness is all around you, where all your devices just work together and technology fades into the background. We call this ambient computing” (Osterloh, 2020)ⁱⁱⁱ. Ambient computing is something we’ll return to throughout this research and smart-glasses were a part of the original conception, but it is important to note that while this research began in 2016 and concurrent research at the universities of West of England and Bath Spa have used the term since then, Google have only used the term ‘ambient computing’ since 2020. Aside from HoloLens and other smart-glasses, most AR in use today happens through smartphones and the software therein. Those are some of the most popular developments in AR at the time of writing; they are important to understand so we can situate the work of this doctoral research within the wider AR field. Though we will return to the AR hardware & software in use by activists & eLit makers in Chapter 2, section iv, AR cultural touchstones that a bystander may know are just as important.

Pokémon Go was a cultural touchstone for AR reaching the wider world as it was the biggest AR software release in the world, soon after its release in 2016. It remains profitable and with a large user base. Many other AR applications and software platforms have achieved admirable recognition within the field but it was *Pokémon Go* which sparked public use, recognition, and imagination for AR, outside of the computing field and enthusiasts. Current fashionable uses for AR include ‘AR Copy Paste’ which lets you photo-scan something in the real world and place a digital copy into a design you’re creating (Diagne et al., 2020), an AR version of the popular game Minecraft that lets you connect with other players and share digital items in your group’s shared digital worlds, and the latest feature in Snap which has the potential to change how most users of AR see it. Snap’s latest feature, *Local Lenses*, wants “...to open up collaborative, larger-scale AR and more” by world mapping and making such larger AR works as city-block art pieces for all other users to see and interact with (Stein, 2020) – this would be above and beyond the individualised, humorous, face-changing AR that Snap has become known for. At the time of writing, it is the hardware and software detailed over the last two paragraphs that are the most publicly understood and contemporary uses of AR. Now that the contemporary state of AR is clear, we can use that context to state how it is used in the testing of this thesis.

The hypothesis of this doctoral research is tested with a Case Study that uses the *situated AR eLit* app of *Here. Now. Ours* for this research and its results are detailed in Chapter 3, Section iii; the testing is underpinned by key research questions and a mixed-method methodology that are detailed in Chapter 3 and it has also helped develop the key terms created and used by this research, also in Chapter 3. Before the theoretical foundations for the doctoral research are detailed in Chapter 2, it is important to give a chapter breakdown of this thesis.

Chapter breakdown

Chapter 1 is this introduction; Chapter 2 is the Literature Review which will define the broad academic field and terms used throughout the thesis, in order to build a firm foundation of shared understanding across those academic fields and convey where those foundations meet this thesis. Chapter 2 does this in 4 sections: *section i)* will examine the Electronic Literature Organization and electronic literature (eLit) as it is practiced and studied today, identifying its core elements and how it interacts with the wider theoretical context of the internet's progress; *section ii)* will give an overview of the readers of eLit, their attention levels with different media, specific media theories on the field, and relevant philosophical bases for understanding the readers of eLit and their agency; *section iii)* gives an overview of the current state of smart cities and some of the threats to privacy emerging from them, then briefly discusses surveillance capitalism and public space, before moving onto detail the contemporary resistance to the appropriation of public space but also balances the possibilities of technology enabling activism with the countervailing surveillance capitalism environment AR makers are working in; *section iv)* gives a technical outlay of what Augmented Reality is and briefly looks at where AR intersects with the other concerns in the Literature Review before moving onto the Methodology in Chapter 3.

Chapter 3 is in three sections. This is to allow for the further development of both key terms and the rationale for practice-based research in this instance. In the three sections: *section i)* will detail the methodological underpinnings, theoretical and practical, before furthering the argument founded in chapter 2 for the rationale of practice-based research; *section ii)* will set out the key terms being used and specified in this work, the key research questions, and the work behind the methodological design; *section iii)* will present and analyse the Galway Case Study results to give both qualitative and quantitative answers to the hypothesis question. Here we will see whether participants felt they had an increased awareness of the green spaces in Galway by using the *situated AR eLit* created for the research.

Chapter 4 is my opportunity to reflect on the practice, detail the process, and evaluate both whether I thought the research had been effective and what it was like as a practice. This isn't solely to give myself an opportunity to explain the work but to truly demonstrate integrity in focusing on my personal role, to keep a critical eye on my reflections as well as emerging insights or theories, and draw out the key messages of what I've learnt so as to summarise these into recommendations. Chapter 5 will be the conclusion and the summary to the whole thesis; here a shorter, sharper statement of the findings and reflections will be made. Both chapters 4 and 5 will reflect on the previous, more theoretical and practical chapters in order to unpack the findings.

Throughout chapters 1 and 2, I will be laying the foundations of the thesis argument and then in chapters 3 and 4 I will endeavour to build on those foundations, up to the Case Study itself in Chapter 3 so we can fully understand its data then reflect on its implications in Chapter 4. The summation in Chapter 5 will be a final precis of all the preceding chapters.

To begin building the foundations and defining the field of this doctoral thesis' argument, we will now move on to the Literature Review.

CHAPTER 2: Literature Review

This chapter engages with existing scholarship on electronic literature [eLit], digital reading, and augmented reality [AR] and their supporting philosophies in order to further interrogate how best to encourage an understanding of one's environment through the use of algorithmic storytelling and AR. By examining these with a particular focus on agency, attention, and materiality, I build a corpus of texts that can then be used to interrogate the efficacy of algorithmic storytelling and AR in affecting change in the reader/user^{iv}. This analysis creates a foundation for my hypothesis: that it is possible for the author/developer of eLit to affect change in how a reader/user of *situated* eLit understands their environment and, in doing so, make them more aware of public space.

Section i) Electronic Literature [eLit]

Introduction

In this section, I will first discuss the networked nature of eLit and how it has come to be interwoven into our everyday lives in the 21st Century. Once the wider theoretical underpinnings of eLit's relationship to our everyday lives are established, I will then define its multiplicitous characteristics within the terms defined by the academic eLit field, before exploring how eLit is contextual to and *Transcoded*^v by other media. In doing so, I will build a clear definition of the context within which the '*situated AR*' of my PhD title sits, define eLit as used in this thesis, and clarify how eLit's place in the world and context in the media-sphere prompts a need to examine the ways in which agency and attention are vital in enabling the author/developer to affect the reader's understanding of their surrounding environment.

Key definitions of eLit

eLit is everyday and its current generation is networked.

Although already set out in the Introduction, it's worth reiterating a clear definition of eLit here, as articulated by Bell et al, who describe it as something which is:

...written for and read on a computer screen that pursues its verbal, discursive and/or conceptual complexity through the digital medium, and would lose something of its aesthetic and semiotic function if it were removed from that medium. (A. Bell et al., 2010)

Here we see that the 'computer screen' of the quote applies to our smartphones and interactive screens in shop windows or the digital layers we apply to the physical world, so long as they are

interwoven with their digital medium. When discussing 'Third Generation Electronic Literature', Leonardo Flores puts it even simpler, "I define electronic literature as a writing-centered art that engages the expressive potential of electronic and digital media." (Flores, 2019) This definition is both broad and technologically specific enough to cover all the generations of eLit. Joseph Tabbi, a long-standing figure in eLit and editor of *The Bloomsbury Handbook of Electronic Literature*, gives many definitions of eLit in the Handbook (Tabbi, 2017) which cover the full gamut of the field, including a breakdown of its generations. Flores does a good job of explaining how the generations of eLit came to be defined by critics such as Hayles (Hayles, 2008) and Funkhouser (Funkhouser, 2007) in a definition worth quoting in full here:

The first one, much as defined by my predecessors, consists of pre-Web experimentation with electronic and digital media. The second generation begins with the Web in 1995 and continues to the present, consisting of innovative works created with custom interfaces and forms, mostly published in the open Web. The third generation, starting from around 2005 to the present, uses established platforms with massive user bases, such as social media networks, apps, mobile and touchscreen devices, and Web API services. This third generation coexists with the previous one and accounts for a massive scale of born digital work produced by and for contemporary audiences for whom digital media has become naturalized. (Flores, 2019)

Flores has given a broad overview of the generations with appropriate dates but it is in its easily parsed language that Flores' paragraph is so useful. As academics researching in the early 2020s, we may be reading this on any number of now 'naturalized' devices through any number of 'established platforms'. Even though relatively young, Flores' definitions have been cited widely from Latin America (Kozak, 2020) to India (Shanmugapriya & Menon, 2019) and beyond; although within the field there is still much debate about whether these definitions are problematic or useful. For our purposes, they are useful; these simply understood definitions of the generations give us a good context of where eLit is today, in its third generation, with its now networked characteristics. In order to understand the everyday societal and theoretical context of eLit, I will focus initially on its connection to the internet; though not all eLit is networked,^{vi} the growth of the internet parallels the growth of third generation eLit and so understanding its place within theoretical discussions on networks themselves conveys the true impact of the internet on eLit.

In each of the four books of the 'Medienumbrüche | Media Upheavals (2007-2010)' series, there is a call to emphasise the networked nature of eLit. The Media Upheavals series is an overview of eLit scholarship up to 2010 in four books and acts as a set of recommended texts on syllabi for

teaching eLit (Gould, 2012). 'Electronic Literature' as a term emerged within the context of the Electronic Literature Organisation (ELO) but in the third of their books, *Reading Moving Letters*, Peter Gendolla & Jürgen Schäfer state clearly that eLit is 'Net Literature' and dedicate their co-written chapter to teaching 'Net Literature in the Classroom' (Simanowski, 2010, pp. 273–291). In the first book, they write that digital-born literature comes about 'as a result of...the networking of computers and their users' (Schäfer & Gendolla, 2007, p. 9). They even go so far as to challenge the hegemony of the term 'eLit' and, through amplifying Noah Wardrip-Fruin's message (Wardrip-Fruin, 2010), encourage us to look at computational processes relating to how people read through eLit first and foremost. In 'Five Elements of Digital Literature', Noah Wardrip-Fruin says '...we need to be *specific* about system behaviour and user experience' (Wardrip-Fruin, 2010, p. 40) when defining eLit. This is important because Wardrip-Fruin is encouraging us to peel back the layers of understanding in eLit and expose the underlying code (more on this, later in the chapter). Though Gendolla and Schäfer may have pushed to rename eLit as net-literature, by instead looking at how eLit is experienced and the characteristics of that experience we can reach a better understanding of eLit without getting caught up in a terminological debate that is not appropriate to my specific research. We saw from the different *generations* of eLit that to call it all 'net-literature' would be to exclude too many seminal works in the wider field. As it stands, eLit has become the dominant umbrella term for all literature read through a digital screen and is widely understood within the academic field, and so this is the term that I will use throughout this thesis. Though eLit itself will be defined further in the next section of this chapter, a defining characteristic of eLit is its digitally networked ability. It is therefore prudent to now explore those theorists who examine the contemporary networked world.

The networked, culturally interwoven hybridity, intertextuality, and modularity of eLit has a clear philosophical correlation to the term "network culture" from *Networked Publics*. Published around the same time as the seminal *Electronic Literature: What is it?* (Hayles, 2007a), *Networked Publics* pinpoints

...the development of a new societal condition, spurred by the maturing of the Internet and mobile telephony [...] Defined by the very issues that these chapters raise – the simultaneous superimposition of real and virtual space, the new participatory media, concerns about the virtues of mobilisation verses deliberation in the networked public sphere, and emerging debates over the nature of access – network culture. (Varnelis, 2008, p. 145).

Here Varnelis develops what he sees as a snapshot of the impending everyday life of someone in the 21st Century and his theorising came true to such a degree that it aptly describes how we live now, with a smartphone, and begins to outline the ‘superimposition of real and virtual space’ that is AR, the very technology that this PhD is examining. In the book, *Networked Publics*, we read several essays detailing the precise nature of this new, 21st Century ‘societal condition’ and state of being. This connection between our everyday experience and a sociocultural term like *network culture* conveys why it is important to ask the question at the heart of this thesis, of how eLit and AR can enable reader-users to connect with the physical environment around them and empower them to engage with it politically. It also reinforces the argument that eLit can be everyday and networked, meaning that it already influences how we see space, how a great many people are already primed to use the blurred line between the digital and the physical in new ways, and how networks are so vital to both eLit and our lives.

In the 21st Century, network culture as a sociocultural term and conceptual-philosophical tool is a useful part of the terms we use when we move from postmodernism to posthumanist and new materialist thought, precisely because it is a concept interwoven into our everyday experiences of using the (globally networked, somewhat cybernetically enhancing) internet. Network culture owes a debt to Barthes’ and Derrida’s works on intertextuality and *différance* (Barthes, 1987, p. 160; Derrida, 1997, p. 65), respectively. When Barthes declared ‘...a text is made from multiple writings, drawn from many cultures and entering into mutual relations... the birth of the reader must be at the cost of the death of the Author’ (Barthes, 1987, p. 148) he changed the site of a text’s meaning from the author to the reader. Barthes put the reader first and made them an important node in a network of cultural interpreters, just as network culture sees each of us as a node in the network of the internet. His interpretation of intertextuality is similar: no work sits alone, rather it is made from many cultures and relations and is in constant discourse with those relations, just as the Derridean *différance* suggests that meaning is always a part of a chain of other signifiers; within a network, every node is connected and feeds the other nodes information and meaning. However, Varnelis argues that network culture differs from Barthes’ and Derrida’s post-structuralism by changing the relationship of the reader from one of individual receptivity to one of public reworking:

... the production of art by the audience and the blurring of boundaries between media and public. If appropriation was a key aspect of postmodernism, network culture almost absentmindedly uses remix as its dominant process.’ (Varnelis, 2008, p. 150)

This definition of eLit as an intertextual-production, remixing, and the blurring of works’ ownership boundaries is a commonly used one – Rettberg (Rettberg, 2014), Funkhouser (Funkhouser, 2007),

Grigar (Grigar, 2013), for example, all use it within their work, and it remains useful to understanding how eLit revalues both computational practices and literature. So too does Flores include it in his definition of *third generation eLit*, as mentioned earlier, and we are indeed in that generation now. All this, in turn, reinforces network culture as a useful tool to examine eLit, as this thesis does.

As network culture has 'remix as its dominant process' (Varnelis, 2008, p. 150), I argue that that quality also has a great effect on the audiences of eLit. In their introduction to *Networked Publics*, Mizuko Ito argues that audiences now have a 'more engaged stance' and 'can be reactors, (re)makers, and (re)distributors, engaging in shared culture and knowledge through discourse and social exchange as well as through acts of media reception' (Varnelis, 2008, p. 3). The audience as digital makers and makers of social exchange is a vital point: we can see the proliferation of this remixing in the numerous eLit works that remix '*Taroko Gorge*', Nick Montfort's foundational procedurally-generated poem that has instigated an entire subgenre of remixes, remakes, and parodies (*Collection: Taroko Gorge Remixes*, n.d.). Though the wider surveillance capitalism context of today is reflected upon later in this thesis, it's still evident from the weight of work that this *third-generation* remix exchange forges a *distributed, online agency*, where readers determine who they share documents with, where they are placed online, and what is done with them next. Furthermore, Henry Jenkins takes the position that 'the new consumers are now noisy and public' and so audiences are 'newly empowered consumers' (Jenkins, 2006, pp. 17–19). This means that audiences are equipped to genuinely feel agency in their interactions with eLit and that makers and scholars should give them opportunities to enact that and test the results, just as this doctoral research does.

Network culture is present in everyday contemporary communication, manufacturing, working, and even playing. Everyone and everything is infused and interwoven with(in) the network in the twenty-first century. Much of what N. Katherine Hayles writes in *Electronic Literature* chimes perfectly with the 'simultaneous superimposition of real and virtual space, [and especially] the new participatory media' discussed by Varnelis (Varnelis, 2008, p. 145), particularly when she writes about how Interactive Fiction^{vii} is a part of eLit - that 'interactivity' is participatory media (Hayles, 2008, p. 8). While Hayles uses the term 'interactive fiction' for a subgenre and/or form of eLit, Varnelis is speaking of the same thing but more widely so as to include computer games, specially-built websites, social media, and more. The practical element of this thesis is a good example of this: as an experience that uses AR, it superimposes the virtual space and text onto the real space of Galway City's walls. Network culture provides a clear conceptual foundation with which to examine eLit and within which to place the practice of this thesis because, just like eLit, it is in the everyday

and it is networked; in order to test whether it is possible to increase awareness of a city's shared green spaces through eLit, it's important to have this philosophical grounding and wider awareness of our early twenty-first century culture. Having established the wider context for eLit, it is important to define the very characteristics of works of eLit – something that needs to be done with great care.

eLit is multiplicitous, interwoven, and needs detailed definition

Different writers use different terms to define and characterise eLit, but as I will point out below these overlap in ways that are revealing of eLit's most significant characteristics. Though there are many definitions of eLit, I will start with the definition given by the Electronic Literature Organization [ELO]^{viii}. As evidenced by its lasting collections and ongoing work, the ELO has become increasingly significant in defining the field of eLit, but not every digital media scholar agrees on the nature of eLit. It is within the ELO conferences, journals, and online debates that the nature of eLit is explored and articulated. The ELO defines eLit as “works with important literary aspects that take advantage of the capabilities and contexts provided by the stand-alone or networked computer.” (*About the ELO – Electronic Literature Organization*, n.d.)^{ix}. In his rough guide to the term, Scott Rettberg notes that the term ‘electronic literature’ was being used as early as 1985 but that ‘By the mid-1990s the term was in wider circulation and referred specifically to *born digital* literary artifacts’ (Rettberg, 2014, emphasis mine)^x. Rettberg has a 2018 monograph, *Electronic Literature*, that some consider a textbook for eLit and it is a very fair consideration as the book takes an encyclopaedic look at the many facets, connected art movements, theoretical and technological considerations of eLit – it revisits many of the debates that were had in eLit up to that point and gives a fair assessment of each (Rettberg, 2018). In his 2014 work, Rettberg also details the ELO's ‘list of “forms and threads of practice”’ simply. These are:

- Hypertext fiction and poetry, on and off the Web
- Kinetic poetry presented in Flash and using other platforms
- Computer art installations which ask viewers to read them or otherwise have literary aspects
- Conversational characters, also known as chatterbots
- Interactive fiction
- Novels that take the form of emails, SMS messages, or blogs
- Poems and stories that are generated by computers, either interactively or based on parameters given at the beginning [or ‘*algorithmic storytelling*’, as will be used in this thesis]
- Collaborative writing projects that allow readers to contribute to the text of a work
- Literary performances online that develop new ways of writing (Rettberg, 2014)

Rettberg looked again at these definitions in his 2020 work and added to them, a work we'll come to later. It's important to note that, as these cover different generations of eLit, not all of these forms and genres are network-based. Indeed, Hayles details exactly the kinds of works made and the defined eras of these forms in her essay 'Electronic Literature: what is it?' (Hayles, 2007a). Here she provides examples of works that match each of the forms listed above but, of course, new forms and genres have emerged for new devices and platforms since Hayles' volume was published. Though this doctoral research study specifically creates something that fits into the algorithmic storytelling form, it is important to situate the work within the wider field and forms it sits alongside, to understand what it does that is more effective in achieving its desired effect of increasing awareness. These definitions, though made canonical by the ELO, are also seen through other scholars attempting to define eLit and its elements^{xi}. Exploring these other definitions can help demonstrate how eLit became the umbrella term for such a wide-ranging field of digital media, and in doing so acknowledge why it is the term used in this thesis, as well as helping to bring together the main texts for the thesis argument.

One of these scholars who further defined the characteristics within eLit is Marie-Laure Ryan. She defined 'Multivariant Narratives', a narrative form similar to the Hypertext or Interactive Fiction or algorithmic storytelling of eLit, and made a list of 'the features I regard as the most relevant to the issues of textuality and narrativity' (M.-L. Ryan, 2004, pp. 415–430). That list is presented here, quoted in full:

- Algorithm-driven operation.
- Reactive and interactive nature.
- 'Performantial' [or performative] aspect. Another consequence of the first property. A digital text is like a music score or theatre script: its written inscription is meant to be executed, either by the underlying code alone, or through a feedback loop that leads from the user to the underlying code to the display, and back to the user. Digital texts thus present the same contrast as the classic performing arts between the invariability of the script and the variability of its execution.
- Multiple sensory and semiotic channels
- Networking capabilities. ... This opens the possibility of multi-user systems and live (real-time) as well as delayed (asynchronous) communication.
- Volatile signs.
- Modularity.

Here we see Ryan's thorough unpacking of the concepts, textures, and systematic behaviours running through the making of eLit; again, Wardrip-Fruin's critique of eLit and suggestion to include the system behaviours and processes (behind eLit) explicitly within the content and form of eLit is echoed here. The full quote of Ryan's seven behaviours shows the connections between her thinking and that of Rettberg's; it also introduces important terms such as 'real-time' and 'digital texts' that have come into mainstream discourse of media thanks to the internet and that I will use in later chapters. Acknowledging the connection between Ryan's 'performative aspect' and the ELO's 'Literary performances online' brings to the fore the breadth of eLit's remit but also shows how these definitions of eLit chime with one another. Similarly, there is a direct link between Ryan's 'volatile signs' and Hayles' intermediations. As a long time member of the ELO, Ryan's work is clearly versed in the growth of the field. These connections are significant because they both give weight to the importance of adaptive, algorithmic, real-time storytelling in the 21st Century's ubiquitous computing environment and support the design of this thesis. The practical element of this doctoral research is algorithm-driven, reactive, performative, multisensory, networked, has volatile/fluid signs, and modularity, taking in all seven of Ryan's points. Indeed, these seven behaviours apply to almost all of the ELO's list of forms and threads – these matching definitions mean we now have a choral, clear, and thorough grounding in what eLit looks like so can position the research of this thesis easily within it.

In the course of this research, it has become clear that the volatile network links and hyperlinks in eLit need a little further exploration and this will now be examined in order to clarify its contemporary use and importance. First published in 1992, George P. Landow's influential *Hypertext* series – now in its third iteration - brought together the worlds of literary theory and Information Technology. Landow connects Derrida's idea of "de-centering" (Landow, 2006, p. 57) and Barthes's conception of the "readerly" versus "writerly" text (Barthes, 1975, p. 5) to the structures behind hypertext fiction. In doing so, Landow connects eLit to the wider post-structuralist discourse of the early nineteen-nineties. Landow also gives us an excellent metaphor for the nature of eLit when he writes: 'Unlike Jorge Louis Borges' *Aleph*, one does not have to view it from a single site... The hypertext document becomes a travelling Aleph.' (Landow, 2006, p. 57) Borges's idea of the 'Aleph' is a moment of spatial and temporal collapse through which you can see everything in the universe unfolding. Landow then uses the concept of the Aleph to refer to the way both the user and the maker of hypertext can understand their place in the networked construction of the hypertext eLit, much as Hayles does when she writes, in her introduction to *Technocriticism and Hypernarrative*, that : "[...]hypertext fiction offers narratives that operate as networks rather than linear sequences"

(Hayles, 1997). In 2015, Silvio Gaggi summed up both the aleph-like nature and the modularity of eLit when they wrote,

Books, stories, poems, essays, or articles may no longer be conceived as primary units, more or less complete and self-sufficient statements of one kind or another. Instead, there will simply be a textual network that one enters, through which one moves, and from which one exits. (Gaggi, 2015, p. 103)

This puts the modular and networked nature of eLit in plain language. A good example of such modular and networked storytelling is Joanna Walsh's *SEED* (Walsh, 2017), made specifically for smartphone devices, which lets you see the entirety of the shape of the story and enables you to start at any point whilst encouraging you to follow a vine from seed to flower. *SEED* is significant as it puts a hyperlink text, and indeed network culture, into pictures – seeing the entirety of the shape of the story; even to a new reader its design is easily understood and so a networked-hypertext becomes more easily comprehended. Works like this are beneficial to the field of eLit because they make it more accessible and that is also the aim of the practical element of this doctoral research – not solely for the purposes of increasing agency and awareness but to widen the reach of the academic field (of eLit and of digital humanities).

Another definition of eLit, which given the amount of works that reference it,^{xii} I would argue is foundational,^{xiii} comes from Hayles. In *Electronic Literature* she defines eLit as 'digital-born' (Hayles, 2008, p. 3); that is, eLit must *not* be understood solely as a descendant of print literature but as a wider part of the cultural, literary, technological, and media landscape. Due to this unique combination and its position between the computer sciences and the humanities, Hayles says eLit revalues both computational practices *and* literature. These three points are interwoven into the foundations laid by the ELO and Marie-Laure Ryan above. 'Digital-born' weaves into both the forms defined by the ELO and the behaviours outlined by Ryan. Hayles' position that eLit revalues both computational practices and literature is a direct result of the modularity, performativity, and reactivity in Ryan's listed behaviours. In defining eLit further, Hayles says,

...it is also informed by the powerhouses of contemporary culture, particularly computer games, films, animations, digital arts, graphic design, and electronic visual culture. In this sense electronic literature is a "hopeful monster" (Hayles, 2008, p. 3).

Hayles is right to call it a 'hopeful monster': eLit proves itself inherently hybrid in construction, as eLit works cannot be created without a computer and, for this reason, become a part of the contexts of information technologies [IT]. These technologies are also essential in contemporary computer

games, films, etc., and so these technologies are interwoven in the cultural contexts, histories, and making of these games, films, etc. Indeed, Dene Grigar confirms that ‘electronic literature is a hybrid art form that requires its readers to utilize various sensory modalities, such as sight, sound, touch, movement, when experiencing it’ (Grigar, 2013), a point which echoes Ryan’s description of the ‘Multiple sensory and semiotic channels’ of eLit. Hayles also illustrates her definition of eLit throughout *Electronic Literature* with various examples from the *Electronic Literature Collection*, and through thorough analysis demonstrates their hybridity and culturally interwoven nature. Much as Ryan discusses the modularity of contexts and cultural combinations undergoing various transformations, so too does Hayles in her ‘hopeful monster’ analogy and Landow in his hypertext as ‘travelling Aleph’. Observing the overlaps in these eLit definitions gives weight to how eLit has an inherent hybrid, multiplicitous, interwoven, and modular character. While eLit is also informed by IT and contemporary culture, it becomes modular in how it samples the styles and structures of other media. eLit is inherently multimedial, as both Hayles and Ryan have shown. Another important but early critical work, Espen J. Aarseth’s *Cybertext, Perspectives on Ergodic Literature*, does not use the term eLit. Rather, it uses “cybertext” ‘to describe a broad textual media category; it is not in itself a literary genre of any kind’ (Aarseth, 1997, p. 5) and “ergodic literature” where ‘nontrivial effort is required to allow the reader to traverse the text.’ (Ibid, p2) Wardrip-Fruin used Aarseth’s *Cybertext* in discussing how we read eLit (Wardrip-Fruin, 2010, pp. 43–48). However, later in their career, Aarseth would join the ELO and embrace the term ‘eLit’. Still, Aarseth’s definitions certainly reinforce the use of the term “multimedia” as they show that even within the eLit community there is great diversity and an evolution of critical terms. Its multimedial nature is why this PhD research is using AR and why we will now examine eLit’s inherent contextuality – with multimedia already a ‘hopeful monster’ and referencing so many types of media, its iterative contexts have great significance in understanding how it is read and made.

eLit is contextual and Transcoded

Another concept that resonates between Hayles and Ryan’s writing on eLit and narrative and connects them to Lev Manovich’s seminal *The Language of New Media* is that of transcoding. In *The Language of New Media*, Lev Manovich attempts to define New Media because, as he states, ‘...today we are in the middle of a new media revolution – the shift of all of our culture to computer-mediated forms of production, distribution and communication’ (Manovich, 2001, p. 5). He does this through his ‘five principles of new media’:

1. Numerical Representation
2. Modularity
3. Automation

4. Variability
5. Transcoding (Manovich, 2001).

These are five features that Manovich feels are integral to the media of the new millennia. These five are mostly self-explanatory in their meaning except for 'transcoding'; this is what Manovich calls the process of the 'cultural layer' becoming the 'computer layer'— for example, a photograph being scanned and going from analogue chemical production to digital bits – and those layers changing each other in 'continuous transformation' (Manovich, 2001, p. 64) by their interactions. The influence of Manovich's concept of transcoding can be seen in the list of 'major characteristics of digital text' (Hayles, 2008, p. 163) offered in Hayles' final chapter on the future of literature, which is an adaptation of Manovich's five principles. The influence of transcoding is also evident in Hayles' theory that all eLit works have critical self-reflexivity, where Hayles describes works as having "dynamic heterarchies", or 'multi-tiered system[s] in which feedback and feedforward loops tie the system together through continuing interactions' and where '...different levels continuously inform and mutually determine each other' (Hayles, 2008, p. 45). Manovich would identify these feedback-loop reflexive processes as examples of transcoding^{xiv} while Ryan positions these feedback loops in her *'Performantial'/Performative Aspect*, so once again we can see an overlap in the definitions from across fields relevant to eLit, moving us closer to defining how eLit is contextual and transcoded. Jessica Pressman also reinforces this:

Electronic literature is comparative literature. It operates across machine and human languages, requiring translation of these languages before it even reaches the human reader...Electronic literature demands that readers compare not only language and text but also the media formats and ecologies that support them. (Pressman, 2017)

This quote from Pressman can help understand the heavy weight of contextual data that comes with eLit and how that impacts transcoding – it is not only the multi-tiered systems of our 21st Century digital actions and interactions but also all the weight of the canon of English literature itself, the weight of the history of the media used, and the widely accepted interpretations of their respective fields. These contexts are rich and embedded within eLit. The mutual and overlapping definitions we saw described in Hayles' dynamic heterarchies and Manovich's concept of transcoding finds its contemporary home in network culture's millions of remixed videos on YouTube,^{xv} memes on social networks, and the algorithms that then suggest what we might like to watch or buy next. The confluence of terms used around this reflexive process also echoes Barthes' concept of *intertextuality* (Barthes, 1987) but expands it from text-to-text to text-to-media plus media-to-agent intertextuality. This is true of many contemporary works in the twenty-first century that use

algorithmic processes to expose the nature of computer-vision and how computers read texts and read us. This is crucial in this doctoral research because it helps us to understand how agency and attention are distributed through these processes, giving backing to the underlying research aim and to the design choices of the case study presented in chapter 3.

From the ELO, Ryan, Landow, Hayles, Manovich, and other scholars, I have established a firm definition of eLit and its constituting characteristics: it is networked, embodied, contextual, multiplicitous, and transcoded. The behaviours and characteristics listed above, such as hybridity, intertextuality, and modularity, are clear throughout all forms of eLit, including my own work developed during this doctoral research. The texts and the examples provided throughout this section of the thesis demonstrate that eLit is something we interact with everyday in its contemporary, pocket-form, and in a networked context; it is interwoven in the wider cultural and technological context as much as it is interwoven in our everyday lives and with this thorough grounding in understanding what eLit is we can see better what it does to the reader-user's agency, attention, and everyday life; from now on the choice of *Situated AR eLit* can be understood as something built on that grounding. Any AR experience, like any remix made by a participant in network culture, involves a distinct level of interactive agency for the reader-user.

Agency in eLit

An exploration of agency in interactions with any media provides a framework with which to understand that media; as well as working through agency in eLit in this chapter, Chapter 3 will detail how *agency & civic-will* is important to understanding and increasing awareness of the civic-political structures underlying our cities.

When reading a printed book, we know that we cannot change the ending and accept that as the limit of our agency; our agency can only be extended through the creation of a complimentary book, which nonetheless leaves the source intact. Computer games change that framework of agency by having multiple potential endings, many of which can only be reached by completing tasks or 'winning' scenarios. eLit as an umbrella term for many hybrid forms falls somewhere between computer games and literature and therefore has a very subtle relationship with agency and attention. As Hayles puts it:

While print literature also operates in this [recursive feedback loop] way, electronic literature performs the additional function of entwining human ways of knowing with machine cognitions. ...electronic literature fashions intermediations between computer code and human only language, ...Intermediation facilitates the recursive cycle by re-

presenting material in a different medium, changing in the process the modes of sensory input. (Hayles, 2008, p. 135)

Hayles' detailed explanation of the 'machine cognitions' of eLit is not only an important point in understanding what eLit is but reflects how intertwined our own agency becomes when reading against, for, and with the algorithms of that machine cognition in algorithmic storytelling and eLit. The intermediation between man and machine makes eLit both a form of comparative literature (Pressman, 2017) and distributed literature – many of those intermediations are now processed through cloud computing rather than on your immediate device and can be played/read in self-contained modules and so that intertwined intermediation of our agency is distributed, too.

In discussing the concept of agency and its changing definition in the twenty-first century, Hayles touches on network culture and our place in it when she argues that 'distributed cognition implies distributed agency' (Hayles, 2008, p. 136). 'Distributed' is a term used because we now live in such 'intensely computational environments' (Hayles, 2008, p. 137) that it is possible to argue we have made a computer of the world by surrounding it with spatially and geographically distributed satellites and data centres; within this framework, 'the contemporary subject is constituted within the network [...] as the product of multiple networks composed of both humans and things' (Varnelis, 2008, pp. 152–153). So Hayles and Varnelis agree that our day-to-day agency and agency within literature is changed by network culture in the 21st Century and so too by eLit. In her 2007 book on eLit, *Electronic Literature*, Hayles references the work of Andy Clark and Edwin Hutchins on posthumanism (Clark, 2003; Hutchins, 1996),^{xvi} before arguing that complex technological systems train us to make their use everyday use, and so intertwine and intermediate our cognition with the digital, with the internet, with the network. One of posthumanism's first exponents, Donna Haraway, wrote a 'Cyborg Manifesto' (Haraway, 1991) that offers a feminist critique of how we understand agency, bodies, and power structures. Haraway's 'Manifesto' is particularly suited to the idea of 'distributed cognition' as defined by both Hayles and Varnelis when she writes that 'Biological organisms have become biotic systems, communications devices like others' and that, philosophically, 'There is no fundamental, ontological separation in our formal knowledge of machine and organism, of technical and organic.' (Haraway, 1991, p. 173)^{xvii}. One of the great strengths of Hayles' *Electronic Literature*, Haraway's 'A Cyborg Manifesto', and Varnelis' *Networked Publics* is that they do not shy away from the posthuman but, rather, take it as rote^{xviii}. So too does this thesis – human agency *has* changed with ubiquitous computing, as has our situation within the world. Much as our agency has changed in the 21st Century, so too has our relationship to attention, the ways our attention is held and flows, and the kinds of attention we pay. That is why this doctoral research is investigating how attention can be drawn to public, green spaces and how it might be

possible to use our posthuman, distributed agency to encourage awareness and increase agency & civic will – posthumanist theory has shaped the theory behind the empirical research.

In her discussion of attention in *Electronic Literature*, Hayles draws on her previous work,^{xix} the work of renowned sociologists like Pierre Bourdieu,^{xx} pop-sociologists Steven Johnson,^{xxi} cognitive scientists and psychologists, and varied philosophical approaches to new media like that of Mark B. N. Hansen's, whose approach is from an embodied, phenomenological perspective. Hayles does all this to give her reader an understanding and comparison of the different ways both old and new media hold our attention. Hayles argues that 'As media change, so do bodies and brains; new media conditions foster new kinds of ontogenic [developmental] adaptations and with them, new possibilities for literary engagements.' (Hayles, 2007a, p. 118) Hayles focuses on the difference between hyper-attention and deep-attention, and in doing so adroitly highlights how eLit makes bridges between the two in ways that are much like its bridges between computational practices and literature. For Hayles, there has been a 'generational shift in cognitive styles' and younger generations engage in both hyper-attention now and deep-attention. The differences between deep-attention and hyper-attention are quite stark: deep-attention is 'characterized by concentrating on a single object for long periods', (Hayles, 2007a, p. 117) as we might with a novel or a research project, while hyper-attention is characterized by switching focus rapidly among different tasks, preferring multiple information streams as we do when playing computer games^{xxii}. When scholars state that eLit bridges the two (Bolter & Grusin, 2000; Ensslin & Bell, 2012; Landow, 2006; Mangen & van der Weel, 2016), they often refer to both the hyper, interactive nature of something like hypertext or interactive fiction and the quality of attentive time spent in completing their reading. A hypertext, for example, may not necessarily have a definitive ending but the reader will spend hours exploring all of their options within that text; this time spent in the eLit shows the reader 'concentrating on a single [eLit] object for long periods' while also 'switching focus rapidly' when clicking through the different narrative nodes/strands of a hypertext^{xxiii}. These switches of focus are explored well in Jay David Bolter's recent work, *The Digital Plenitude*, when he discusses our attention less as a series of states but more as a 'flow': a state of optimal experience, in which people are so involved in an activity that nothing else matters – the pleasure of losing oneself, even if the pleasure is muted or intense, whereby 'The user not only experiences flow, she actually becomes part of the program's flow' (Bolter, 2019, pp. 100–109). While traditional media forms like film are likely to inspire an emotional release for audiences, newer media offer the experience of flow; indeed Bolter describes our contemporary media environment as a series of dichotomies – catharsis and flow, originality and remix, the organic/spontaneous and procedurality/datafication, history and simulation (Bolter, 2019, p. 84) – that highlight just how complex and interrelated our

relationship to agency and attention has become when it bridges computational practices and art of all kinds.

Hayles calls the bridges between computational practices and literature ‘intermediations’ which echoes Bolter and Grusin’s concept of ‘remediation’ (Bolter & Grusin, 2000), and Lev Manovich’s ‘transcoding’ (Manovich, 2001), which we’ll return to later. All of these terms have overlapping meanings which hint at the interplay between human and machine cognition and how that affects both the work of eLit and us. These terms are also connected to the intertextual-production, remixing, and the blurring of works’ ownership boundaries that Varnelis defined earlier in this chapter. The only critique that could be applied to Hayles’ analysis of attention is that it misses the opportunity to explore “ambient attention”, “ambient computing”, and “ambient literature” which are kinds of experiences that go hand in hand with ubiquitous computing. I will discuss these briefly in this chapter and in more detail in Chapter 3.

Though Hayles does briefly mention ubiquitous computing and the notion of being posthuman,^{xxiv} she does not take the logical next step and ask, as this research does, what eLit looks like when we live inside a world that is constantly computing data about itself and us. Our satellites surround and comfort us when we’re lost, making a computer of the world; we wear the internet, invisibly; it sits in our pockets, making us cocooned-beacons, and so long as we have electricity, we have a connection and are aided by that distributed agency. Hayles does mention the growth of ubiquitous computing but perhaps, at the time of her writing, its spread did not seem so inevitable. Given that the first iPhone was released on June 28th, 2007, thus changing the media landscape and our place in it, Hayles would have been unable to incorporate its influence in a book she had likely finished writing at the same time. In the 21st Century, the notions of ambient attention and ubiquitous computing are becoming increasingly important, and so they will be key considerations throughout this thesis.

A consideration of *ambient* attention is the logical next step to Hayles’ analysis of agency and attention, but one Hayles never quite makes. Published five years after *Electronic Literature* and *Networked Publics*, Malcolm McCullough’s *Ambient Commons* defines the ‘ambient’ as,

When you perceive the whole environment more and its individual signals less, when at least some of the information superabundance assumes embodied, inhabitable form, when your attention isn’t being stolen, when you feel renewed sensibility to surroundings you might try calling this ambient. (McCullough, 2013, p. 3).

This thesis will explore the idea that distributed agency can renew sensibility to information if done through the architecture and specific features around us. Just as McCullough notes our contemporary, tech-intertwined, cyborg condition when he argues 'the use of information technology has become increasingly circumstantial: interspersed with other sensibilities, contingencies, and actions' (McCullough, 2013, p. 19) and its distribution effect on our agency, so too does Hayles in standing on the shoulders of posthuman giants like Haraway. In both of the above quotations McCullough is recognising ubiquitous yet embodied information, circumstantial but architectural forms of information interspersed throughout our experiences of agency and attention. With regards to attention, McCullough takes the view that 'tacit, action-based, and externalised forms of knowledge contribute more to attention than they do to most other functions of the mind', and that attention is most attuned through 'physical experience and [...] through links with the properties and usable relationships of things habitual, stable physical contexts' (McCullough, 2013, pp. 63–64). McCullough's explicitly embodied approach is integral both to this thesis and to all of the literature that is reviewed here.

Having established that eLit is every day and networked and having set out my theoretical approaches to agency and attention as underpinned by Hayles and McCullough, I can combine these with AR's integral need for an environment to understand how important ambient attention and embodiment actually is. Though each piece of software that uses it might change our perception dependant on its design or purpose, AR is not structurally escapist in the way that Virtual Reality [VR] is because it does not block out the world around the body but, rather, layers digital information on top of the world around us. This 'mixed-reality' approach means that we have to be able to understand where our bodies are when experiencing AR and so our bodies become vital tools in maintaining our attention to and agency in the world. Embodiment then, is vital to AR. As McCullough argues:

Literary theorists sometimes speak of text as if it were disembodied, but of course it isn't; it always shows up attached to particular physical objects, in particular spatial contexts, and those contexts - like the contexts of speech - furnish essential components of meaning. (McCullough, 2013, pp. 95–96)

Here McCullough notes that all texts are attached and embodied. Even if it is only to the screen of a digital device, that screen becomes the body of the text. This means that embodiment is not only vital to AR but to eLit, as well, both of which are explored throughout this thesis, suggesting that embodiment will be a key exploration for my case study (something explored, specifically in section ii of this chapter). AR works of activism, eLit, and art will be detailed and explored further in section

iv of this chapter. To conclude, eLit is experienced every day in our smartphone interactions, is embodied in the everyday human to computer interactions we have, is embodied in the way the texts we read and play with are contained within the body of a screen, and all of these exist within a networked, distributed, and remixed network culture.

Having now defined the nature of eLit, its development, and its core characteristics, it is important to turn our attention to those who will be reading eLit, in many of the forms outlined above. The following section will outline the nature of digital reading but will focus primarily on the different reader-types that exist around eLit, what defines them, and how they engage with and pay attention to eLit in different ways. This exploration of the reader-types will then turn to consider the impact of play on engagement, as well as how a phenomenological approach to the notions of touch and immersion can facilitate a greater understanding of how the reader experience can impact on levels of attention and engagement, in order to answer the core research questions.

Section ii) Digital reading

Introduction

Though 'digital reading' could be described as reading anything on a screen, this study only examines the reading of eLit and digital-only texts. As we have seen in the previous section, there are a great variety of forms of eLit; so numerous are the forms and types that there should, hypothetically, be numerous types of readers to go with them. In this section, I will discuss the types of readers of eLit and their particular approaches to reading and engaging with eLit in order to identify the most fitting approaches for keeping the attention of, and affecting change in, any reader or participant of my *Situated AR eLit* experience. To do this, I will put the reader-types I am analysing on a spectrum of interactivity and a spectrum of understanding of processing so as to examine which end of the spectrum is most useful in affecting change. I will then explore how those reader-types are embodied through different kinds of play and define the terms of embodiment, asking if the reader/user can be radically and virtually embodied, and in so doing shift the traditionally perceived scene of knowledge from (solely) the mind to the body-through-touch and touchscreens. Following this, I will explore a recent case study which shows how contemporary digital-technologies can enable embodiment, affect, and immersion. By completing this analysis of the impact of the reader/reading experience on the participant, I can begin to answer the thesis question 'Can eLit and AR increase awareness of the reader's shared public, green spaces?' and further interrogate the use of algorithmic storytelling to effect change.

eLit reader-types and their respective levels of attention.

In order to approach an analysis of the different types of eLit reader-types, first, I must examine how eLit scholars have defined the reader. In this section I will critique the definitions of 'Wreader', a term coined by George P. Landow (Landow, 2006) to describe the readers of hypertext-fictions, and 'reader/user', a term used in this section that combines the traditional 'reader' with the term 'user' as used in the field of Information Technologies [IT] to identify an operator or agent. I will then assess whether these terms might all be subsumed under the term 'player'. Once completed, this will then determine which of the terms will be used throughout this thesis.

In all editions of his influential *Hypertext* books, Landow has suggested that when reading eLit, we become a 'Wreader' (Landow, 2006, p. 185), a co-author to the work. As discussed in the previous section, this draws on Barthes' idea of the 'writerly' text. 'Writerly' texts are those that put the reader in an active role in the construction of meaning, rather than a passive-absorption role. 'Writerly' texts stand in contrast to the traditional 'readerly' texts and replace the linear, stable meaning of a 'readerly' text with a multiplicity of meanings and a disregard of narrative structure.

There are many cultural and ideological indicators (codes) for the reader to find in these ‘writerly’ texts, the writerly text destabilizes the reader’s expectations and turns the reader into the writer (Barthes, 1975). The hypertext form works similarly by requiring the reader to navigate through its multiplicitous, non-linear web of storylines, narratives, and content. However, a reasonable critique of the term ‘Wreader’ and its associated experiences is that with many digital texts, it is easy to feel disempowered by the infinite possibilities that deny the catharsis of a definitive ending for the reader. A desire for linear experience is backed up by scholars studying digital reading (Brooks, 1984; Skains & Bell, 2017). Peter Brooks states that many readers desire ‘a portent of design that holds the promise of progress toward meaning’ (Brooks, 1984, p. xiii). In other words, according to Brooks & Skains & Bell at least, readers want an experience that they are assured will end satisfactorily and be cathartic. In attempting to analyse the types of eLit readers, we must be aware of the fine line between how much non-linearity is desired and how much undermines the experience – then be prepared to critique those reader-types that forefront experiences which leave the reader unfulfilled by prioritizing hypertext links over narrative catharsis. Shulamit Almog also critiques hypertext fictions, and thus the ‘Wreader’ experience associated with them, when she says the intense exposure to ‘the immense hypertext,’ of ‘the global electronic data flow’, profoundly affects our ‘narrative cognizance,’ (Almog, 2002) in a negative way. Indeed, I agree with the critique that if a reader becomes confused by or disconnected from a digital text then they are unlikely to be attentive to or affected by it and will add that any reader-type that encourages this reading-perspective, like the ‘Wreader’ reader-type, suffers this confusion. Although the ‘Wreader’ reader-type is well-recognized within the field of eLit and Almog’s critique is directed at the nature of hypertext, her critique is nevertheless valid and wide enough to prompt the need for a further understanding of how it is we interact and interface with digital reading.

Together with a critique of the ‘Wreader’ reader-type, a critique of *how we read* eLit allows this line of enquiry to surpass the confusion inherent in ‘the immense hypertext’ that Almog criticizes; to do this, we can look to Lori Emerson, whose critiques of reading interfaces echoes Wardrip-Fruin’s desire, mentioned in the previous section, for more explicit processes in eLit. This is evident when Emerson says,

...why would we—whether we identify as a user or a creator, a reader, a writer—want our interactions with interfaces to be ‘unthinking,’ such that we have no sense of how the interface works on us, delimiting reading, writing, even thinking? (L. Emerson, 2014, p. 131)

Here Emerson has articulated a desire that does not fit into the 'Wreader' reader-type because it is not calling for an unknowing reader like a 'Wreader', gently finding their open-ended way from hyperlink to hyperlink, but has, instead, pushed to create a new type of reader – a *user* who understands all the implications of the platform or device they are reading on. This provides a solid response to Almog's critique of too much non-linearity in both hypertext and the figure of the 'Wreader'. Emerson argues that if a reader identifies with both the interface *and* the text then the underlying processual qualities of eLit and digital reading can be effective in keeping the reader's attention through an interest in processes, therefore creating a new reader-type: the reader/user. Adelaide Morris's approach reiterates the concept of a reader/user when she says,

To function adequately, reading strategies for digital literature must include a set of critical concepts sufficient to capture the dynamic, processual interchanges between the programmes' code, the scenic interface, and the clicking, dragging, scrolling rink, and the navigating options it makes available to the interpreter. (M.-L. Ryan et al., 2014, p. 422)

When Morris calls for reading strategies that include '...processual interchanges', she echoes Emerson's call for a thinking interface. Here the reader becomes both critic and user-interpreter of all those explicit, thinking interfaces. The idea that the reader is the main creator of meaning isn't new – 'The Death of The Author' (Barthes, 1977) , written in 1967, being a pivotal text – but it is made anew in light of Manovich's transcoding, Hayles' transmediations, and the discourse around how we define eLit, all of which were examined in the previous section.

In writing about the eLit work 'Computers, Cut-ups and Combinatory Volvelles' (2010) by Whitney Anne Trettien, John Vincler states '...the work engages the user/participant (the term "reader" seems inadequate) in writerly practices, as his or her choices determine the text that is woven' (Vincler, 2010) and in so doing stretches the reader type of reader/user further, to user-participant. Through the sheer practice of reading/using Trettien's work, you interact with the very processes which create the eLit, and in doing so create and alter the order in which you read it. Integral to this thesis, this explicitly connects the usage of 'user' in a reader-type to Morris' call for readers to understand the processual interchanges involved in eLit^{xxv}. A reader-participant, then, is one who knows that their reading is underlined by complex code and that each of their choices affects their reading; in understanding the underlying complexities, the reader-participant can choose whether to seek an end and a traditional form of catharsis or they can admire the technical complexities, unlike the 'Wreader'. The reader-participant also differs from the 'Wreader' as they can look into the code of a work of eLit and decipher the ends, should they so wish. This choice is a

catharsis in itself and in so being, gives the reader more agency and so, potentially, keeps their attention for longer. This increased level of agency is important to the research question at the heart of this thesis and agency, itself, is something that will be returned to regularly but with a specific focus in Chapter 3.

Taking these varying definitions into account, it is possible to argue that the digital reader is now a user-interpreter, a transmedial interpreter or, more simply, a player. Players of computer games and table-top role-playing board games have long had to interpret the mediations of software or the rules of the game set by the gamemaster,^{xxvi} learning, interpreting, and applying these rules to the locale. When looking at different reading strategies for digital media and digital texts, Morris also notes play as critical:

...critics of digital textuality have found it simpler, more productive, and much more fun to switch into game mode and “play”, “use”, or “explore” these networked and programmable engines or instruments. (M.-L. Ryan et al., 2014)

Here, Morris articulates how the reader has become not just a player but a user and explorer. These are fitting terms for eLit: the term ‘user’ is already applied to anyone using the IT software that eLit needs while the term ‘explorer’ expresses the way in which each example of eLit has to be understood by playing through it.

A ‘player’ of eLit, then, does all that interpreting, learning, and applying that players of other games & sports do while also appreciating the aesthetics, code, and forms they are presented with. Hayles, Morris, Rettberg, and Ryan all use the term ‘player’ interchangeably with the term ‘reader’ in their work on eLit, suggesting that those most well-versed in the field lean toward these two terms. The Electronic Literature as a Model of Creativity and Innovation in Practice [ELMCIP] project has a Knowledge Base that acts as their repository for eLit studies: my own quantitative study of it shows there to be three instances of ‘Wreader’, 89 of reader/user, and 170 of ‘player’ used across their repository of writings. The Electronic Literature Directory [ELD] is a peer-reviewed, academic directory of and repository for discourse on eLit (Spinosa et al., 2017) hosted by the largest institute for eLit, the Electronic Literature Organization [ELO]. My own quantitative study of the ELD uncovered three uses of ‘wreader’, four of ‘reader/user’, and 49 of ‘player’. From this it is clear that the reader-type ‘player’ is the most regularly used by those writing about eLit.

I have now defined and critiqued three types of eLit reader: ‘Wreader’, reader/user, and player. Each of the reader-types has a closely associated experience: for a ‘Wreader’, it’s the open-ended hypertext narrative; for the reader/user, it’s a meta-processual experience that revels in and

reveals the code or technological workings behind the piece; and for a player, it's any of the above that also offers a conclusive end via playful means; more detail on these will be given in the next few paragraphs. These reader-types and their associated experiences are varied in their approach to digital texts and can be seen on spectrums of both interactivity and processual understanding, e.g. from the least interactive on one side to the most on the other. I would like to briefly plot the reader-types and their associated experiences on these spectrums in order to help us understand the effectiveness of different modes of reader engagement on levels of attention and agency in the end user of an eLit project like *Here. Now. Ours*.

On a spectrum of interactivity, each of the three types of reader has a simple level of interactivity in pointing and clicking; reader/user and player then have an additional level of interactivity in more advanced processes that involve changing the reading experience and the form of the eLit, understanding the cultural touchpoints and the processual interchanges going on in the code. By comparison, 'Wreader' sits at a less interactive level because you don't need to understand code or process to be a reader, you only need to know how to point and click; Landow's later iterations of what the term might mean questioned this position but the original interpretation was not of a reader/user revelling in and revealing the code underneath.

On a spectrum of processual understanding whereby the reader has an understanding of the inner workings and interfaces of the devices and software used, each of the three types has a simple level of understanding because of the Graphic User Interface (GUI, an IT term which is as it sounds – an interface that isn't solely text-based but includes pictographic representation) used to point and click: each of the three types understands links as they click through hypertext stories. After this, however, the similarities end – a 'Wreader' needs to understand neither code nor form nor context, a player may or may not understand these, and a reader/user will have a stronger understanding. This means Wreader is the least and reader/user is the most understanding of device interfaces and their underlying processual interchanges. It could be argued that a player needs to know the landscape and devices on which they play but novice players will often begin and fail multiple times in their playing as a process of learning, rather than studying the interfaces first. It is difficult to qualify, but that process of failing, learning, and playing again is a large part of what both software-code-engineers and players do in engaging with eLit. So a player could be said to become just as understanding of the underlying processes within the text, if they play for long enough, and I would argue that approaching a work through play means there are further opportunities to be creative with it. The creativity referred to here should be considered not as the creativity of a formal artist but instead as the creativity of an innovator – a reader/user may be happy understanding the complexity of the coding but a player can choose to overturn that, could wish to innovate and

change that code thus becoming more engaged, more attentive through innovation and renovation of the eLit work.

As we can see, the reader-types are defined by their differing abilities when it comes to interacting with eLit and digital texts; just as it may be different types of eLit encouraging different forms of engagement with the works, a reader may be one reader-type in their early experiences of eLit but that may change or they may find a comfortable level, choosing to only use the mode of reading inherent to that reader type. In order for a reader-type and their associated experiences to be effective in keeping someone's attention, a reader-type must be both highly interactive and processual because, as Hayles and Varnelis and Wardrip-Fruin have argued, we readers of eLit want to be able to affect and understand the cultural contexts, processes, textures and layers of the works. In answering the question of which reader-type is the most effective in keeping someone's attention in AR eLit like *Here. Now. Ours*, we can see from the above that Wreader is the least interactive and processual and so would not be the most effective, whereas reader/user and player have the same levels of interactivity and processual understanding, but player may well have an additional creative interaction with the eLit text. These creative interactions and processual explorations mean experiencing eLit as either a reader/user or as a player is thus effective in keeping attention.

What we can be quantitatively sure of is that there are indeed many types of eLit reader and that player is one of the most regularly used, well-recognised terms within the field. Now that we have outlined eLit reader-types, we need to understand how players approach the act of playing, so that we might then understand what most affects the player and their engagement with eLit texts and experiences.

[Play, the player, and eLit, in more depth.](#)

'Player' alludes to the logic of playing and play: ludology. Ludology is a much-codified concept within anthropology, as well as game and media studies. In his seminal work *Homo Ludens* (or 'Man, the Player'), anthropologist and sociologist Johan Huizinga argues that 'For many years the conviction has grown upon me that civilization arises and unfolds in and as play,' (Huizinga, 1949). Alongside play affecting civilization, Huizinga also argues that play deserves a prominent place in discussions of human identity because play informs what we learn and therefore who we become. A radical idea in the mid twentieth-century, this has now become conventional wisdom among anthropologists and sociologists. Experimental psychology, neuroscience, cultural history all show that when we play we learn more effectively, we form stronger bonds, and we are more attentive. Play is also important to how we think about what is in the realm of a shared commons in society. In

his ground-breaking essay, 'Deep Play: Notes on the Balinese Cockfight' (Geertz, 1973) anthropologist Clifford Geertz describes how on the island of Bali, people spent much time and money betting on cockfights. The betting and the fights involved elaborate rituals and the outcomes had substantial impact on the social, economic, and political standing of the whole community. The cockfights were so important to the Balinese that when the Indonesian government declared the practice illegal, people ignored the law and risked arrest. For the Balinese, cockfights were "deep play" – a made-up game that is invested with so much meaning that it becomes reality. We will return to the notion of a shared commons in the next section of this chapter but in a similar manner, the recent Augmented Reality [AR] game, *Pokémon Go*, was shown to boost friendships and social cohesion by bringing players together in person, outside, while searching for digital-layered locations (2016)^{xxvii}. eLit functions similarly: playing with digital texts can help users form stronger emotional bonds and switching from the passive mode of reader to the active mode of player makes users more attentive. Though it is important to note, as Hans Rustad has, that different types of readers interact with digital texts in diverse ways (Rustad, 2009), we can see a strong case in 'deep play' and *Pokemon Go* for the *embodied* reader-as-a-player emerging. These linked theories come to the conclusions that embodied practices become a form of play, constructing meaning, and forming social bonds.

Some argue that the eLit reader has always been defined as a player because electronic literature is comparative literature (Pressman, 2017), and as comparative literature is the study of literature and cultural expression across linguistic, national, and disciplinary boundaries, it will often mean its students read with a great sense of playful intertextuality. If we look at art books, pop-up books, or commonplace books of antiquity, we can see the form of the book itself is 'a plaything' as Amaranth Borsuk defines it (Borsuk, 2018), and so reading can be defined as a kind of practice of play. This argument is backed up by works of literary satire and humour which have always had mediation with their literary culture's lexicon, while eLit has transmediations with machine lexicons. Rabelais, Swift, and Sterne were all responding to their cultural canon and all shaped new forms of the book that resulted in new, playful forms of reading (e.g. Sterne's *The Life and Opinions of Tristram Shandy, Gentleman* changing the way narration in novels was thought of). This line of thinking might suggest that the reader of eLit can simply be called a 'reader', and this encapsulates the practice of play within it. Unfortunately this critique of the reader-type definition 'player' does not account for either the digital devices we use when reading eLit or the history of our interactions with information & computer technologies [ICT]; if we wish to be clearer, it might be better to say the reader of eLit is an eLit-player because player is the term used by the first computer-game companies. A student of comparative literature making a literary comparison over national

boundaries is not the same as an eLit player who has agency to remake a work over many boundaries until it has satisfied them.

Ensslin, Spiekermann, and Aarseth (Aarseth, 1997; Christl & Spiekermann, 2016; Ensslin, 2014) all use or have used 'player' to identify the ergodic, ludic, and/or playful agent in eLit and so too does the Virtual Reality [VR] community when speaking about themselves and their VR experiences. Though there may be initial instructions, the player only understands the mechanics, the qualities, the agency they have by spending time with and exploring the work of eLit. It is this agency, I argue, which builds a sense of attention and affection within the eLit player. When we ask, 'How can the use of *situated AR eLit* increase awareness of a city's green spaces?' play, therefore, must be a part of the answer, and as such, I have ensured that the experience of *Here. Now. Ours*, built specifically for this doctoral research, has a satisfactory end point but encourages the player to go from the smartphone and onto address real-world problems thus connecting the digital processual with the political-processual and should the player want to go further still, they can extend their time with the application and go all over the city to find more to engage with.

Phenomenological approaches to the eLit-player

Examining agency in her essay 'Reading Strategies', Morris discusses reading procedures used when approaching digital texts:

More events than objects, digital texts contain their own pedagogy: they teach the cognitive strategies they require through an array of rewards and reverses. For this reason, the most useful approaches to digital textuality are often phenomenological (M.-L. Ryan et al., 2014, p. 421)

In context, Morris is discussing the ways that digital texts do not necessarily follow traditional rules around reading: text may appear briefly or need to be read right to left, bottom to top, or have to be changed and uncovered in order to be read. Positioning the reader as a phenomenological player also reinforces a sense of agency, a sense that the reader/player can change things toward enhancing their own experience and understanding. So 'player' is definitely a fitting and useful definition of the reader of eLit,^{xxviii} and we can see from these theories around playthings, playful forms, and agency that the eLit-player usefully approaches and perceives an eLit experience as a subjective, playful, physical, and therefore phenomenological one.

Phenomenological methods have become a regularly returned to approach in eLit studies (Ensslin & Bell, 2012; Hayles, 2008; Mangen, 2016) and understanding reader/player responses (A.

Bell, Ensslin, Bom, & Smith, 2018; Skains & Bell, 2017) over the past fifteen years. Ludology is also highly dependent on a phenomenological framework because of the embodied nature of play. As a reader/user of eLit is also an eLit-player, their reading is a kind of play: this is especially true of Virtual Reality [VR] eLit and Augmented Reality [AR] eLit when the player is often standing and moving with the aid or instruction of the eLit work, the movement is then an integral part of playing. If we accept that Morris and Bell are correct, I suggest that we can go further and say that eLit players have a radically and virtually embodied experience through distinct phenomenological approaches to touch in eLit. To probe and proof this, we will now look at how phenomenologists have expanded the definition of touch.

In this section, I will briefly outline the origins of phenomenology, what the key differences are between its key theories, how these are most applicable to this study, how we might apply contemporary iterations of phenomenology to this study, and then move towards an exploration of the implications of this for a radical and virtual embodiment existing within the experience of eLit.

It is widely agreed that Edmund Husserl gave us the foundations of the philosophy of Phenomenology at the turn of the 19th into the 20th century. Across the first and second parts of his *Logical Investigations* in 1900 and 1901, Husserl sought ways to explain that mathematical laws do not determine how the mind works^{xxix} and in so doing called into question the relationships between subject and object. Twelve years later, in 1913, Husserl published *Ideas* in which he detailed certain philosophical practices and theories that he suggested would be useful in understanding how to discuss the nature and structure of consciousness: practices such as phenomenological reduction or 'bracketing' (Husserl, 1962, pp. 96–103, 155–167, 194). 'Bracketing' is a tool intended to aid the attempt to leave behind our learned preconceptions and symbolic understanding of phenomena so that we may be able to understand an object or experience as it is, on its own. Husserl called this the '*phenomenological epoché*'. In this way, both the phenomena *and* our subjective experience of it can be examined, allowing a distinction between consciousness and the phenomena at which consciousness is directed. Husserl developed these ideas further in *Cartesian Meditations: An introduction to Phenomenology* (Husserl, 1960), first published in 1931, and here broached the notion of intersubjectivity.

For the purposes of this thesis, the most significant phenomenologist after Husserl is Maurice Merleau-Ponty. Their differences are at once subtle and radical. Merleau-Ponty built on Husserl's later works and the phenomenologists who came after, to eventually publish his best-known work, *Phenomenology of Perception* (Merleau-Ponty & Smith, 2002). When discussing the different approaches to the body taken by Husserl and Merleau-Ponty, Taylor Carman says,

...equating the perceptual subject with the lived body, as Merleau-Ponty does, would mean relinquishing the conceptual dualism on which Husserl's project rests. ...his theory of intentionality is predicated on what he regards as a strict categorical distinction between consciousness and reality. (Carman, 1999)

The categorical distinction between consciousness and reality that Carman is referring to, which creates a kind of dualism in Husserl's thinking, comes from Husserl's early book *Ideas* in which he states 'Between consciousness and reality there yawns a veritable abyss of meaning' (Husserl, 1962, p. 93). That abyssal separation creates a duality between lived-experience ('consciousness' to Husserl) and the world ('reality' to Husserl) and Merleau-Ponty doesn't fully accept this dualism. Merleau-Ponty disagrees that consciousness is completely distinct from the world^{xxx}. When talking about Husserl's *phenomenological epoché*, Merleau-Ponty states that 'The most important lesson of the reduction is the impossibility of a complete reduction' (Merleau-Ponty & Smith, 2002, p. 20). Here Merleau-Ponty is dismantling Husserl's early conception of phenomenological reduction and the dualistic distinction between lived-experience and the world by making it clear that no-one can completely remove all of their learned preconceptions and symbolic understanding without becoming solipsistic. In order to combat solipsism but still continue the further push for knowledge, Merleau-Ponty changes phenomenological reduction slightly and asks phenomenology to seek a 'phenomenal field' through that reduction (Merleau-Ponty & Smith, 2002, p. 56). The 'field' is the world presented through experience, as is perceived by the perceiver. This focus on the perceiver's subjective experience/perception rather than Husserl's dualistic 'consciousness or reality' is a key difference^{xxxi}.

Phenomenologists distinguish phenomena from noumena (Willis, 2007, p. 53) or subjective experiences (phenomena) from what is perceived as objective reality (noumena), all while unpicking the philosophical desire for the *need* to define an objective reality. 'Phenomenology (is) focused on the subjectivity of reality, continually pointing out the need to understand how humans view themselves and the world around them' (Willis, 2007, p. 53). Those human perceptions don't come simply from an individual perspective but can also be formed through a shared-experience which is perceived more widely within a group. As Willis says, 'The focus is thus on understanding from the perspective of the person or persons being studied' (Willis, 2007, p. 107). Here, Willis offers a clear and simple way to explain the focus of phenomenology and the phenomenological method on the experience of the self, a critical focus echoed by Jason J. Campbell in his evaluation of methods of qualitative research (Campbell, 2011). It was Merleau-Ponty that really brought attention to and focus on the embodied nature of experience in the study of phenomenology and that focus of perspective is highly relevant to how I use phenomenology in this practical, digital-humanities

research: when asking an eLit player if they have been affected by a work – and affected enough to increase their understanding of their environment – I can only rely on their qualitative report of how they were affected. Therefore, as their embodied lived experience is a key focus in analysing whether their understanding of their environment has changed, the most useful qualitative report is a phenomenological one.

Relocating the scene of knowledge

In *Literary Studies in the Digital Age*, Julia Flanders argues that,

Digital literary study ...seeks to move from explanatory narratives that apply to individuals to explanatory narratives that apply to populations. This is a move that seeks to relocate the scene of our knowledge (Flanders, n.d.)

Flanders is not solely referring to eLit works here but also includes quantitative digital corpus studies that semantically examine connections and recurrences within genres, eras, and even within individual works. She is making a wider point about the nature of digital humanities, arguing that digital humanities is a bridge that examines both the importance of IT's influence on the humanities and also of using humanities-related ways of thinking to analyse and inform digital studies; not only using digital technology to analyse textual production, transmission, reception, etc, but also using approaches from the humanities to, for example, discuss the ethical, human, and philosophical implications of Artificial Intelligence sentience or sex-bots. This is borne out in the second sentence where she '...seeks to relocate the scene of our knowledge'. This relocation of the scene of our knowledge is precisely what the remit of this PhD study intends to do through making the reader/user/player more aware of their city-wide surroundings. Its theoretical basis is set out below.

In a radical and seminal work called *Situated Knowledges* (Haraway, 1988), Donna Haraway argues for a need to relocate the scene of knowledge to a more situated, more multivariant perspective that considers individuals' connectedness and partial perspectives. These partial perspectives forge '...attention to the contemporary dissolution of boundaries between human and animal, human and machine, and physical and nonphysical' as G.L. Downey says (Downey, 2001) and though daring, this relocation goes too far for the remit of this doctoral research precisely because it decentres the human so very much. Instead this doctoral research looks to connect with the human *better* through phenomenology.

Core phenomenological texts have relocated the scene of our knowledge (e.g. from mind to body) before. Merleau-Ponty rearticulates the relationship between subject and object, i.e. self and

world, and so attempts to dismantle Cartesian Dualism. He does so through accounts of the lived body where he argues that the significance of the body – 'the body-subject' – is often underestimated by philosophy, which tends to consider the body simply as an object that the mind controls to perform functions. In short: where Descartes says 'I think, therefore I am', Merleau-Ponty says (if I may paraphrase) 'I perceive the world through my body and therefore it is' and in doing so denies the detachment of subject from object, mind from body (Merleau-Ponty & Smith, 2002, p. xii). By dismantling the primacy of the mind, he relocates the scene of our knowledge to the body and asks for scientific methods to appreciate that embodied knowledge – our lived account – is an important consideration because each of our bodies is affected by the world. As philosophy scholar Nick Crossley says in examining Merleau-Ponty, '...there is no meaning which is not embodied, nor any matter that is not meaningful' (Crossley, 1994, p. 14). Merleau-Ponty argues, further, that '...every perceptual habituality is still a motor habit' (Merleau-Ponty & Smith, 2002, p. 153); here both Crossley and Merleau-Ponty argue that every reflective thought we have is something our body has learned through experience. For Merleau-Ponty, philosophers looking only at reflective thought ignore the paradoxical condition of all human subjectivity: that we are both a part of the world and limited by it, constituting a part of it but in turn also constituted by it (Merleau-Ponty & Smith, 2002, p. 453). He grounds this in a simple notion: we have always had a body so to think, to have knowledge, or to experience without a body is inconceivable (Merleau-Ponty & Smith, 2002, p. 91). It is a clear logic and one that resonates with this study, as Augmented Reality [AR] is rooted in a requirement to experience through movement of our bodies. My own research considers how that movement through a city might deepen our understanding of its shared public space^{xxxii}.

Phenomenological theories of 'touch'

Not only did Merleau-Ponty seek to relocate the scene of our knowledge to an embodied understanding based on experience and experiencing but, in rearticulating the relationship of subject and object, he also expanded the definition of touching. Throughout the 20th Century, phenomenologists have explored the relationship between body and technology: Martin Heidegger's *Question Concerning Technology...* (Heidegger, 1993) did so and asked whether all extensions of our instrumentality (or desire or will) that have an end could be considered technology. This was a move on from his earlier conception of technology as *techne*, as all the tools we use (Heidegger et al., 1962); in the *Question Concerning Technology...* Heidegger revised his conception of technology and posited that we live in a world that is *already* shaped by technology and we, in turn, shape technology in a will to power (or "producing", bringing things to be, or mastery) over the raw materials of the world (Heidegger, 1993, p. 287). He also asked if *all* these extensions of our will might be a prosthesis. Merleau-Ponty followed on from Heidegger's point and

argued that the simple (original Heideggerian *techne*) technology of a stick or cane is an extension of one's senses, with touch being transferred from the hand through to the end point of the cane (Merleau-Ponty & Smith, 2002, p. 176). This is especially important to the haptic-phenomenologists discussed later in this section and to how we use our touchscreen-led smartphones today. Each of our taps on a touchscreen are extensions into the internet and could be seen as technological prosthesis (whether of memory, of will, or more). Heidegger did not celebrate modern technology though, Heidegger thought 20th Century technology was incredibly dangerous and was very concerned by the 'Gestell' (or the framework of how we interact with the world) driving us to only be interested in a world-model of "numbers crunching" in which things exist and come into existence only insofar as they can be measured. From that fear, we can see a direct line to Merleau-Ponty's *Phenomenology of Perception* that wishes to explore our embodied understanding of the world in order to ensure we give space to the qualitative (within the production of knowledge). We will now explore the contemporary manifestations of extensions and how this process has become intertwined, intersubjectively, with our everyday experiences in the present day.

In the 21st century, we use 'cloud computing' and 'cloud storage' every day when we upload the photos of moments we have experienced so we can store a memory. We outsource our memory when we ask our smartphones to 'remind us' of something: we have made a memory prosthesis of computing, as Heidegger suggested. Indeed, this behaviour is now so common, it has led to the adage 'We're all cyborgs now' (Case, n.d.; Clark, 2003). In 1999, Angela Carter ventured so far as to say 'Now we have machines to do our dreaming for us' (Carter, 1999) and before her, in 1968, the science fiction writer Philip K. Dick asked 'Do Androids Dream of Electric Sheep?'. These statements and questions serve to highlight how intertwined the human and the machine is becoming in contemporary society. Much as Donna Haraway noted in her 'Cyborg Manifesto',^{xxxiii} our memories are tied up in external items and machines. Merleau-Ponty's work on intersubjectivity and the expansion of the definition of touching helps us to better understand the implications of this.

Merleau-Ponty's expansion of the definition of touching is highly relevant to digital reading. In expanding that definition, Merleau-Ponty emphasizes the relationship between touching and being touched, suggesting that there is a slight overlap in the phenomena. He explains this through the phenomenon of putting our hands together:

...when I press my two hands together, it is not a matter of two sensations felt together as one perceives two objects placed side by side, but an ambiguous set-up in which both hands can alternate the role of 'touching' and being 'touched'... (Merleau-Ponty & Smith, 2002, p. 93)

When we put our hands together, it can begin to feel as though we are both touching and being touched as Merleau-Ponty says; that there is a completeness to the phenomena which dissolves the difference between the two states, unlike when we touch two objects, where the difference in sensation highlights and clarifies the distinction of subject-object separation. Merleau-Ponty also says that, 'The body tries... to touch itself while being touched and initiates a kind of reversible reflection...' (Merleau-Ponty & Smith, 2002, p. 93). It's this 'reversible reflection' which is the clearest way of describing the phenomena that dissolve the difference between the two states of touching and being touched. In his later work, *The Visible and the Invisible*, Merleau-Ponty asks us to consider how our very *awareness* of being physically touched overlaps with the experience of touching (Lingis & Merleau-Ponty, 1968, p. 147). He does so to complicate and expand our definition of touching because, like wearing clothes, we are always in a process of touching the world and being touched by it. He goes further and argues that the dualism between mind and body (Lingis & Merleau-Ponty, 1968, p. 247) and the self and the world (Lingis & Merleau-Ponty, 1968, p. 123) are not so distinct as traditional philosophy would have them. He suggests they are interdependent: this interdependence is something he calls 'the flesh of the world' (Lingis & Merleau-Ponty, 1968, pp. 247–251); he also states that 'we may say that the things pass into us, as well as we into the things' (Lingis & Merleau-Ponty, 1968, p. 123). In diluting the idea of the world as merely a static object, here Merleau-Ponty suggests to the philosophical field what so many narrative writers have been writing toward: namely, that the world is capable of altering us and touching us, just as we are capable of altering and touching it from afar. That is not to say that we *are* the world and the world is us – Merleau-Ponty goes to great pains to make the paradox of interdependence clear (Lingis & Merleau-Ponty, 1968, p. 127) – but, rather, our embodiment in the world is neither fusion nor absolute distance from it; we are touched by and we touch the flesh of the world^{xxxiv}.

The interdependence of the flesh of the world is also something we see in reading when we associate with a character and an overlap develops between us and them: we are not that character and they are distant from us, but as we hold a book or digital device and we go on their narrative journey with them, we are emotionally moved – we are touched by – them. Our emotional selves overlap with the character's journey, from afar, creating an interdependence of emotion and journeying – 'the things pass into us, as well as we into the things' – and so we are affected by that reading. Feeling a part of a narrative or feeling an emotional connection to a character has always been referred to as 'touching' or 'being touched by' that narrative or character, and so it is entirely possible to expand the notion of touch into the digital and virtual through being 'touched-at-a-distance' and with 'felt-proximity' like contemporary phenomenologists do. This notion of

interdependence is further expanded by contemporary haptic-phenomenologists to examine how a touchscreen device might revolutionize what touch and touching is.

In further expanding the definition of touching, Merleau-Ponty has enabled contemporary philosophers to use that expanded definition and apply it to the changes of the 21st century: specifically, the changes in digital technologies. In his book *The Senses of Touch* (2007), Mark Paterson does just this^{xxxv}. Through his own work, which examines how blindness affects internal sight and touch, as well as his engagement with the work of other Merleau-Ponty scholars, Paterson explores all the types of touching available to different types of bodies, including abled and disabled, female, male, and non-binary. Through the overlaps detected in Merleau-Ponty's work with other phenomenologists like Luce Irigaray, Paterson then teases out a sense of what he calls 'haptic-phenomenology', felt-phenomenology or touch-based phenomenology, and applies that to early 21st-century digital technologies like touchscreen computers and ultrasonics. 'Haptic technologies', as a term, has been used by engineering since the invention of the aeroplane and the resulting force-feedback of air-pressure on cockpits. However, though there were a few patents established in the 1970s, IT communities have only embraced the term since the 1990s, when computer-game controllers were given the ability to vibrate in response to actions in the game. Due to the popularity of the Apple iPhone and its touchscreen interface, the IT community has become progressively more interested in haptic technologies – so much so that Apple developed a '3D touch' pressure sensitive system for iPhones in 2015 (Apple, 2015). There are also companies like UltraHaptics developing ultrasound-based touch-feedback technologies for everyday computing input (*Ultrahaptics*, 2018). Paterson, however, highlights how a sense of feedback and touch through a technology was also defined by Aristotle centuries previously, who describes a man carrying a shield:

If the shield is struck forcefully the blow is felt immediately, not as the successive blow of sword on shield and then of shield to man. The intermediary nature the shield received as the blow is felt, just as the intermediary of flesh is forgotten in tactile experience. (Paterson, 2007, p. 158)

If our computer game avatar is struck and our controller vibrates, so too do we feel that we have been struck, like the man using a shield; if we click through an eLit text and it leads us to disappointment for our character, we too are disappointed. This echoes Merleau-Ponty's gestalt approach to touching and being touched – we can be emotionally touched at a distance and we can be physically touched through an intermediary. Here, too, the scene of knowledge is relocated and we can see it becoming distributed through our digitally networked technologies; to me, this notion of being touched at a distance has become evident in the Skype, Google, Zoom, or Microsoft Teams

calls we make to family or friends in the 21st Century. This has expanded our notion of touching, our sense of presence, and the scene of our knowledge. This is explained well by a synthesis of phenomenology and haptic-phenomenology: to be ‘touched at a distance’ is something that Paterson discusses in an even wider sense than Merleau-Ponty; both Paterson and Merleau-Ponty discuss this so we will look at just one more of Merleau-Ponty’s texts before going into more detail on Paterson. In another of his major works, *The Primacy of Perception*, Merleau-Ponty argues that one can perceive objects in the world relative to their significance to the lived body’s needs and that the objects in the world ‘display themselves’ or, in other words, that to look at or through an object is to understand how it relates to other agents and objects in the world and so we may also be able inhabit or look through the objects perception (Merleau-Ponty & Cobb, 1964, p. 68). This ‘looking through’ connects the idea of a touch intermediary through objects to Paterson’s ongoing expansion of what both the haptic and touch is in the 21st century. That inhabitation of ‘looking through’ will be familiar to anyone who makes a Skype or video call.

Paterson regularly suggests that feeling and touching is ‘more usually a feeling-with’ (Paterson, 2007, p. 34) because all touching, all action, is embodied and our bodies sense proximity, and reversibility. Paterson argues this by referring to Merleau-Ponty’s notion of intercorporeity as something which ‘decouples “touch” from mere “sensation”’^{xxxvi}. Paterson pushes for the focus to ‘remain on tactility, empathy and felt proximity’. We can use these terms, ‘empathy’ and ‘felt proximity’, interchangeably with ‘being touched’ and the inhabitation of ‘looking through’ discussed earlier. The terms ‘touched at a distance’, ‘looking through’, ‘feeling-with’, and ‘felt proximity’ are especially relevant to digital reading and eLit as explored in this thesis because many studies of digital reading show that it is an embodied practice (Mackey, 2002; Mangen & van der Weel, 2016; Merchant, 2015) and that embodiment can be expanded from the tactility of holding a book or device to a radical embodiment achieved through ‘touching at a distance’ and ‘felt proximity’ achieved by various technologies like telepresence and touchscreens. Ontological boundaries are transcended when we feel touched by something that is not ourselves or another person. eLit, through haptic feedback and touching at a distance, expands and reshapes our notions of embodiment, radically, into the augmented and virtual digital worlds; if, for example, you are using a device to navigate through an eLit horror text and it vibrates (gives haptic feedback) as you turn a click or tap to turn a corner in a tense environment, you could feel as scared and as alert as if you were touched (at a distance) by an arrow hitting your shield. At the time of writing this thesis, Elisabeth Nesheim at the University of Bergen is working on a doctoral study of haptic phenomenology in the digital context, which demonstrates that this is a cutting-edge and growing field.

Immersion, its affect, and its analysis

Whether read on a digital device or in a book, the notion of being touched at a distance is something readers have felt whenever they have felt themselves to be a part of a text-world. That text-world is built through a narrative created by the author and the activity of reading undertaken by the reader (Gerrig, 2018) – in literary studies, this process is known as metaleptic projection. Metaleptic projection happens when we invest, or project, an element of ourselves into the text world. Here we see an interdependence of worlds, reminiscent of Merleau-Ponty's interdependence of subject and object that allows the reader to access logically incompatible worlds. These worlds are connected and layered over one another by metaleptic tools to *merge* those worlds (A. Bell, 2016) allowing the reader to immerse themselves in eLit.

Immersion in eLit and the strength of narratological metalepsis is something Bell, Ensslin, and Smith have recently studied in depth. Through an empirical and rigorous case-study of an immersive eLit project, they were able to tease out the 'doubly-embodied' nature of immersive eLit, defining categories of immersion as 'narrative or ludic immersion', and offering a new analytical method for immersive features in eLit (A. Bell, Ensslin, Bom, & Smith, 2018). They found that, simply, players bring elements of the physical world into the narrative world. Their method is what makes their findings just as interesting. They suggest a method which is a symbiotic '...cognitive poetic approach to immersion in digital fiction, which combines text-driven analysis with theories of cognition and empirical research'. In combining the theories discussed here and in the previous section of this chapter with neuroscience and reading studies, alongside examining case studies, they provide a triple-layered approach; they shorten this empirical gathering of data that informs analysis to the term 'empirical cognitive poetics', a term which they've created for their study and their future research. Published in 2018, this is a cutting-edge method that I will use in the practical element of this PhD because of its innovative and thorough approach to addressing the nature of the reader/user/player^{xxxvii}. The most innovative element of their method is their inclusion of 'extratextual' and 'collaborative' immersion. 'Extratextual' refers to other phenomena affecting the text's reader/users/players while playing and what they brought to the experience, while 'collaborative' refers to how those players play together. This extratextual immersion is especially important in understanding how eLit can affect change in a reader/user/player when at play: if they bring phenomena into the text's narrative world then these must be either of importance to them, highly noticeable, or a recent encounter. This gestalt approach gives both a theoretical and methodological value to the structure of this study into understanding immersion. Importantly, this highlights something that has not been popularly articulated before: that immersion in eLit can actually be stimulated by external phenomena, interdependently as Merleau-Ponty might point out,

and not solely through metaleptic projection. This extratextual, gestalt understanding of immersion helps affect change in a player and I will use it in my own work by actively encouraging reader/users of my *Situated AR eLit* to take in the world around them, to feel the skin of the world then relocate their scene of knowledge there, and feel out their environments while immersing themselves in the play of *Here. Now. Ours* (the practical element of this PhD).

When Huizinga and Geertz's play-focused approaches are combined with Bell, Ensslin, and Smith's empirical cognitive poetics work on immersion, it becomes clear that immersive eLit which is played through an embodied project can help the reader/user to get more from it and be affected more acutely by it. When we accept Merleau-Ponty's notion of interdependence through the skin of the world and Paterson's 'being touched' through the many kinds of haptic phenomenology, we can see how embodied Augmented Reality experiences could affect and touch a player deeply through radical felt-proximity as well as relocating the scene of knowledge to be a part of the surrounding environment. From all of these theorists' work, it is the position of this research that AR offers the highest form of narratological metalepsis in eLit and that increasing awareness of a city's public spaces is possible through embodied, immersive, narratological metalepsis when the text is embedded in the architecture and history around them. I call this Architectural Literature and will be explaining this key term in more detail in Chapter 3. *Here. Now. Ours* can instil *agency & civic will* through a 21st Century embodiment combining all that has been detailed in this section.

Section iii) Smart cities, public space, and resistance to the appropriation of public space

Introduction

This section will briefly detail what a smart city is before moving onto the problems with them. Following this, contemporary perspectives on smart cities and their positive or negative effects are discussed in the context of the broader analysis. This includes discussion and reasoning behind the methodological choices of this study. Following this outline of smart cities, this chapter examines how smart cities affect our public space and the theoretical writings on public space with a focus on how public spaces are produced, this will enable us to further understand the qualities of *agency and civic will* in our shared green commons and public spaces. Finally, efforts to resist the private purchase and government sell-off of public space will be detailed in order to ascertain how contested our public spaces are, here, in the early 21st Century and how the practice of this PhD might respond to these issues.

What is a smart city?

Smart cities are urban, built environments that “...collect electronic data from citizens, devices, and assets to manage available resources more efficiently.” (Holst, 2020b). Smart cities are also known as U-Cities (Ibid), sentient cities (Shepard, 2011), and a part of the Internet of Things [IoT] (Accenture, 2016). They have developed because of the advances in ubiquitous computing, urban informatics, and the growth of cities into megacities (i.e. cities of over ten million people) and now, as Malcolm McCullough writes, “Everyday transactions use and create long trails of data.” (McCullough, 2013, p. 195). Though complex in design and theory, smart cities are now commonplace over the world in varying levels, due to the aforementioned technological developments.

Mark Weiser coined the phrase "ubiquitous computing" in his 1991 technical paper 'The Computer for the 21st Century' (Weiser, 1991) and it has developed into an important field of its own – it has grown massively with the expansion of the internet, big data, mobile telephony, and has demonstrably enabled the growth of smart cities (Lissandrello & Vesco, 2020, p. iv; *Transactions on Large-Scale Data- and Knowledge-Centered Systems XXVII Special Issue on Big Data for Complex Urban Systems*, 2016). The terms ubiquitous computing and urban informatics are relatively new: “urban informatics” wasn’t used until 2003 (Rheingold, 2005) but has grown since and now sits at the intersect of urban planning and smart cities (*Handbook of research on urban informatics the*

practice and promise of the real-time city, 2009; Kontokosta, 2018); such is the strong growth of ubiquitous computing that there is now an annual conference from the Institute of Electrical and Electronics Engineers (IEEE) under another of its names, pervasive computing. There has been much recent work on ubiquitous computing like the book *Ubiquitous Computing, Complexity, and Culture* (Ekman et al., 2015) and indeed the IEEE journal recently published a special edition exploring pervasive technology by and for children and teens (Kostakos et al., 2020) because ubiquitous computing has now become an everyday part of our lives. Cities the world over are similar, data trails are growing everywhere and at different levels of complexity. Building on the telegraph and telephone network before it (Castells, 1989; Hu, 2015), this complexity of data and information has seen a large number of novel uses built on top of the internet and “cloud-based” computing (i.e. on-demand delivery of computing services over the internet). Such is the interest in and demand for these novel uses of data that there have been many negative and positive applications of it.

What are their positives?

There are many advocates of smart cities. Some show that smart cities have major benefits to efficiency (Rujan, 2018) through the use of large amounts of data being processed (Nathali Silva et al., 2017) and through the speed at which decisions can be made (Tran Thi Hoang et al., 2019). Another positive example of novel uses for data came from the inventor of the internet, Sir Tim Berners-Lee himself, with the creation of the Open Data Institute (ODI) in 2012 (ODI, 2018). The ODI attempts to advocate “for the innovative use of open data to affect positive change across the globe”. In practice this means promoting the use of open data (i.e. data from institutions and organisations that is made easily available and transparent as soon as possible) to public and private enterprises alike, with the aim of increased accountability for and transparency to the general public especially in cities that are becoming smart cities. The ODI says,

We advocate for and support practices that increase trust and trustworthiness: building ethical considerations into how data is collected, managed and used; ensuring equity around who can access and use data; engaging widely with affected people and organisations. (ODI, 2018)

Here the ODI has made clear that their work isn’t solely in promoting the use of open data for public transparency, but also in wider advocacy to ensure ethical considerations are paramount when data (and especially big data) is used.

As the use of the internet, big data, and smart cities continues, the voices calling for more ethical considerations grows parallel to it; this can be seen in the growth of the Electronic Frontier Foundation (EFF), America’s leading non-profit organisation in “defending digital privacy, free

speech, and innovation" (Mikhailichenko, 2020) has won many privacy cases and run many successful campaigns (EFF, 2020). Other similar organisations have mounted similar campaigns, such as Open Knowledge Foundation (OKF) which builds on the ODI's work with open data and runs campaigns similar to the EFF. We'll discuss the OKF more in this section but first it's important to look at an example of how open data has made positive change.

The ODI's work and a renewed global initiative by governments working alongside organizations^{xxxviii} has indeed meant some positive changes. One such set of positive changes is detailed by Piyush Yadav et al (2017) who list the following as the impact of open data on mobility:

- *Better Parking Management*
- *Intelligent Traffic Management*
- *Improved Travel Planning*
- *Active Mobility*
- *Increased Trend in Ride-Sharing*
- *Increased Environmental Awareness*
- *Fostering Innovation and R&D*
- *Mobility as a Service (MaaS)* (Yadav et al., 2017, pp. 1259–1260)

Their quantitative research in the above shows an increase in all of the above in the nine smart cities they studied and they finish by saying "Arguably, we are moving towards more citizen-centric and participatory mobility model leveraging ICT and open data as its backbone." (Yadav et al., 2017, p. 1260) This is a positive step in enabling more mobility, for both able-bodied and disabled people, using open data and is a strong argument for the positives of smart cities.

The lessons from Yadav et al's study that smart cities help civic society move towards more citizen-centric models has impacted a variety of other studies. This includes, 'The Humanification of the Urban Community: An Italian Smart District Experience' (Cappellaro et al., 2020) and 'Digital Participatory Platforms for Civic Engagement' (De Filippi et al., 2020). Francesca Cappellaro et al's in-depth study on one Italian district found that:

...new capacities emerged to overcome [participants'] existent inertia through the mediation of interests between governmental institutions and communities in a deep, circular reciprocity that involves technology and the territory...[and] the involved citizens become interested to experiment [in] new forms of organization of the community, towards a collaborative governance. (Cappellaro et al., 2020, p. 40)

The nature of this research, alongside the evolution of smart cities, is recent at the time of writing (2020) and positive test results from Capellaro and her team can be observed here; as the quote states, individuals and communities felt the technology helped them connect to their governing institutions. This connection is an important, positive step and this positive connection to governing systems through technology was also something that Francesca De Filippi et al saw in the study of Digital Participatory Platforms (DPPs). De Filippi et al reviewed several smart-city projects that aimed to increase civic participation in the work of public authorities and found “e-Government represents an important improvement in the provision of public services” (De Filippi et al., 2020, p. 4) and that;

On one side, the DPPs have the great merit of favoring the bottom up involvement, making the citizens aware and responsible protagonists of the choices adopted in their own city. On the other side they give the possibility to make the PA [Public Authority] more transparent in the investment decisions and aware of the citizens’ needs (accountability), facilitating the activation of inclusive processes and the planning of projects in the territory on a small and large scale. (De Filippi et al., 2020, p. 17)

Here De Filippi et al have shown that using a digital participation tool can increase awareness in citizens while having the added benefit of making the public authority or council more accountable, especially in planning. This is an important and positive point to take from smart city initiatives, precisely because this is what this doctoral research interrogates; by creating a tool for digital participation, Chapter 3 indicates that awareness has been raised in the participants. These are some of the contemporary, positive results that can come from the use of smart city environments and their tools and many of these require the open data previously mentioned.

What are their negatives?

The problems inherent in smart cities are the problems inherent in big data. A foundation which reveals the negative sides to the growing use of big and open data is The Open Knowledge Foundation (OKF). The OKF uses open data to build on the ethical aims of the ODI and make campaigns for institutional transparency and individual privacy. They are the primary trustee of the CKAN project which governments use, they facilitate the annual Open Data Day, and ran the first Open Government Data event (Foundation, 2020a). Most recently they have launched the Open Knowledge Justice Programme to work against some of the more negative practices that have emerged from big data use, specifically the OKF is supporting legal professionals in “the fight for algorithmic accountability” (Foundation, 2020b). This could include, for example, training legal professionals to further their work protecting individual legal rights from the threat of private companies’ artificial intelligence (AI) programmes and algorithmic stockpiling of data on and about

individuals. Just as with big data, accountability in Smart Cities is a very unclear subject as individuals rarely know or understand the fullest extent to which their data and their lives are being surveilled and thus profiled; this negative practice can lead to smart city operators, often private companies, holding vast amounts of data on individuals without the individuals knowing (Al Zamal et al., 2012; Hinds et al., 2020; Park et al., 2009).

The work of the OFK is instructive because it hopes to ensure wider accountability and transparency, not just from public institutions but, from some of the biggest companies in the 21st Century global technological order. Some of these large companies – e.g. Facebook, Apple, Netflix, Google (FANG) – have so much data on the billions of people that use their digital services that they have become known as ‘people farmers’, with Facebook being the biggest social media network (or people farmer) in the world^{xxxix}. As a result, many investigations have led to it and other companies being taken to court over the use of negative, big data practices (Guynn, 2020; Li, 2018; Reisinger, 2012). These negative practices are the great risk that smart cities run: when large, private companies are so intertwined with the administration of a place, their data gathering becomes invasive; that invasion is not only a negative practice on a local level but it undermines basic human rights that have been recognised by global governance organizations like the United Nations; broadly speaking, the FANG people farmers walk on a very thin line, balancing how much personal data we choose to give them and how much they can then sell – this isn’t a breach of personal privacy when we choose to do it but if it is done in a smart city, without our consent, then it is a very great invasion and dismantling of rights. To illuminate this broad point, there are very real, very pressing examples that will now be discussed.

Examples of the negative practices and uses of big data that come in many forms can be explained through contemporary smart city sites: Sidewalk Labs, a subsidiary of Google, have been in talks with Toronto City to develop the neighbourhoods of Quayside and Villiers West into smart city areas (D’Onfro, 2019) but have faced a fierce reaction against the immense invasions of privacy within the plans; these privacy concerns, alarming in and of themselves, have seen many of the appointed people from Toronto City’s management agency quit due to their concern over Google’s history of the sale of personal data (Cyphers, 2020). Workers’ concerns grew exponentially when the amount of data and the number of people being surveilled was revealed; this level of access to personal, city-wide data caused serious concerns at the level of control it gave a private company over Torontonians’ daily lives – concerns generated by the fact that a private company isn’t liable to the public in the same way that a public body or local government is. Google has already suffered longstanding complaints that its growing reach into our everyday lives is authoritarian (Pollock, 2019) so to then allow the company control over a section of a city would make their position

literally and figuratively cemented. The Sidewalk Labs project has thus struggled through planning processes, indeed a mass #BlockSidewalk campaign was mobilised to halt the process until full democratization and transparency of the planning process is given to the people of Toronto (BlockSidewalk, 2019) (more on this in the next section of this chapter). Another, more successful but no less notable example, is 'City Brain' – City Brain is an AI, joint project between technology company Alibaba and the Chinese city of Hangzhou in Zhejiang province that is now expanding its services to Kuala Lumpur (Beall, 2018). Just like Google before it, Alibaba is a technology company that has grown to become a data-harvesting company and indeed sells its user data onto larger companies, often obliquely (Bloomberg, 2018). These examples cite instances of arrangements to share public data with private companies. This is problematic because countries within the European Union consider organisations - be they public or private - holding data on them a personal privacy issue under General Data Protection Regulation (GDPR) and any unknown sharing of that data is a legally indefensible step beyond whatever the individual agreed to or signed up to; though this isn't a globally recognised standard of data protection, it is the highest standard and as such others should be held to it.

These are pressing concerns as the influence and power of technology companies grows; if they are given the data flows of a section of a city, the notion of 'mission creep' would argue that there is little to stop them eventually growing to control and data harvest from a whole city; if those cities have large populations, there is little to stop individual companies influencing the laws and habits of tens of millions of people without oversight, just as lobbyists for Google have done to the Federal Governments of Australia and the USA (Meade, 2021; Taplin, 2017). Google and Alibaba run under light-touch regulation in their home countries, Google and Facebook have lobbied against legislation that would control their use of news media (Meade, 2021), and Google uses complex systems of tax avoidance to ensure their profits are not properly shared by public governments (Reuters, 2019) and so their practices as applied to legal oversight and taxes could easily be applied to laws and people – tilting legislation to their benefit while extracting from people all the profit with undue care to the public. These practices of extractive surveillance are detailed below in Shoshana Zuboff's work but it is clear that the downside to giving private companies control of our cities is that those companies grow their institutional, legal, and political power while the public's power to affect their cities shrinks. Detailed in the next section of this chapter is just how much our public space has shrunk over the last few decades and giving more power over public space to private companies is a risky practice. Added to this, there are also larger, ethical questions at the heart of smart city arrangements. These include, but are not limited to, whether an AI be given near-omniscient observance tools, should people farmers be allowed to become a property developer, should a city's

population be given a vote before a city becomes a smart city, and – importantly for this doctoral research – where should public and private interests *not* intersect?

Though there are many claims that smart cities have major benefits to efficiency (Rujan, 2018), the ever-shifting questions around smart cities and negative practices are being explored by many researchers across diverse fields, this is indicative of the range of impacts that smart cities are having and can help us understand where public and private business interests should not intersect (at least without challenge from the public). Of particular interest is the work concerned with Data Privacy and the future of technology (Gray, 2019; Verdegem & Van Der Graaf, 2014; Yeung, 2018) with Shoshana Zuboff at the forefront of contemporary public research in her continuing work (Biddle, 2019; Zuboff, 1988, 2015, 2019) on surveillance capitalism. Like Wolfie Christl and Sarah Spiekermann's *Networks of Control* (Christl & Spiekermann, 2016) before it, Zuboff's work questions whether individual users profit from the contemporary structures of the internet or whether we have replicated capitalist exploitation and control through corporate surveillance of the network flows of the internet.

Zuboff's central premise is that we are now in an era of capitalism that is best defined as surveillance capitalism because, as her examination of big people farmer companies has made explicit, these companies use mobile telephony software surveillance to extract profitable data from individual lives in order to sell it to bidders wishing to affect behaviour, as well as using the data themselves to affect behaviour; this creates a new expression of algorithmic and institutional power that radically affects democratic norms (Zuboff, 2015, 2019). Surveillance capitalism is only possible through the use of big data; the consequences of big data go much further than simply advertising things in a more directed and personalized way, they can and have won elections and referenda in America, England, and Kenya for the highest bidder and inquiries are still ongoing (Cadwalladr, 2020; Madowo, 2018) into their damaging democratic effects – such are the concerns that Peter Corcoran's Plenary Presentation at the IEEE 5th World Forum on the Internet of Things called the privacy challenges inherent in smart cities using IoT 'uberveillance' (Corcoran, 2019). Here, again, we see the growth of technology companies' power: from Google and Alibaba's efforts to develop Artificial Intelligence (AI) to run smart cities to technology companies allowing their data to affect votes in referenda and thus directly affect the direction of democracies; this is not simply lobbying on the internet, this is a huge socio-political change that has been well documented as such in its aftermath ("Cambridge Analytica controversy must spur researchers to update data ethics," 2018; Hinds et al., 2020; Isaak & Hanna, 2018; Schneble et al., 2018). Such revelations have, in turn, increased calls data for transparency while documenting how "Online privacy is confusing and people lack knowledge of risks relating to their networks" (Hinds et al., 2020). Hinds et al found that,

even in the wake of the Cambridge Analytica police investigations, many users did not delete their affected online accounts and so the researchers are right to highlight that online privacy is confusing to many people. Just as it is with online platforms, so it is with smart cities – when the personal is the (data-led) political within smart cities, people may opt-out of smart services but their behaviour may be inferred and a data profile harvested simply by being in their community and/or around their friends (Al Zamal et al., 2012; Park et al., 2009). From this we can see that there is an increasing amount of evidence to show that companies using extractive surveillance practices are powerful political actors with little understanding of said power from their users. Indeed these privacy risks, confusion, and negative practices have caused more than just Foundations to become involved in exposing data malpractice, there are many groups of academics, activists, and communities engaged in resistance to surveillance capitalism and big data extraction; examples of these resistances will be detailed later in the chapter but the publication of the very recent work *Data Feminism* (Catherine D'Ignazio & Klein, 2020) shows how these interrogations, both academic and public, are becoming increasingly important: “*Data feminism begins by analyzing how power operates in the world.*” (Catherine D'Ignazio & Klein, 2020, p. 21) – by interrogating the relationships between data and power, *Data Feminism* continues the work of feminist scholars into Surveillance Capitalism.

It is in that spirit of interrogation that the focus of this doctoral research sits; the main aim of the Case Study is to interrogate whether the use of specific open data from Galway City, through augmented reality (AR) electronic literature (eLit), can increase awareness of citizens' green space and the city's planning applications. This approach necessitates using some of the open data available to Galway City residents but in an anonymised, focused, non-invasive way. The methodological choices involved in constructing something that enables the participant but resists the negative practices of surveillance capitalism, identified by Zuboff and others, are detailed in Chapters 3 and 4. At this point, it is important to note that the debates and concerns around big data, smart cities, and surveillance capitalism are very much at the forefront of the construction of this doctoral research. Therefore, the practical element of this PhD was constructed to resist the negative practices identified; the AR of the practical element complicates and enriches the way we see our cities.

If we accept that cities are a series of instructions and inhabited information that use architecture and signage to convey this information in a calm, static way as David Henkin (Henkin & Henkin, 1998) and Malcolm McCullough (McCullough, 2013) separately argue, then smart cities and urban informatics complicate those signs through the layering of the digital onto the physical. Yet, if we consider there are physical manifestations of digital space around us at all times, some that can be seen with the naked eye – the telephone poll is the most obvious but the WiFi symbol in a café

window or on a park streetlight is now commonplace – then we must examine and understand the relationship between the production of space, physical public space itself, and where digital technologies then intersect with those spaces. With this wider understanding of the smart cities and therefore the context for the *Situated AR eLit* of this research, a selection of the theoretical writings on public space will be examined to see how smart cities affect our relationship with public space.

Public space and the changes it faces in the 21st Century

With a history as long as civilization itself, public space has a broad, physical definition – meeting places, pathways and roadways, common woods; simply put, commons. In this section, the relevant selection of the theoretical writings on public space and the public sphere will be detailed so that the work of this research is contextualised. First, one of the theorists with a great impact on how we think about space will be detailed.

Over the course of his life, Henri Lefebvre wrote about cities and space in many ways. Over the course of the whole book, Lefebvre's *The Production of Space* (Lefebvre, 1991) articulates the idea that space is socially produced and that socially produced space, itself, can be categorised into three types:

1. spatial practice
2. representations of space
3. representational space

'Spatial practice' describes the geographical places and practices of human social activity; in the everyday acts of buying, playing, travelling, and working, as much as in the everyday spaces of the home, office, school, and streets. 'Representations of space' are how space is conceived by cartographers, city planners, and others through plans and maps; these representations of space are the sorts of symbols and forms used to organize and direct spatial relations. 'Representational spaces' are those spaces that the imagination seeks to change and appropriate; this type of space gives a place of representation to the diversity of thought in society and is often found in clandestine places of resistance to the societal norm. Lefebvre also argues that 'abstract space' is space made and remade through grids, plans, and schedules, and is utilized by the capitalist system of production to reinforce a capitalist atomization of space. One could argue that Augmented Reality (AR) sits across all of these due to its reproduceable, representational, and discursive potential but I would argue that AR is the other form of space that Lefebvre articulates, *differential space*, as articulated in this quote,

I shall call that new space 'differential space', because, inasmuch as abstract space tends towards homogeneity, towards the elimination of existing differences or

peculiarities, a new space cannot be born (produced) unless it accentuates differences. It will also restore unity to what abstract space breaks up - to the functions, elements and moments of social practice. It will put an end to those localizations which shatter the integrity of the individual body, the social body... (Lefebvre, 1991, p. 52)

Here Lefebvre defines 'differential space' against his conception of other types of space, in particular 'abstract space', and he sets out how 'differential space' might shatter 'the social body' and thus change the relationships between citizen and state via reshaping socially produced space. This use of differential space to effect change is noticeable for how many writers and groups it has inspired, from the Situationist International in the 20th Century to modern, internet theorists in the 21st. Indeed, Lefebvre was so ahead of his time that, in describing mid-20th Century capitalist uses of space, he described our current surveillance-capitalism organisation of urban space as somewhere that,

...no longer gathers people and things, but data and knowledge. It inscribes in an eminently elaborated form of simultaneity the conception of the whole incorporated into an electronic brain, using the quasi-instantaneity of communications (Lefebvre, 1996, p. 170)

Again, here Lefebvre critiques how public space is used for the social production of space and critiques why these spaces are made to conform to centralized symbols and actions that affect behaviour, thus giving observers both data and a form of control. These concerns are exactly those of Zuboff, writing now in 2020, that guide the design and case study methodology of this doctoral research. Public space, then, isn't solely a space that is shared by a community but one that is a 'differential space', a surveilled space, and a 'representational space' where common and illicit or revolutionary activities can happen side-by-side. Lefebvre's notion of a 'representational space' has also been called a 'hybrid space' by architectural theorists including Frans Vogelaar and Elisabeth Sikiaridi. Vogelaar and Sikiaridi began work on the concept in 1988 but first presented it in 1991 at the exhibition space of the Architectural Association (A.A.), and then they published "Demand Your Right to Broadcast" as a part of the A.A. Projects Review for that year (Vogelaar & Sikiaridi, 1991). Discussing 'the interaction of analogue/digital space' (Kluitenberg, 2015) of hybrid space, Eric Kluitenberg describes it – in its fullest sense – as somewhere which

designates a single, unified concept of space that is characterised by the simultaneous presence (co-presence) of different, heterogeneous and, at times, contradictory (operational) spatial logics. The concept proceeds from the assumption that different spatial logics are superimposed in any "lived" space. (Kluitenberg, 2015)

The 'different spatial logics' that Kluitenberg says are 'superimposed' align with Lefebvre's and Zuboff's concerns for space, echoing the need to resist the negative practices of surveillance capitalism through playful resistance to that which gathers and extracts 'data and knowledge'. AR is a kind of play that creates a hybrid space and, if created with privacy in mind, can be used as a tool to resist the gathering of data while contradicting those aforementioned imposed spatial logics – this is a part of why AR was chosen for this research. Hybrid space is also analogous to the design term 'Hertzian Space' that Anthony Dunne and Fiona Raby used to describe a holistic view of the electronic device and its cultural interactions as well as the architecture of the physical interactivity between a device and a person (Dunne, 2001, p. 21) – as AR creates hybrid space through Hertzian space, it is a fascinating and playful intervention in spatial logics. More of the reasoning behind choosing AR will be detailed in the next section and in the next chapter, Chapter 3, but playing and play within public space have an important part in resistance to negative practises.

The play of everyday life, happening in the 'spatial practice' Lefebvre defined, is something that architects, artists, human geographers, and theorists alike have remarked upon as an important force in community building. Nicolas Whybrow, Professor of Urban Performance, put Lefebvre's desire for play into context when he wrote

...Lefebvre outlines his desire to 'restitute the *fête* by changing daily life' (168). In *Right to the City*, which, as the title suggests, polemically asserts the urban dweller's claim to participatory citizenship, he writes that such a 'renewed *fête*' was 'fundamentally linked to play' and involved, in an echo perhaps of Hall's 'modernism in the streets', 'subordinating to play rather than to subordinate play to the "seriousness" of culturalism [. . .] Only relatively recently and through institutions has theatre become "cultural", while play has lost its place and value in society' (171). (Whybrow, 2011, p. 17)

In this quote, Whybrow has done the difficult work of summarising Lefebvre's position and putting it into context alongside the contemporary thinking of the English academic Stuart Hall. Lefebvre is calling for a more playful everyday – just as Walter Benjamin and Michel de Certeau did^{xl} – through both the state encouraging playful engagements by 'subordinating to play' and through people embracing the play of everyday life. This raises the question of whether we can choose to experience an ongoing, continuous kind of *Ambient Play* that is both in the background and, when we choose, the foreground of everyday life – this is a key term for this doctoral research and is explored in-depth in Chapter 3. What's clear from all Lefebvre's work is that, to him, public space must be an open, playful, and participatory space to enable the possibilities of 'differential space'

and hybrid space so that citizens engage with their rights (to the city). An expansion of citizens' rights is the theme of many of the essays in a collection responding to Lefebvre from 2008, *Space, Difference, Everyday Life: Reading Henri Lefebvre* (Goonewardena et al., 2008), and it's clear that Lefebvre has had a far-reaching effect on thinking around agency, publics, commons, and participatory citizenship. These areas of Lefebvre's thinking are particularly relevant to this doctoral research as it seeks to interrogate whether awareness of particular public and/or common spaces can be increased via kinds of play.

From Jane Jacob's "...intricate ballet..." of her 1960s street (Jacobs, 2000, p. 60)^{xli} and Mexican public spaces being reserved for playful ways of being (Pieprz, 2016),^{xlii} right through to the *Barcelona Declaration* presented to the United Nations in 2016,^{xliii} playing in public space and having a right to a space to play is arguably becoming recognised as crucial to a good quality of urban life. Architects and architectural theorists like Jahn Gehl and Annette Miae Kim (Gehl, 2011; Kim, 2015) are refocusing the primary dimension of architectural design from the building to the human and the spaces that humans use. Mayors from cities around the world are moving to discussing the importance of ideas like the Barcelona Declaration (Colau, 2016; Harvey, 2012; Perry, 2016) and, at the time of writing, Lithuania's capital of Vilnius "...has announced plans to turn the city into a vast open-air cafe by giving over much of its public space" (Henley, 2020). All this shows that there is a great momentum behind the desire for more public space that increases quality of life and in a 21st Century where the internet is everywhere, this is true of both the physical and digital. Unfortunately, this desire for more public space is not shared equally.

Public space is for sale and under threat in the UK, America, and much of the Western Anglosphere. These are appropriations of public space by private interests, facilitated by governments of the last 100 years.

The first example we will explore is from Brett Christophers' book, *The New Enclosure: The Appropriation of Public Land in Neoliberal Britain* (Christophers, 2018). He forensically exposes how roughly 10% of the entire British land mass has passed from public to private ownership since 1979, worth approximately £400 billion, with a considerable amount of it disappearing from records entirely (Christophers, 2018, pp. 247–249). Christophers explicitly ties this sell-off to a neoliberal political ideology and, in the data since 2010, to a UK governmental programme of austerity (Christophers, 2018, pp. 128–131). Christophers is not alone in this analysis; an investigation led by The Bureau of Investigative Journalism and aided by Huffington Post UK in 2019 found that thousands of English public spaces had been sold due to central UK government squeezing local government budgets (G. Davies et al., 2019); these included libraries, community centres,

playgrounds, and commons. Both investigations look at the numbers and monetary values of the sales but it is the clarity of the second which truly shows us the scale of public space lost – twelve thousand public spaces have been disposed of by English councils since late-2014 (G. Davies et al., 2019). So acute is the problem that protests began in 2016 and have continued regularly since, with some journalists dedicating their work to it (Dixon et al., 2018; Gleave, 2016). There is a similar, though not as severe, problem in the United States. Public space is certainly under threat there, however, with Yosemite National Park having lost 30% of its mass over the last 100 years (S. Emerson, 2016). The subtlety of this atomising, encroaching appropriation of public space is represented in a particularly telling way by the phenomena of Privately Owned Public Spaces (POPS): these are areas of urban environments that seem like the streets, thoroughfares, or parks of Lefebvre’s ‘spatial practice’ but are in fact privately owned and thus subject to private control and different laws of trespass; when private companies can patrol and privately police areas which have historically been public and still seem public, this is a clear and nefarious appropriation of public space.

Recent reports indicate that these negative practices continue today and are even expanding to feature technology as a means of regulating behaviour in public space. Recent reporting from The Guardian reveals just how much ‘creeping privatisation of London parks’ took place in 2019 (Hancox, 2019) and how large, London property developers are facing a backlash against their plans for privacy-invading, facial-recognition technology on the streets near their development (Sabbagh, 2019). Facial recognition technology is a very clear example of how the intersection of physical and digital space can be negative. Alongside that, recent investigative journalism has shown that Facebook has affected both the flow of people and the way they vote (Herrman, 2016; Kang & Isaac, 2020) in the real world; in short, the online ‘social media’ sphere has affected the public sphere. Here, again, we have a very real and recent example of how the intersection of physical and digital space can be negative. Due to the Black Lives Matter protests in mid-2020, Amazon and IBM revoked American police department’s licenses to use their facial-recognition technologies (Levy & Hirsch, 2020; Peters, 2020) and some parts of the world are pushing back and pushing back against big technology companies appropriation of space as well as their use of power and influence in the process – in late 2018, Stockholm refused Apple the planning permission for an Apple Store on one of their oldest public spaces because

“Kungsträdgården is the most important park in Sweden,” says Johanna Jarméus of Nyréns Arkitektkontor, a leading architecture firm. “It is the thread that pulls together the historical power of the monarchy with the commercial blocks of Hamngatan and the

working-class districts of Södermalm. This is very important for democracy because it has to do with power, symbolically and spatially.” (Orange, 2018)

When Johanna Jarméus says this decision around public space ‘has to do with power, symbolically and spatially’, she neatly conveys how important public spaces and their preservation are to cities, democracies, and the people in them everywhere. That one sentence of Johanna Jarméus’ sits underneath all the theories and questions of Lefebvre, Jacobs, de Certeau, and Zuboff; there is great and growing resistance to the powerful, private appropriation of public space and those resistance movements will now be detailed.

In this chapter, we have explored real-world examples of how big data, people farmers, and smart cities affect our relationship with public space: when the largest social media platform in the world, Facebook, is affecting the flow of people in normal, non-smart-cities, then giving large technology companies like Facebook or Google control over a city will mean they can increase that private influence over public space. The larger any one monopoly of an internet company grows, the more that other public forums & commons are squeezed – just as private interests squeeze public land, something that can and should be challenged by the digital humanities.

Alongside the research discussed, there are many other activists and groups working to resist the negative practices of surveillance capitalism and these go hand in hand with a resistance to the appropriation of public space.

Resistance to the appropriation of public space

There are diverse groups resisting the private appropriation of public space; from academics and artists through legislators to technological wunderkinds. Newcastle University are currently undertaking a research project, *Wastes and Strays: The Past, Present and Future of English Urban Commons* (Hammersley & Rodgers, 2019), that will explore how these valuable green spaces can be protected through “...the historical and archaeological records relating to four case studies: The Town Moor, Newcastle upon Tyne; Valley Gardens, Brighton; Mousehold Heath, Norwich; and Clifton Down, Bristol.” (Hammersley & Rodgers, 2019). This is a joint research study between the History and Legal departments of Newcastle University and will conclude in 2021. This from Newcastle University is of note as its conclusions could have greater implications for how both communities and legislators think about public space. Indeed, the London Assembly in 2017 passed a motion that ‘Privately owned public spaces need new London plan rules’ (Labboun, 2017) and the Mayor of London responded by drawing up a Charter to regulate London’s POPS (Shenker, 2017). This implies that legislators are aware of the problem and have taken some steps to curb it but the problem nevertheless persists. Global organisations continue their efforts to promote the

importance of public space – the Project for Public Spaces is a “nonprofit organization dedicated to helping people create and sustain public spaces that build strong communities” (PPS, 2019) – and have expanded to work in the growing field of ‘placemaking’, which is the process of embedding a space within its community (and vice versa) through a programme of events. These institutional efforts are commendable and ongoing but require a level of funding that not every group has and therefore individual efforts at resistance will now be discussed.

In order to combat the persistent problem of private appropriation of public space, activists, clubbing together, have been successful in some areas. One such example, and pertinent to illustrate the discussion here, is from the aforementioned #BlockSidewalk campaign. This group have, at the time of writing, had a very recent success and – as of May 7th 2020 – Sidewalk Toronto have announced they are “no longer pursuing the Quayside project” (Doctoroff, 2020). Therefore Google in Toronto, like Apple in Stockholm before it, have been pushed to step away from being a property developer by activist pressure. And this same activist pressure has protected public space from the creep of both privatisation and surveillance capitalism.

In a more individual way, performance artists and soundscape artists have offered examples of ‘taking up space’ in differing and challenging ways (D’Avignon, 2016). In her book *Walking and Mapping* (O’Rourke, 2013), Karen O’Rourke explores a series of walking/mapping projects by contemporary artists that are often digitally augmented and through close readings of those works O’Rourke is able to relate them to well-known works of art from the past half-century. Elsewhere Christina Kubish’s art-walks series of interactive soundscape performances, *Electrical Walks*, makes the electromagnetic fields all around us into something that we can hear during the performance. This is a playful revealing that aurally embodies ambient information and that playfulness is key to understanding how best to engage citizens and encourage them to embrace their *agency and civic will*, a discussion that will be returned to in Chapter 3. It is this idea of playfulness which links the artistic and technological efforts of resistance.

Playing and playfulness within our public space isn’t only a form of resistance employed by artists but something that can be done by the everyday smartphone user. This ties in neatly with the growth of smart cities and pervasiveness of technology because the new digital layer that smartphones can offer means a new, further, and sometimes anarchic level of expression. One of the most popular, recent Augmented Reality (AR) examples of this is Pokémon Go, an app inspired by the popular Nintendo Game Boy franchise that now has people walking around the real world in order to encounter AR experiences. It is as Leighton Evans and Michael Saker say, “The playeur moves more, goes to different places, pensioners reconnect with cities, and experiences many

benefits of this increased mobility and sociospatial awareness thanks to their play” (Evans & Saker, 2019). Here Evans and Saker have invented the term ‘playeur’ by combining the terms ‘player’ and the Walter Benjamin idea of a ‘flaneur’ (who traverses streets in order to enjoy and observe the experience of street life, a critic in the intricate ballet of Jane Jacobs’ streets) so that we know that this new flaneur is critic, investigator, player, and AR technology enthusiast. Some academics and independent researchers use *Pokémon Go* as a successful example of linking communities, play, geographies, and encouraging the use of public space because of the communities it has had a positive effect on (Group, 2016; Piera Jimenez & Hjorth, 2019; Riva et al., 2016; Saker & Evans, 2018), while others have used AR to create smartphone applications of their own for more satirical purposes. It is these artist-activist purposes which are highly relevant to this thesis and will now be detailed.

The academic, activist, and artist Conor McGarrigle gained international attention and inspired community action in Dublin with his playful, satirical AR project *NAMALand*. *NAMALand* used the LayAR app as a platform on which to plot the secretive purchases of the Irish Government department the National Assets Management Agency (NAMA) in the wake of the 2008 financial crisis and subsequent domestic and international government bailouts to banks and big companies. Many of these properties sat empty or unavailable to the public, whose very taxes had paid for them; the *NAMALand* app plotted these locations and let the user see them, with a playful Monopoly man icon imposed on them, through the AR LayAR platform. In discussing the project, McGarrigle wrote

In considering AR art and data it is important to locate the discussion within an artistic tradition of using data (open or otherwise) as a tool of political critique within an art context. ... From the Occupy Dublin camp one day to city-sponsored seminars on Open Data and the smart economy the next, this was its ability to function as a conduit which reconnected NAMA with the space of the city, a connection which had been deliberately severed, to preserve the idea of the agency as a by-product of obscure international financial dealings. What *NAMALand* contributed was an opening up of previously unavailable data and a reconnecting of this data with the fabric of the city itself. (Conor, 2013, pp. 108–112)t

McGarrigle’s own PhD was on agency in Locative Media (Conor, 2012) and *NAMALand* was a fitting, sharp example of increasing agency within a community; in the quote McGarrigle is detailing the artistic design of *NAMALand*, the response to it, and some of the invitations he received to discuss it, as well as explaining how he saw the connection between the negative practises of global finance and his government illuminated by the *NAMALand* AR app. These responses and illuminated

connections bring back into public discourse something which had been appropriated by private finance. Like McGarrigle proved, we can alert communities to when public – and especially green spaces – have had planning applications and/or are being changed from public hands to private through open data, urban informatics, and AR. Just as McGarrigle has done, so too does the practical element of this PhD illuminate government practice through AR and a kind of play.

How my practice responds to these issues

Whether or not the expansion of large internet companies into our public spaces has happened to citizens' benefit is a debate that continues, what is clear is that it *has* happened and *is* happening in places such as Hangzhou, but also that activists are using technology as well as democratic engagement tools to resist it. *Here. Now. Ours* offers an example of such a use of digital humanities tools to challenge the subsuming of public spaces by private interests. Due to the design of the software, the smartphone app won't record user data, publish any route or personal data to me, nor connect with any data-storage-server except the local City Council server; this means the research sits at the edge of these ongoing smart-city arguments and offers a case study which hopes to show an alternative of open data over big data, local over global, and anonymized over surveilled. The 'different spatial logics' of hybrid space along with Lefebvre's *differential space* can provide a way to understand where it is possible to push back against space being privatised like so many Privately Owned Public Spaces. Open Data and AR provide a new avenue for online activism and so this research hopes to create a tool that enables agency in citizens, just as Lefebvre encouraged shattering 'the social body', and thus changing the relationships between citizen and state.

Throughout this thesis, the term 'public space' is used, and the term 'public sphere' avoided, because the latter has its own intellectual history and set of implications. The two overlap (indeed, are intertwined) but for the purposes of this research, the focus remains on 'public space' itself. This is because focusing on public space *itself* gives a quantifiable and qualitative measure of the awareness within the Case Study participants within an urban populace. An undiscovered park is easier to discover than where an undiscovered conversation sits within the wider cultural, political, and social milieu. Measuring awareness of a public sphere is almost entirely qualitative but measuring footfall in a park (quantitative) and what led them there (qualitative) can give us a clear insight into what tools were used to raise the visitor's awareness to get them there. Though this will be explained further in the Methodology chapter, this is why this doctoral research takes a mixed-method approach and tests whether AR can be used as a part of *Situated AR eLit* to increase awareness in participants.

In order to fully understand the technological context of AR and this thesis, the next section will give a brief overview of the current state of AR, AR as public space, and the power dynamics therein.

Section iv) Augmented Reality (AR), AR activism within public space & the power dynamics therein, how AR can help us see our public spaces differently

Introduction

This section will offer a technical outlay of augmented reality (AR). Here, I will define AR within its contemporary, technological field; running briefly through its history to its contemporary applications, I will then use specific examples to enable a fuller context of the wider discussion within this thesis' case study and practical software development. Those examples discussed will also connect to the possibilities of AR activism within public space. This will include discussion around activism and the wider efforts to deconstruct the power dynamics of the burgeoning AR companies (contemporary, surveillance-capitalist, technology companies as well as the companies becoming dominant AR platforms). This will help contextualise the power structures inherent in A.R. also explored within this research. Finally, recent examples and studies on how AR might help us see our public spaces more clearly will be detailed so that the Methodology of this doctoral research can 'stand on the shoulders of giants' and be positioned within contemporary AR contexts.

Augmented Reality (AR)

The first usage of the term "Augmented Reality", as applied to digital technology, was in 1990 at Boeing. In current terminology 'Augmented Reality' (AR) refers to the layering of digital items on the real world, often through a smartphone or Heads Up Display (HUD) wearable computing device. The term is often used or defined alongside Virtual Reality (VR) because of their connected or perceived connected uses and shared technology. AR is for use *in and with* the real world, whereas VR is intended to take you away from the real world and immerse you solely in the digital. As the definition and associated technology are recent inventions, a brief history is needed.

As noted above, "Augmented Reality" in this context, was first used in 1990 at Boeing. Researchers Tom Caudell and David Mizell were asked to invent an alternative to the expensive methods then used to guide engineering workers on the factory floor. They theorised it would be possible to replace the large plywood wiring diagram boards with a head-mounted apparatus that would display a plane's specific schematics through high-tech eyewear and project them onto multipurpose, reusable boards. This was ahead of its time and wearable computing would only really reach experimental research stages by the late 1990s with the practices and publication of Thad Eugene Starner's PhD Thesis 'Wearable Computing and Contextual Awareness' (Starner, 1999) which

showed that wearable computing for basic AR purposes was a definite possibility^{xliv}. From 2000 to 2006, the Wearable Computer Lab at the University of South Australia made and played one of the first AR games, *ARQuake*; based on the popular *id software* game *Quake*, they adapted it for AR before smartphones made computing power small enough to enable ease-of-access to AR (Piekarski, 2006; Piekarski & Thomas, 2002) – once the concept was proven globally, it was soon applied commercially and one of the first Android smartphones featured a basic AR travel-guide app in 2008.

After 2008, smaller AR companies developed around smartphone usage and small platforms emerged. These platforms included LayAR, zappAR, BlippAR and more^{xlv}. Some, like BlippAR and LayAR, burned up and faded away at great expense by the end of the 2010s (Hamilton, 2018) but other smaller companies remain (Mangur, 2020) that use the software developed for the newer Apple and Google smartphones; in the early 2020s, there is some talk of Apple and Google entering the AR wearable consumer-hardware ecosystem to accompany their now prevalent software (Heisler, 2020). Whether they do or not isn't as consequential as the fact that they hold the dominant software foundations of most AR work in 2020 – ARCore and ARKit, made by Google and Apple respectively, underpin most of the platforms that use their smartphone Operating Systems (OS); the OS is the software platform that other applications (apps) sit on top of when we use a smartphone – Google and Apple hold 96-98% of the entire world's OS usage (Holst, 2020a; Milijic, 2019), the dominant share of smartphone OS sales in the world. This means that, today, if you want to make popular AR that works out in the street then you do so through Apple or Google's underlying software structures.

There continue to be AR app innovations in a variety of areas, from gaming through home furnishing and medical consultations to teleconferenced manufacturing training,^{xlvi} but there is a specific company which has gained global attention from young and old alike: Niantic. We will now discuss their work so as to understand how their work has impacted on the public awareness of AR and what that means for this thesis' practical software development. Niantic are the producers of the games *Ingress*, *Pokémon Go*, and *Harry Potter: Wizard's Unite*. They are also one of the most profitable and well-known AR production companies (or studios) in the world (Boland, 2020; Iqbal, 2020). They produce their games for both Apple and Google operating systems, continue to bring in revenue, and *Pokémon Go* downloads crossed the one billion threshold in March 2019. Through regular updates and *Pokémon Go* Live events and festivals (like *Pokémon Go* Fest 2019 Chicago), *Pokémon Go* has been a bigger success than simply software – it has created a community of fans, globally, to support continued engagement through to today and beyond as evinced by their continued user-engagement online (P. G. Team, 2020). Indeed, Hari Kanzu wrote 'Why *Pokémon Go* is a game-changer for us all' in 2016 and many other public-facing publications explored its impacts

(Kanzu, 2016; Malik, 2016; Ross, 2016). Just last year, a specific player was highlighted because *Pokémon Go* enabled her to reconnect with her city after being widowed (Piera Jimenez & Hjorth, 2019) – just as this PhD research hopes to reconnect its participants with Galway City. Due to the success of Niantic, there is a general public awareness of what AR is, with *Pokémon Go* offering an example that people will understand. For this research, this very understanding means that when it comes to explaining this thesis' practical software, it's possible to explain the field with a well-known example that the listener will understand far quicker. This will be invaluable in explaining the impact of this work to a wider audience.

There are also many fascinating experiments with AR that have not had as wide a reception but have been celebrated within eLit and AR fields. Some of these include works that use books as a playful medium for AR interaction like Borsuk & Bouse's *Between Page and Screen*, Reed & Garbe's *The Ice-Bound Compendium*, and *The Ice-Bound Concordance* as featured in Rettberg's *Electronic Literature* – a fitting hybrid form for AR eLit. Rettberg surveys the range of these works well in Chapter 7 of *Electronic Literature* and gives us an understanding of the breadth of work (Rettberg, 2018, pp. 159–175). Frequently referenced, there are 23 works of AR eLit listed on the Electronic Literature Knowledge Base (ELMCIP) and indeed many are attached to books but there are also works similar to the practical element created for this PhD, *Here. Now. Ours*, whereby participants explore their city or area: *Wasser* by Stefan Schemat triggered audio when participants reached certain areas (Rettberg & Schemat, 2004), much like many experimental works by the Bristol, UK based group Of Circumstance are also based on GPS-linked audio playback, and so we see immersive audio works (that may feature certain augmentations) within this grouping too; there are a range of works that are made for specific hardware combinations and installations like *View From Within* (Ulvund et al., 2014), *Operatus* (Sperre & Morrissey, 2013), and *Screen* (Wardrip-Fruin et al., 2003). Rettberg describes Judd Morrissey's *Kjell Theøry* as '...AR texts are located both on bodies of performers and in specific geolocated environments' (Rettberg, 2018, p. 172) and this is of particular interest because it is one of very few examples that use AR text, specifically. There are also works that choose to do as this PhD research has done and create AR text specific to and situated in its location: *Lijn 3* "...is a poem that you can travel through when using tram line 3 in Amsterdam," (Marsman & Bluijs, 2018) and *Wolk* "allows library users to walk through a virtual poetry museum. The poems that are animated in augmented reality are particularly aimed at children and adolescents" (Bluijs et al., 2019) so we can see a growing number of works created recently that are similar to *Here. Now. Ours* and the field itself is growing.

From well-known examples to the experimental, we can understand where AR originated and where it sits today. This gives an understanding of the awareness of AR in the mind of the general public in 2020 and so we can move onto discussing AR activism within public space.

AR activism within public space

The next chapter details many of the theories around the exploration of public space and AR so here focus remains on activism and the emergent practices of AR being used as an activist overlay in public space.

The conversation on this continues across a range of scholarship. This may be journal entries calling for more cities to be less like computers (Shannon Mattern, 2017), the wider debate on public space, and even protestors who are specifically creating a holographic protest to combat a law banning dissidents from meeting outside the Spanish parliament (Madrigal, 2015). In all of these, the scholarly and practical conversation on AR continues. When discussing the legal implications of AR in America, Fusion magazine asked a constitutional scholar,

First Amendment scholar Eugene Volokh predicted that the legal fate of light projections will be different from projections in augmented reality. ... “Why do I get to have control over how someone *portrays* my building?” said Volokh. “My right to stop physical touching of my building doesn’t extend to depictions of my building.” (Hill, 2016)

Here we can see that AR is still in a legal grey area and can inhabit a Lefebvrian *differential space* because of that blurred line between the digital and the physical, the portrayal and the place.

Mentioned in the previous section of this chapter, Conor McGarrigle used the LayAR platform to create *NAMALand* and inspire activist conversations around who owns public space, where public money goes in global capital flows, and what ordinary people can do to affect it. This is an excellent example of using AR as activism not only because it inspired communities but because it exposed the underlying economic and political structures that control public spaces. There is also some ongoing research into how *Pokémon Go* exposes intercity inequality in Catalunya (Piera Jimenez & Hjorth, 2019) where poorer regions of the city are less well covered by the algorithm that encourages play.

Playfulness in their activism is one of the elements of the AR works of Glenn Cantave and Idris Brewster as a part of the collective, Movers and Shakers NYC. Creating beautifully designed, politically charged interventions that are accompanied by talks and tours, they explain their *Monuments Project* when they write

There are currently 1,503 confederate symbols in US public spaces. The conversation around their removal is highly contentious and has catalyzed global controversy. The peak of this animosity manifested at the riots in Charlottesville Virginia in August 2017. The after effect was a national conversation regarding what to do with monuments that represent pride for some and hatred for others. One year later, statues of Confederate generals in Charlottesville, Virginia still stand. New York City also has a skewed portrayal of narratives in our public spaces. There are 155 of men and 6 of women (2 of which are imaginary figures) are represented as statues. (Cantave & Brewster, 2019)

Since they wrote this in 2019, their work has gone from ‘highly contentious’ to politically prescient in 2020 as the Black Lives Matter protests in the USA have seen confederate symbols removed by protestors from public spaces. Leaving graffiti and protest signs behind and in the place of the symbols removed, the protests have had such an effect that many local governments are now proactively removing the Confederate generals and engaging in discussions with activist groups like Movers and Shakers NYC.

Our solution is to use augmented reality to digitally create monuments that represent the voices of marginalized communities (women, black, brown, queer, trans). We aim to highlight both contemporary and historical figures to be placed in public spaces. To that end, our team is creating a catalog of augmented monuments to be used for augmented reality tours in different cities. (Cantave & Brewster, 2019)

The AR monuments that Movers and Shakers NYC create can be big or small but are always of marginalized peoples and they place them both experimentally and in notable public spaces like The Lincoln Museum or Central Park in New York; they do this to highlight systemic racism in America and to expose marginalized peoples to their undiscovered histories. Their work has been supported by Google, TEDtalks, and the Museum of Modern Art (MOMA) as well as covered in international press; they are at the forefront of contemporary AR activism in America.

The effectiveness of these programmes/monuments is their ability to do what they do with the lightest of touches. A monument can be programmed to appear on every logo of a certain brand, to affect a guerrilla campaign, or it can be a big monument whose location is shared through word of mouth – to achieve individual change and an increase in awareness of data lost to structural obfuscation and racism. There is an AR graffiti app, MarkAR, in development that might free the AR space to increase awareness in similar ways to the Movers and Shakers NYC (M. Team, 2019) but until MarkAR is widely adopted, we won’t know if it is effective in helping create *differential space*. Snap, a large AR platform, has recently announced that they are introducing a graffiti like function

called *Local Lenses*. Though mentioned in the introduction, here we can briefly examine its potential for layering over and affecting public space. More than 170 million people access Snap's AR features daily (Matney, 2020) and soon they will be given access to *Local Lenses*. Local Lenses will be "...shared and persistent augmented reality in much larger areas, so you can experience AR with your friends, at the same time, across entire city blocks." (Ibid) This means that Snap AR creators using the platform will be able to paint or add to any street, with lasting AR models for every user to see. It is this public, 'persistent' (or lasting) aspect which will leave room for users to 'leave their mark' and reframe their environment. Snap has suggested that they'll use the images that users make public to map the environments of their users and thus have one of the largest mapping repositories of buildings and streets, enabling users to share those persistent graffiti like elements with their area. It is precisely Snap's large user base which gives this such a large potential for the rewriting – for what else is graffiti but rewriting the texts of our buildings and – the paratexts of our streets.

There are, however, some criticisms of AR reframing public space through both guerrilla efforts and larger platforms like Snap: it could be argued that the Movers and Shakers NYC collective, by working with big technology companies like Google, could be co-opted into the structures they raise awareness of. This is an understandable criticism, especially as all peoples involved in the creation of technological interventions have to use the technology they critique, but Movers and Shakers NYC also ensure their work is disseminated through state schools and so reaches those marginalized peoples, most in need of the information they highlight. This direct connection to state schools is a fitting example that represents how AR activism can circumnavigate the real-world power dynamics and structural obfuscation evident in underlying economic and political structures that control public spaces. These real-world power dynamics are not completely undone by AR but, though complex and emergent, AR's effects on them have been researched; as a space of public play on the internet, AR has the opportunity to act as a springboard, a *differential space*, to make change and to say things that can affect both the power structures of the real world and the construction of debate around AR, itself. This research will be discussed further below.

[The power dynamics of AR & how AR can help us see our public spaces differently](#)

There are important considerations within the power dynamics of AR. Though this is discussed in some depth in the next chapter, a 2013 study by Graham et al examined how power helps to produce place and how this is manifested in AR. Much like Michel de Certeau writing in the late 20th Century,^{xlvii} Graham et al found that the users of AR platforms had far less power to produce place than the creators (Graham et al., 2013) and so called for "redoubled attention" and further investigations into how that power dynamic might be changed.

How users approach and operate AR reveals much about the dynamics of it and so I will now discuss what researchers have found out works for the user and what relationships the user typically finds themselves in. Nicola Liberati asked whether we should have one larger AR platform or many smaller. She concluded that it is ‘...better to resist solipsism so that the AR experience is less game-like and more community-based^{xlviii} (Liberati, 2014) and this chimed with the findings of Liao and Humphreys whose study into the qualitative uses of the LayAR platform (T. Liao & Humphreys, 2014) found users chose the LayAR platform to publicly convey specific power dynamics by making AR that was

...typically done over specific types of physical space, and developers consciously chose highly contested public areas or curated spaces. Second, we found that they did not just physically overcode on top of those places, but utilized physical artifacts within that place to tell stories that historicized, made commentary, changed the meaning of, subverted, and reproduced narratives of that place. (T. Liao & Humphreys, 2014, p. 1431)

Liao and Humphreys’ 2014 study illustrates the same work that the Movers and Shakers NYC collective are doing in 2020, choosing contested public areas and subverting their accepted narratives. Just as traditional graffiti reclaims urban visual space, AR users in a shared platform like LayAR seem to wish to reclaim and reinterpret public space. Indeed Liao and Humphreys’ found that their participants “went beyond just changing the representation and began telling spatial stories, or narratives that transform... to create visual representations that reproduce, reappropriate, and displace those narratives” (T. Liao & Humphreys, 2014, p. 1431). Could we see this with Snap’s *Local Lenses*? Only time will tell. From both the studies of Liberati and Liao and Humphreys, we can observe an ongoing desire from 2014 to 2020 to use AR to help us see our public spaces differently. There are still ongoing efforts, such as JidoMaps, to encourage a global AR platform that is open to all in 2020 however the institutional power of the big people farmers like Facebook continues to stifle these efforts and silo users within technology companies’ own digital-ecosystem^{xlix}. These power dynamics whereby larger corporations with more money squeeze out smaller efforts to create *differential spaces* that might change the power dynamics are analogous to privatization of public space in the real world because it is private, often global, financing which is at the root of both; only accessible and open interventions can enable individual awareness of these dynamics – those interventions are how AR can help us see our public spaces differently.

Literature Review conclusion

This chapter has reviewed debates around eLit, digital reading, cities, and augmented reality [AR] to better understand the context that this doctoral research works in and to build a thorough line-of-

thought. From wider understandings what it means to be an engaged reader/user to the specificities of the uses and power dynamics of AR, this line-of-thought can now be used in the Methodology to interrogate the efficacy of *situated eLit AR* in affecting change.

CHAPTER 3: Methodology

Introduction

In this chapter, my methodological perspective is articulated. In order to fully detail the methodology and validate its approach, practice-based research is briefly contextualised, and the rationale for choosing a practice-based research approach to the overall doctoral research question is discussed in depth. The key research questions which underpin the fieldwork are then stated and the specific methodology used to answer them is detailed. Finally, key methodological issues arising out of the fieldwork are analysed in the context of the thesis question.

Section i) A brief exploration of practice-based research

Though the field is wide, in defining *practice-based* versus *practice-led research*, Candy defines the former as:

An original investigation undertaken in order to gain new knowledge partly by means of practice and the outcomes of that practice. In a doctoral thesis, claims of originality and contribution to knowledge may be demonstrated through creative outcomes in the form of designs, music, digital media, performances and exhibitions. Whilst the significance and context of the claims are described in words, a full understanding can only be obtained with direct reference to the outcomes (Candy, 2006, p. 1).

My own augmented reality [AR] sits at the intersection of original software design and a sociological understanding of a city's common green space. Therefore, Candy's statement that 'a full understanding can only be obtained with direct reference to the outcomes' strongly suggests that studying how participants feel and play through the AR experience is necessary to understanding what the creativity of the experience might reveal to be new in our conception of augmented interactions. Understanding this innovation gives validity not just to my methodological perspective but also to exploring these specific interactions through AR. The understanding of such interactions is something Leavy addresses when she says arts-based research practices

...are a set of methodological tools ... [which] adapt the tenets of the creative arts in order to address social research questions in holistic and engaged ways in which theory and practice are intertwined (Leavy, 2015, pp. 2–3).

Put more simply, as practice-based researchers we use creative practice to investigate society. Leavy also states that arts-based research is a holistic approach to knowledge-building that enables the researcher to merge an artist-scientist identity, and opens up new ways to see the social world

(Leavy, 2015, pp. 253–254); later in this chapter, I will be outlining the ethnographic interview technique used in the methodological perspective and so bringing that ‘artist-scientist identity’ closer. Finally, like Freeman (Freeman, 2010), Leavy says that there is an ‘oppositional potential of art’ (Leavy, 2015, p. 220) that might raise social consciousness. This suggests that practice-based research can act as a catalyst for social change through the way it ‘offers a clear challenge to conventional thinking’ (Freeman, 2010, p. 7), challenging both its academic and its popular audience to adopt a different perspective. That challenge, I believe, is inherent in the work of this doctoral research: it challenges the participants to look again at their everyday environments through play, thus encouraging an understanding of the personal as political. This thesis proposes an innovative model for AR eLit that makes satirical comment on the City of Galway’s access to planning applications, and brings generative performance, together with phenomenology and ethnography, to bear on the practice and the findings of the overall work. This sense of a challenge to conventional thinking is important to the research work and to AR more widely as a practice; though many personal, individual benefits have been observed in AR games (Group, 2016; Rouse et al., 2015), there is still an important area of direct political connection to the user to be explored. The rationale for the design of that challenge to conventional thinking will now be detailed in full.

Methodological underpinnings, development of key terms, and the rationale for practice-based research

Situating practice-based research in relation to digital media and its methodologies led to a decision to adopt a methodological perspective that incorporates elements of the following:

- Bell and Davies’ (D. Bell & Stoneman, 2016) reworking of the idea of ‘generative performance’ as a methodological framework for a practice-based doctorate, integrating practice and theory in iterative cycles of theorizing, production, and reflection;
- Bell et al’s (A. Bell, Ensslin, Bom, & Smith-Sheffield, 2018) phenomenological approach to investigating immersion in eLit; Schwitzgebel’s “epistemic awareness” combined with Malcolm McCullough’s ambient attention and forging my own terms, *architectural literature* and *ambient play* from that (in both understanding and creating *Situated AR eLit*)¹;
- simple software functionality testing combined with testing methods from previous AR studies like Liao et al’s and Shilkrot’s (Shilkrot et al., 2014);
- ethnographic interview techniques;
- Boulton, Graham, and Zook’s examination of the power structures in AR;
- All of these elements will be internally critiqued by Venturini et al’s ‘...reality check(list) for digital methods’ (Venturini et al., 2018).

In making something that is so interdisciplinary it is crucial that there should be such a broad range of connections within my approach. Throughout the rest of this section, they will be returned to and expanded on as I further explore the rationale for practice-based research, outline my key terms, and explore the methodological underpinnings of my approach to the research.

In his investigation of the historical development of practice-based research in the arts and media in UK institutions, Desmond Bell endorses the performative approach to understanding art which was proposed by the American philosopher David Davies in his book *Art as Performance*. Davies says art practice should be understood as a 'generative performance' which addresses the relationship 'between the generative act that brings a work into existence and the receptive act that is a proper appreciation of that work' (D. Davies, 2004, p. 26).

The favourability of Davies' view of art as a 'generative performance', according to Bell, is that it 'abolishes the demarcation which has bedevilled the creative arts in their relationship to critical theory, namely that between the act of aesthetic judgement of a manifest work and the acts of practice and reflection through which a work is produced' (D. Bell & Stoneman, 2016, p. 96)ⁱⁱ. In this thesis, this generative practice and reflection-performance is demonstrated/undertaken in the act of walking and testing out the AR poetry. This critical practice and reflection-performance is contrasted with a poststructuralist understanding of art that emphasizes semiotic readings and discursive analysis and which in so doing underplays the role of artistic intent in the act of production. Bell goes on to say that in order to properly understand the creative work it needs to be seen:

...not as an objectified sign structure but as an embodied and historically situated performance. In particular, we must appreciate how an artist employing specific media and artistic means and conditioned by specific historical conditions gives form to a creative intention which may or may not be realized in the generative act of making the work (D. Bell & Stoneman, 2016, p. 98).

The 'embodied and historically situated [critical-reflective] performance' that Bell discusses here is pivotal to understanding the rationale of choosing a practice-based research approach to my research question, because my participants will have walked around Galway city, reading 'historically situated' AR poetry within texts about the city, on the walls of the city, and been guided to a green space. Walking and reading through the device is an example of the embodied, generative, and reflective practice that Bell and Davies speak about. Indeed my own introductory process for participants in the testing (detailed later in this chapter) was altered, throughout, in order to more fully enable participants to embody and enjoy the experience. Through undertaking a

practice-based approach to the research question, I was able to test multiple iterations of both the software and the introduction to the experience, reflect immediately on barriers to engagement and attention and correct them, and improve the experience while keeping the testing conditions and questions constant. Jane Rendall states the necessity of practice-based research in a piece for *Here, There, Elsewhere*:

Practice intends to answer a set of aims. Critical thinking questions the values of the aims themselves. Thinking is also a practice. It is something we do. We make ideas. Unless we understand thinking as a form of practice, and practice as a thoughtful process, it is impossible to transform the relationship between the two. (Rendall, 2002, pp. 43–54)

Rendall sets out that for theory to affect practice, and vice versa, they must be understood together; any mode of enquiry into the practice of citizen politics must engage with both practice and theories of the personal-political. Action must inform reflection, and reflection should be followed by the opportunity again for action, as exemplified in my continuous development of the software and introduction within my project. Practice is included in this thesis as a manner of investigating the personal-political effectiveness of AR and how memorable that might be due to the embodied, somatic nature of learning in AR.

Embodiment of knowledge and understanding is key to phenomenological approaches seen both in practice and the canonical texts of phenomenology: Edmund Husserl, Martin Heidegger, Maurice Merleau-Ponty and Luce Irigaray, through to the contemporary Haptic Phenomenology of You-Jin Lee and Mark Paterson, all rely on that age-old adage that ‘seeing is believing but touching is knowing’. All of those same phenomenologists also expand the uses of the term ‘touching’ and Paterson specifically expands it to ‘being [emotionally] touched’ (Paterson, 2007). To test how touched the participants of my study with AR were, I needed to create a metalepsis (a transgression of reality and fiction’s boundaries) that was embodied, playful, and had an effect on both their personal, reflective narratives and the narrative of the city around them. To reflect on the effectiveness of this, I then needed to interview them, in both a structured and freer, semi-structured way, about their experience. Using phenomenological methods was the most valid approach to this interview not just because embodied knowledge is ‘felt’ deeper, retained for longer, and helps us better retain a geo-spatial understanding of our locale (Paterson, 2007, p. 77; Van Duppen & Spierings, 2013) but because it gives the most holistic understanding of a participant’s attention, engagement, and immersion, as Bell et al found.

In their 2018 study, Bell et al used a novel methodological approach that they termed an ‘empirical cognitive poetic’ approach (A. Bell, Ensslin, Bom, & Smith-Sheffield, 2018) . In this, they made the qualitative quantitative through observation and analysis via a phenomenologically-grounded reader response study. This is important not just because it is the first of its kind used to study immersion in this way but because, they assert, it is a replicable method based in the gathering of empirical evidence:

We provide empirically substantiated insights to show how immersion is experienced cognitively and site-specifically by using Andy Campbell and Judi Alston’s (2015) digital fiction installation WALLPAPER as a case study. Our approach is unique in that it marks the first systematic attempt at analysing immersive features in digital fiction using a replicable method and, perhaps more importantly, at empirically investigating these immersive features. (A. Bell, Ensslin, Bom, & Smith-Sheffield, 2018)

To undertake this empirical investigation, they used a method familiar to gamers: they gave an ‘on-boarding’ introductory session and explainer conversation to the participants. This ‘on-boarding’ is a soft tutorial in the shape, tone, and structure of the research’s test; it also explained how the participants would be interviewed, observed, and debriefed about their experiences. This on-boarding was something my own test included and then expanded in the second and third iteration of testing with participants. It also reinforced the critical importance of using the Bell & Davies (2016) and Bell et al (2018) designs as a part of my own methodological approach. In the Bell et al study, their expansion of the term ‘immersion’ was also integral to the development of my methodological perspective and worthy of further clarification.

Building on the work of Thon, which reconfigured the focus of immersion to that of immersing one’s attention (Thon, 2008), Bell et al used Ensslin’s concept of the “doubly-situated” and “re-embodied” reader-player of eLit (Ensslin, 2009, p. 158) combined with Ryan’s categories of spatial, temporal, and emotional immersion which are a “response to setting” (M. L. Ryan, 2015, p. 86)ⁱⁱⁱ to show how a metalepsis can also be an embodied, immersive experience that phenomenologically touches the reader-player through ludic play. It is Bell et al’s innovation of accounting for the role that the real-world plays in the immersive experience that makes their empirical study so vital: Ryan and Thon before them had only theorised about the nature of immersion for readers and players but not *situated* reader-players. Crucially, in 2019 Ensslin & Bell et al built on their 2018 case study by expanding their analysis to encompass “...immersion as a medium-, site-, situation-, and person-specifically differentiated, hybrid, dynamic, con- and divergent phenomenon, with types, or levels, of immersion interacting and changing in relation to each other

and to elements in and outside the text.” (Ensslin et al., 2019, p. 321). As the augmented reality [AR] created for this PhD focuses on building a Galway-specific experience, every participant experienced a metalepsis that encompasses that “...medium-, site-, situation-, and person-specifically differentiated, hybrid, dynamic, ... phenomenon” in that they actively engaged and changed as they played through it. I believe that it is specifically in *Situated AR eLit* that this PhD finds its innovation and provides empirical, case-study-based evidence which adds to the digital fiction/eLit immersion/efficacy debate. Ensslin et al’s secondary 2019 analysis of their case study re-evaluates their own 2018 work and finds a new metaphor for the way immersion works in “...multimodal forms of storytelling” – one that encompasses the earlier quoted specificity. The efforts of this PhD are in building on both Ensslin & Bell et al’s methodology and their theory with my own case study and asking a parallel question: ‘Can Situated AR eLit increase awareness of a city’s green commons through ludic-immersion in a metaleptic state?’^{liiii} Indeed I would argue that the AR developed for this PhD immerses the reader-player specifically by giving them a task and a series of destinations that they themselves must travel to in order to access more information. This delivers an ambient, embodied, ludic immersion that blurs the game world and the actual world by layering digital text of real-world data onto the real-world itself. The participant data collected from my case study supports this assertion and is detailed in the next section of this chapter.

With Augmented Reality, the reader-player is automatically immersed and “...present on the scene of the represented events” (M. L. Ryan, 2001, p. 122) because the game world is the same as the real-world. This accomplishes the “ludic immersion” (Thon, 2008, p. 36) and “deep absorption in the performance of a task” (M. L. Ryan, 2015, p. 246) set out by Thon and Ryan, respectively, through the automatic understanding by AR reader-players that the real-world *is* the game world. And yet, it only does so through AR’s innovative metalepsis. One of my central arguments follows Ensslin et al when they suggest that “if interactivity is absorbing, it can help to immerse a reader-player within the digital storyworld” (Ensslin et al., 2019), by testing whether absorbing interactivity in metaleptic play can increase awareness of the real-world.

The notion of increasing awareness of the real-world through play is not new to the 21st Century and its digital technologies; play formed a central part of Walter Benjamin’s *Flaneur*, the Situationist International’s [SI] *dérive*, and Michel de Certeau’s conception of the *Wandersmänner* (de Certeau & Rendall, 1984). Here again we can see the importance of O’Rourke’s *Walking and Mapping* and within these conceptions of play and playfulness, walking itself was both a kind of play and also a political act; Benjamin wanted the spirit of the *Flaneur* to see the city anew and reimagine it by encouraging us to ‘...walk out your front door as if you’ve just arrived from a foreign country; to discover the world in which you already live’ (Benjamin, 1999, p. 427). There was a male gender

bias and class privilege to Benjamin's conception of the *flâneur* but it has maintained a place of prominence in these discussions while coming under considered, deserved, and increased scrutiny by figures like Doreen Massey (Massey, 1991, 2005, 2006). To the Situationist International [SI], the practice of the *dérive* was a kind of 'drift' that invited the practitioner to open themselves to the affecting flows and energies of the city. The SI particularly emphasised play as a part of the *dérive* to unpick the daily, capitalist-accumulation routines of those around them (Debord, 2004). Finally, de Certeau's *Wandersmänner* concept was subtler and more personal in its play and politics. It saw urban space as a place created by the self along with the subjective other.

De Certeau discussed the importance of understanding the city as a shared practice:

The ordinary practitioners of the city live 'down below,' below the thresholds at which visibility begins. They walk – an elementary form of this experience of the city; they are walkers, *Wandersmänner*, whose bodies follow the thicks and thins of an urban 'text' they write without being able to read it. These practitioners make use of spaces that cannot be seen; their knowledge of them is as blind as that of lovers in each other's arms. The paths that correspond in this intertwining, unrecognized poems in which each body is an element signed by many others, elude legibility. It is as though the practices organizing a bustling city were characterized by their blindness. The networks of these moving, intersecting writings compose a manifold story that has neither author nor spectator, shaped out of fragments of trajectories and alterations of spaces: in relation to representations, it remains daily and indefinitely other. (de Certeau & Rendall, 1984, p. 93)

The idea of a network of texts woven across a city isn't new^{liv} but de Certeau clearly wants us, as *Wandersmänner*, to experience and explore the city until we read its 'unrecognized poems'. This contestation of the everyday is a subtly playful reading of our place in the city, one that researchers and Human Computer Interaction [HCI] labs have furthered. Crivellaro et al expanded these notions with their paper 'Contesting the City: Enacting the Political Through Digitally Supported Urban Walks' where their case study presented as "...a method for the situated discovery and articulation of issues at the intersection between the politics of place making and city planning" (Crivellaro et al., 2015). This 'discovery and articulation' is exactly the purpose of this thesis and its research testing; Crivellaro's work is essential to pursuing whether eLit can increase awareness of place, of a real-world city, of green spaces because, as she says,

Our method offered opportunities to articulate, imagine, *but also contest* uses and consequences of technologies to facilitate current and near-future productions of the

city. Building on previous work that reconfigured the design process as initiator of publics [26], ... Most critically it provided opportunities to articulate how political processes of city planning and the city 'should be' [27] while reflecting on individual and collective roles and agency in this regard. [Emphasis mine.] (Crivellaro et al., 2015)

This is important to emphasize because, in an empirical investigation based on HCI design-methods and case studies, Crivellaro has 'provided opportunities' for *Wandersmänner* to do more than just see the network of texts that make up our city: she has given them a taste of agency and made "...a step towards the building of collective capacities that are in dialogue with the institutions that can actualize civic will", all with research method development, evidence, and post-case study results to back up the work. Where Crivellaro has provided opportunities for *Wandersmänner* to contest the city and actualize *agency & civic will*, I have created and tested a tool which will allow participants to do so directly.

In the context of de Certeau, Carl Lavery writes,

To get to grips with everyday life, we have to be a part of it, to experience it, engage with it. Walking permits this type of embodied knowledge, this form of concrete participation, because it compels the walker to be physically present in the space s/he observes. (Lavery, 2010, p. 153)

De Certeau and Lavery are both engaged in the theory of social practice, strategies, and tactics to reveal the complexities of the systems built around us. Even if we were to remove the question of awareness of one's green space, it is clear that walking itself helps us to gain an embodied knowledge of the areas through which we walk. When we add in the concepts of the *Flaneur*, *dérive*, and *Wandersmänner* as lenses through which to explore this methodological perspective, it is clear that walking and playful encounters with our environments - through those critical-walking-practices - binds ordinary people's lived experiences and Benjamin, SI, and de Certeau's concepts together, and that those methods are backed up by the contemporary, empirical work of researchers like Bell, Crivellaro, and Lavery.

To challenge the city and its institutions by building *agency & civic will* through walking could be considered rationale enough for practice-based research here, in that *Wandersmänner* walking is itself an observable, critical practice. However, I intend to build on that practice-based research by specifically interrogating and testing how early 21st Century digital technologies can be used to augment and further understand that process of building *agency & civic will*, while also making a tool that fits with contemporary trends in digital media consumption. I write at the beginning of the

2020s and so cannot claim to speak for its particular trends but researchers looking at the broader cultural-philosophical shifts of the century like Schwitzgebel and McCullough, have noted an ambient quality to both attention and information; by ‘ambient’, they mean a sense of the ubiquitous nature of information and how our attention tunes into and out of that continuous flow. If it took all the studies of the 20th Century to build up to Harrison and Dourish’s definition that “space is the opportunity; place is the (understood) reality” (Harrison & Dourish, 1996, p. 69), it will arguably take the 21st Century to define how our augmented selves – the *Augmented Wandersmänner* of the 21st Century – pay attention, gather information, and shape institutions with *agency & civic will*. It is the position of this doctoral research that we now do so in an ambient, ongoing manner and to test this, Schwitzgebel and McCullough’s concepts of ‘epistemic awareness’ and ‘ambient attention’, respectively, are woven into my methodological approach. These key terms will now be articulated in order to give a fuller understanding of how they underpin the methodology and rationale for practice-based research.

Section ii) Development of key terms

Eric Schwitzgebel began developing his theory of epistemic awareness in 1997 and has continued to publish in philosophical journals on the subject. Much like phenomenological stalwarts such as Heidegger and Merleau-Ponty, Schwitzgebel explores, from a philosophical perspective, where our awareness and attention ends, as well as its “[r]ich” and “thin” views of experience” (Schwitzgebel, 2007). To Schwitzgebel, “[w]e do not know our own stream of conscious experience very well, nor is it easy to remedy our ignorance” (Schwitzgebel, 2013) although he does acknowledge that “...perhaps there’s a kind of especially *diffuse* attention, distinct from focal attention, which is capable of being spread broadly across multiple modalities and objects” (Schwitzgebel, 2007). It is this diffuse awareness of the ambient that becomes evident in the use of augmented reality [AR] because, though our attention is primarily focused on the AR device, we are still aware of the actual world, both through and away from the device. Schwitzgebel’s diffuse/epistemic awareness could be considered very similar to McCullough’s ‘ambient attention’ – as is clear from their wording – but it is McCullough’s development of the concept that makes this term so important to both my methodological perspective and the wider rationale for my practice-based research.

Malcolm McCullough’s concept of ambient attention is borne from his notion that “...around the Millennium a paradigm shift from Cyberspace to pervasive computing began” (McCullough, 2013, p. 14) and so, along with pervasive computing, a different relationship with information has emerged. To McCullough, it is this change in information technology that has shifted our relationship

with information. He states that , “...the use of information technology has become increasingly circumstantial: interspersed with other sensibilities, contingencies, and actions.” (McCullough, 2013, p. 19). When information is circumstantial and interspersed, it is a part of our environment; when it is pervasive and yet unseen, it *is* our environment. Crucially, ‘ambiente’ is the Italian, Portuguese, and Spanish word for ‘the environment’, and considering that the satellite-based ‘Global Positioning Service’ of America, ‘Galileo of Europe’, and ‘Beidou’ of China now cover the entire world in range (Zhou, 2018), making digital information available all over the world, McCullough’s notion is correct: information is now pervasive - it has become our environment - and so we have adapted our attention to treat it as such. McCullough also attempts to redefine the ‘ambient’ as ‘ambient attention’ for the 21st Century and therefore the *Augmented Wandersmänner*, by suggesting that,

...when you perceive the whole environment more and its individual signals less, when at least some of the information superabundance seems embodied in a habitable form, when your attention isn't being stolen, when you feel renewed Sensibility to your surroundings, you might try calling this ambient. (McCullough, 2013, p. 3)

Here McCullough has reworked the notion of ‘surfing the internet’ into an ambient attention to information, often through walking the city – just as the Situationist International and de Certeau did. Indeed, later in *Ambient Commons*, McCullough goes on to say “Walkability in dense neighbourhoods happens to favour location-based social and curatorial media. ...Our present inquiry simply seeks to connect environmental histories with future prospects for augmented cities.” (McCullough, 2013, pp. 232–233). In defining a new attention model in a world of pervasive computing, McCullough has transformed the notion of ‘the ambient’ from the environment into a hybrid of the environment and digital tools enabling a critical ‘practice of everyday life’ within the daily flows of human traffic and phenomenological experience. McCullough also explains the renewed importance of fixity and fixed information in this new environment when he says “[architecture's] fixity provides exercise and rest for attention” (McCullough, 2013, p. 102) and this is especially true of text. McCullough quotes architectural computing pioneer William Mitchell in order to make it clear that text isn’t ever disembodied, but rather every text comes with context and a frame (McCullough, 2013, pp. 95–96) . It is these observation from McCullough which led to my two main focal points in designing the AR tested in this thesis: ‘*architectural literature*’ and ‘*ambient play*’. I will explain these terms in more detail in the next paragraph, but it is important to note here that McCullough also sees value in embodied knowledge when he says, “Indeed, tacit, action-based, and externalized forms of knowledge contribute more to attention than they do to most other functions of the mind” (McCullough, 2013, p. 65). Here we see a particular focus on embodied,

action-based knowledge helping to attune attention, a perspective which has been shared by the other researchers outlined in this section.

Just as McCullough detailed architecture's 'cognitive roles' and its role in giving a calming fixity to ambient attention (McCullough, 2013, p. 193), my *architectural literature* concept details how we might create the text of a city, and more specifically, one that is read and retained. For Anne Mangen, reading "...involves factors not usually acknowledged...The ergonomics, the haptics of the device itself." (Mangen, 2016). In her detailed study, 'The Digitization of Literary Reading: Contributions from empirical research', Mangen says that all reading devices, from the scroll to the eReader - have user interfaces and, she says, '[w]hen screens replace paper, it becomes apparent that reading is both multisensory and embodied' (Mangen, 2016, pp. 246–247). In Terje Hillesund's 2010 review of the qualitative studies looking at digital reading, they too found the relation between reading and materiality to be of great significance – they found "...all participants considered digital scholarly reading to be more superficial than paper reading" (Hillesund, 2010) and many more examples of how "reading is a bodily and mental process evolving in time" (Ibid). This was then reinforced by Myrberg and Wiberg (Myrberg & Wiberg, 2015) and Singer and Alexander (Singer & Alexander, 2017) whose studies found that data retention was stronger when reading analogue than when reading digital texts. In one of the biggest studies, Baron et al. found that 92% of the 429 participants said they concentrated best when reading in print (Baron, 2017). From these studies it becomes clear that physical materiality is key to concentration and retention. Therefore, in order for eLiterature to be felt to be a memorable experience, it needs, in some way, to cross over from a purely digital text to a partially material text; my practice-based research considers this need for materiality by ensuring a *fixity* of digital text (in angle, architectural, and geographical terms) is used to give weight and materiality to the experience – in debriefing, participants are then asked if it felt material and memorable.

In order to get to writers using the city as a medium with/on which to write and create new (interactive) narratives, some street-game developers have relied on making narratives more like games. At the time of writing, the companies Blast Theory, Yello Brick, and Niantic are key examples. Architectural writers such as Dr Carol Cragoe can tell you *How To Read...* the architecture of a city (Cragoe, 2018) but don't offer guidance on how we read the paratexts of the streets; if we take Cragoe at her word and a city's buildings can be said to be read as texts, this implies that the streets function as paratexts. These aren't new notions: they have been explored by Dr. Karin Wenz, David Henkin, the students of the Paris 1968 revolt as well as the makers of contemporary ambient literature. They know the significance of the graffiti, the street sign, the in-joke of our own city; so too should writers looking to write about, and work through cities, know these and their political

significance. In articulating the difficulties of making such work, the film studies scholar Henry Jenkins has said

Much of the writing in the ludologist tradition is unduly polemical...For my money, a series of conceptual blind spots prevent them from developing a full understanding of the interplay between narrative and games. (Jenkins, 2004, p. 120)

Here Jenkins is discussing the 'ludologist tradition' in video-game makers' consistent positioning that places game-mechanics over storytelling and posits "conceptual blind spots" that we often see used to create the kinds of interactive, city-wide experiences like *Here. Now. Ours*. The problems that Jenkins articulates can perhaps be addressed by the Situationists and their concept of the *derive*, explored earlier when we create city-wide experiences. The SI concept of the drifting individual is key to understanding city streets and public spaces as more than just thoroughfares and squares and is key to changing the way we read a city and understand our public ownership of it.

Crucially, recent developments in privately owned public spaces [POPS] in cities have taken away ownership of cities from government and into private hands^{lv}. POPS can be defined as spaces within urban environments that seem and appear to be publicly accessible, free to public use, and a part of the public network of thoroughfares but are legally owned and operated privately – these range in form from well-designed plazas that link several roads through to huge riverside parks. This has been in development in certain parts of the world since the 1980s but in the UK and Ireland has expanded massively over the last 10 years. As has been set out above, an investigation by The Guardian in the UK in 2012 revealed the extent to which this has occurred, and the work of social geographer Bradley L Garrett continues to do so^{lv}; Garrett has written on cities and the loss of public space since 2010. Brett Christopher's 2018 book, *The New Enclosure*, studies the excessive ways in which governments are selling public land in Britain. Most recently, a co-authored investigation by Huffington Post and the Bureau of Investigative Journalism found that 9.1 billion pounds worth of public land in England had been sold because "Councils have been forced to take ever more desperate measures to stay in the black as their funding from central government has been cut by about 60% since 2010." (G. Davies et al., 2019). This quote makes clear the main justification given for POPS and ongoing sales of public land: namely, a push by central governments for a smaller state and attempts to 'balance the books' of local governments. Some critics say that these efforts are entirely unnecessary and ideologically motivated (Carmona et al., 2019; Labboun, 2017; O'Farrell, 2019); these sales, in turn, mean less access to public land for all and fewer places for poorer people to gather, to discuss, and to protest. There's hope, then, that AR might give us a new tool with which to reclaim those spaces; if we can't reclaim the stones, we can certainly graffiti them. Once this

digital graffitiing is done, by writers who choose to make the city their medium, then we have a new form of literature which demands a new way to be read.

To understand this new way of reading, we might turn to another anthropologist, Victor Turner, and combine his approach with the concept of 'deep play,' as developed by Clifford Geertz and set out above. Turner's seminal work is the anthropological study that fashioned how we use the term "liminal" today, which he defines as that which relates to, or is situated at a sensory threshold. This liminality is often at play in theatre practice or game playing as it asks the audience/reader to enter into a space of possibility, a space of transformation, that is created for them. The application of liminality has led to great political change in some surprising locations: Augusto Boal is considered a pioneer of applying this technique to theatre in South America; his Forum Theatre, developed with liminality and deep play in mind (and also called Theatre of The Oppressed), invited audience members to replay the action of a play, shout 'stop' when they wanted to intervene, and take the place of an actor – clearly, Boal instinctively understood deep play, liminality, and their combined potential; this work led to changes in police officer training, Boal's own election, and audiences grappling with their own oppression (McLaverty-Robinson, 2016, 2017). If a transformative space can be created, we may well bring this subtly theatrical and definitely playful approach to how we understand our cities, how we play with them, and how we read them. If we consider an augmented walk through city streets as a liminal, deep play, which allows us to read a city's paratexts and explore its commons, then we need to find a new way of understanding that reading not solely as reading, but also as experiencing.

To further clarify how a liminal working-understanding might help us to read our streets differently, we can look again at Schwitzgebel's 2007 study which found that "epistemic awareness" affected the way people read, where they choose to read, and what that does to their understanding of their embodied self (Schwitzgebel, 2007). That epistemic awareness is a sense of our periphery and a connection to it and Schwitzgebel talks about the 'rich' nature of consciousness that allows us to sense things in the far reaches of our visual field and the parts of our body that we grow unaware of when thinking or knowledge-working for long periods, "aswarm with detail in many modalities at once, both inside and outside the field of attention" (Schwitzgebel, 2007, pp. 35–36). This sensing of the peripheral was shown by Schwitzgebel to directly affect the habits of readers; where we are and what's around us affects how much, and when, we read. These peripheral connections matter more in a 'network aesthetic', as Varnelis defines our 21st Century's mode of being in *Network Culture* (Varnelis, 2008); building on Manuel Castells description of 'the information age' (Castells, 1989) and Deleuze and Gattari's considerations of what they label rhizomatic connections (Deleuze et al., 1987), Varnelis' emphasis on each of us as nodes in a

network of interconnected remixers and data creators has been cemented by the growth of the internet and the global technology companies previously discussed. I'd like to argue that this interconnectedness is what has given rise to the use of AR and its location-based iterations; I'd like to suggest that it is fixity and fixity of orientation – what some might assert to be material attachments - that are critical to making a difference in reading digital content overlaid on our streets. It is now possible to fix these texts at an exact angle so that when the AR user turns away from it, it stays and can be located again later. As a user you can share it, you can look up to it as we would have looked at a church clock 150 years ago, a job board 100 years ago, or a community board 50 years ago. This fixity not only calms the eye and makes the experience memorable with material weight but also enables a more critical, reflective state in the reader-player that, in turn, encourages a more critical discussion (leading to more critical civic will) – this too gives writers opportunities.

This is the platform we can now give to writers to enable a new form of writing which in turn breeds a new form of reading. The changeability of the content of that AR text isn't as important as the form, the fixity of position, or the orientation of the text. This, therefore, gives users the opportunity for a meditative walking/reading experience. This is literature writ large on buildings taken back from private owners by AR, but still with a subtle, liminal reading: literature that you walk around in rather than sit down to; literature that's fixed, ambient, and that can be experienced in your own time but also changes each time. I term this '*architectural literature*'. In practice, the intention of using *architectural literature* in my methodological perspective is to enable, as McCullough highlighted, fixity's restful effect on attention while its graffiti-like material weight, given to it by both the fixity of its geographical location and its very angle of alignment, will also make the experience both memorable and subtly playful. *Play is interwoven in the history of AR, eLit, and place-making so developing 'ambient play' for this research was integral to the work.* Exploring and using the liminal, exploring and using our cities as more than just an authority's sphere of influence, exploring and using new tools to enhance our experience of and influence in our environment are all key parts of play – that has shaped the practice of this doctoral research, its theoretical underpinnings, and its key terms.

It is the combination of 20th Century place-making theory and 21st Century digital technologies that brought about my concept of *ambient play* which is integral to my practice-based research. Much like architectural literature, *ambient play* sits at the intersection of where Benjamin, Situationist, and de Certeau's concepts in placemaking meet phenomenological concepts of play and virtuality, augmented reality [AR], the Ambient Literature research project, story world absorption, smartphone notifications, and McCullough's notion of the ambient. It is important to add to

placemaking – to understand Augmented Reality, Mixed Reality, and Virtual Reality’s subtle differences in understanding place – with contemporary understandings of what early digital technologies and artists’ application of them has added to those theorists’ notions of place. In looking at ‘Virtual Place and Virtualized Place’ Bruce B. Janz neatly sums up the lenses through which digital humanities scholars are discussing place in games, Virtual Reality [VR], Mixed Reality [MR], Augmented Reality [AR], and indeed how those affect our notions of place in the actual world (Janz, 2019). Janz says,

A virtualization is the digital - discrete, disconnected, codeable, and iterable, while a virtuality is the analog - continuous, connected, and unique. ... A virtualization is ultimately an abstraction, whereas the virtual always remains tied to the concrete. (Janz, 2019, p. 62)

Here Janz makes an initial distinction between the virtual and the virtualized place. By articulating the difference, this definition subverts an initial reading that might associate the ‘virtual’ with VR. Janz defines ‘virtuality’ through flexibility, responsiveness, and playfulness; indeed he goes on to use play as the clearest example of how – though ‘virtualization’ can be a representation of anything made digital – the virtual is rich in relations to the real-world. Janz underpins this definition by specifically looking at it through phenomenological approaches to play. After thoroughly detailing phenomenology’s old and new tenets of play, Janz focuses on Eugen Fink’s claim that

There is, in other words, an affective dimension to play which is represented by him as a space, a sphere. It is a sense-creating space. ...Since play is fundamental to human existence for Fink, and not just a pastime for children, we are always playing, and in so doing always creating reality. (Janz, 2019, p. 65)

Where Janz and Fink coalesce is in understanding the benefit of play to digitally augmented life and any tool-augmented or urban-environment-augmented life, respectively. Following Fink and Janz’s line of enquiry, it is play that makes a ‘sense-creating space’ while ‘creating [our] reality’. Later we’ll see that Clifford Geertz has observed this in other cultures too. McCullough’s use of ‘ambient’ in *ambient play* is another way of understanding how we sense and create our 21st Century reality: a continuously created, smooth experience of our digitally surrounded reality that subtly filters out the ongoing (informational) noise but enables and sustains an ongoing sense of playful interaction with our environment, often via a device or tool (such as AR). This is the foundation of my term, *ambient play*, as stated previously in this chapter.

The Ambient Literature research project (2016-2018) explored a similar area with three commissioned works and surrounding research. Run by the University of the West of England, Bath Spa University, and the University of Birmingham, the Ambient Literature research project set out to explore “the developing relationship between digital technology and literature” (*Press Release: July 2016 – Ambient Literature*, 2016). An English answer to the burgeoning of eLit in the UK, the project commissioned three ‘*ambient literature*’ pieces – two of which were perambulatory locative-media and one was an app that scraped data about you from your phone to tell a changing ghost-story full of virtuality, in Janz’s sense of the word. Each of the authors of the commissions has stated how important place or creating a “situated text” was (Pullinger, 2018). At the same time that I had been exploring and asserting the importance of *Situated AR eLit*, the Ambient Literature research project had been doing similar work around texts and guided audio-walks. This parallel development of theory and practice is why it is important here to include a consideration of their particular understanding of eLit and the situated text. In their 2017 midway research presentation, they described *ambient literature* as:

Taken together, such practices establish ambient literary works as nexus points for temporal, historical, geographical, networked, psychological, and interpersonal trajectories producing, in more or less ergodic fashions, a hermeneutic oscillation between the foreground and background of post-phenomenological experience, highlighting the necessary dependence that meaningful actions have on the situations and stipulations of their enaction (writing, recording) and reception (reading, viewing, listening). Formulated as a trans-medial engagement with the situated/stipulated context of the reader (writ large), works of ambient literature reinscribe the occurrence of literary experience according to a spectral logic of an unbounded textuality across an errant lattice of both existent and nonexistent materiality. (Abba et al., 2017)

Here the researchers have listed all the necessary components that make *any* ambient work: from ‘geographical, networked’ to ‘an unbounded textuality across an errant lattice of both existent and nonexistent materiality’. When taken alongside the comments that the eLit writer Kate Pullinger made in 2018, that she was seeking to write a situated text, it is clear that the Ambient Literature research project understands (and correlates with) all the considerations that my own methodological perspective incorporates when it considers *ambient play* in the practice of *Situated AR eLit* development. Though there’s room to disagree with their usage of the term ‘post-phenomenological’, the whole definition of *ambient literature* serves as a thorough list of all the *possible* elements of an ambient work, not all the *necessary* elements. Where they are examining the opportunities of eLit in geographic and Deleuzian textual lattices, my research examines the

materiality of architectural fixity in AR text and the ambient nature of ongoing, everyday play that is, in itself, across geographic, political, and textual lattices.

Measurement

Everyday play requires a sustained level of attention and oscillating-immersion so in order for this doctoral research to measure those elements, I have used elements of the Kuijpers et al Story World Absorption Scale throughout my analysis of the data. Measuring how we interact with narrative or situated text is a difficult thing and one that has only been empirically codified within the last decade. Building on key theorists from different disciplines, Kuijpers et al built and tested their Story World Absorption Scale (SWAS):

In sum, story world absorption can be defined as an experiential state that can emerge during the reading of a narrative text. This state is characterized by readers' focused attention on the alternate story world presented in the text ...H1: Story world absorption consists of four dimensions, namely *attention*, *emotional engagement*, *mental imagery*, and *transportation*. [My emphasis.] (Kuijpers et al., 2014, p. 95)

As is clear in this quote, the absorption described is the same as described in the study of metaleptic immersion: a state of focused attention onto, and ontological transportation into, the text. For the purposes of my methodological perspective, attention of users will be a primary measure. The other three SWAS dimensions will be taken into consideration, but due to the automatic metalepsis of AR, the SWAS transportation dimension wouldn't quite suit the AR experience as an empirical measure in the same way, and indeed one of the few faults of Kuijpers' study is its lack of consideration of socio-political-satirical awareness, multi-player/reader-playership, and embodiment(s). Therefore, while incorporating elements of the SWAS study, the interview questions in the case study explored in this thesis were designed primarily around McCullough's notion of the ambient and asked about the social, potential, and the phenomenological feeling of the experience. Together, these make a good measure of the absorbing experiences of the participants in this study and can give us a wider understanding of the effectiveness (and qualities) of *ambient play*.

In 2014, Shilkrot et al undertook a comparative review of actual AR works from 1999 to 2014. They found, as others have consequently, a natural propensity toward metalepsis in AR works: "...the real and fictional blurring is the convention in the medium", they also suggest that the "...sensation of immersion is intensified" (Shilkrot et al., 2014, p. 37) because AR works layer onto the real-world. Shilkrot also goes further and says "If we define AR as a duality of reality+augmentation, we could think of immersion in AR as dual as well", going on to offer "jointly immersive" as a possible term because of "the concept of *minimal departure*, where a completely

fictional story-world is comprehensible to readers because it resembles or derives from their own real-world, from which they fill in the gaps” (Ibid). Shilkrot’s succinct explanations of how AR immerses users quickly through ‘minimal departure’ and easy metalepsis is rationale for a practice-based research approach because it offers coherent, recognisable way with which to measure the user’s attention and engagement while bringing them into the experience with relative ease. *Minimal departure* also influenced the design of the whole AR experience tested in this doctoral research, as well as being a part of the methodological perspective which allows an understanding of participant feedback.

Like Shilkrot et al before them, Liao and Humphreys studied *Layar*, an AR software platform, to understand how users of the software engage with it and what they get from it. In 2015, Liao and Humphreys interviewed many users of Layar and found several emerging uses that mirror the sociological investigation of this PhD^{lvii}. The two primary uses they found were:

First, users are creating content on Layar to think about and communicate about place.
Second, users are deploying AR to raise questions regarding who has authority over space and to reconstruct political and historical meaning in place. (T. Liao & Humphreys, 2014, p. 1420)

Here the link between AR and placemaking is explicit and the second finding shows users contesting the city and actualizing individual *agency & civic will* through questioning who has authority over space; both are critical to my own research and have shaped my approach. Like Crivellaro, Liao and Humphreys note a greater awareness of virtual and physical interactions in creating a hybrid social space with further use of the Layar AR tool.

The connections between their work and the work of this PhD are further deepened as Liao and Humphreys note the importance of embodiment when discussing how Farman articulates digital-physical hybrid spaces as the “social production of space”. They note that “In particular, he argues that the ways mobile media are incorporated into everyday life are part of a “sensory-inscribed” form of embodiment where media, space, and bodies are mutually constituted.” (T. Liao & Humphreys, 2014, p. 1422) This broad range of concepts and connections is fitting to my methodological perspective precisely because ‘inscribing’ an embodied understanding of the city through media, space, and bodies walking through/with AR and the city itself is the purpose and the ultimate test of my research. Liao and Humphreys were also able to record efforts by artist group Manifest.AR to challenge the centralized curation and ownership of a museum space (T. Liao & Humphreys, 2014, p. 1429) which demonstrates a small but potent example of the ways that AR is

used to challenge authority over space and decentralize: they found that this challenge to authority also affected the participants,

This heightened attention to place and feelings of control over space owing to mobile AR is both a change in attitude and perception, and illustrates how mobile AR can motivate users to scrutinize strategic places...demonstrating expertise and ownership of that place (T. Liao & Humphreys, 2014, p. 1430)

An exploration of user's feelings of 'heightened attention to place' and 'ownership of that place' is precisely the goal of the practical element of this PhD, so incorporating Liao and Humphreys' findings and methods is key to the development of my own methodological perspective. Liao and Humphreys were observing how an existing software is used; this PhD both creates software and observes how participants use it. Therefore, alongside building on Liao and Humphrey's observations and observatory methods, simple software testing is also vital to my practice and analysis. Simple software testing is a series of trials in which one can measure users' ability to carry out targeted tests using the software. In the case of this PhD it means testing whether the software allows the users to see AR poetry, fixed in place and unmoving, isolating and testing each component of the software – AR text, intro text, green space found and planning applications text - by having them do a series of monitored exercises, discussing the ambient qualities of the whole experience and asking about their heightened attention to place and ownership of green space, as well as anything else they found. Full details of the questions, interview technique, and testing are explored below. This flexibility of testing and finding feedback in a semi-structured interview is another part of the rationale for choosing practice-based research in this PhD; that flexibility and ability to look across different fields of study through interviewing participants has meant an ability to see how effectively users question the power structures in the civic, real-world and within AR development.

eLit scholars have examined the power structures behind the growing AR software platforms. In 2013, Boulton, Graham, and Zook examined the power structures inherent in AR and specifically, how power helps to produce place. They found four key ways in which power is manifested in augmented realities: two performed largely by social actors - distributed power, and communication power - and two enacted primarily via software - code power and timeless power - (Graham et al., 2013). Distributed power and communication power are "the social production of augmented realities" (Graham et al., 2013, p. 465) in digital resources of value made by users evident in digital objects or markers left for one another; code power and timeless power are "the taken-for-granted processes enacted through code" (Ibid) so we can see that only software designers have access to code power but this access means they are able to "regulate conduct" and

use software's "power to influence" (Graham et al., 2013, p. 469). This demonstrates a clear division between the users in the first two and the software designers with greater power in the latter two. In 2014, Nicola Liberati presented a research paper at the IEEE International Symposium on Mixed and Augmented Reality titled "A single co-lived augmented world or many solipsistic fantasies," exploring whether we should have one larger augmented reality platform or many smaller. She answered the question in two ways: firstly, through the consideration of whether it was feasible to have everyone in the world playing at the same time; and secondly, exploring whether or not objects in AR are to be shared. She concluded that it is better to resist solipsism so that the AR experience is less game-like and more community-based^{lviii} (Liberati, 2014). When we apply Liberati's thinking to Facebook's current Facebook Reality Lab AR platform which wants to "...allow you to stay present, connected, and deeply in tune with the people and places around you and at a distance — both physically and virtually" (Facebook, 2019) we can see that developers are thinking along the lines of building a single, co-lived world that our social circles introduce us to or our social bubble has us rub up against; a halfway house. This is different from the Spark AR platform Facebook developed that mostly uses the camera inside the Facebook mobile app for filter-effects applied to a user's face or, for more advanced programmers, graffiti or Layar-like effects they can apply to buildings and architectural features (Facebook, n.d.). This difference highlights what access the public has to Facebook's AR platforms; there is clear division between Spark – open platform, public - and Facebook Reality Lab – closed platform, private – which also reveals how much Facebook – the biggest social media platform at the time of writing in 2020 – wishes to retain its institutional control and influence, or what Boulton, Graham, and Zook called 'code power'.

The stratification of AR user access and influence is clearer as we move from 2013 to 2020. Boulton et al's concerns around the 'opaque and depoliticized process[es]' (Graham et al., 2013) created by large corporations have become more opaque, as is evidenced by Facebook's firmer grip on controlling its code power. Liberati's hope for 'more community based' AR has not been realised because AR software platforms such as Snap (previously Snapchat), Facebook, Layar, and Google, have opted to remain on their own and develop only for their own platforms. This is reflected in the way Boulton et al built on the concept of 'filter bubbles' online and wrote that we may see an AR future where we are "...ever more fragmented into individualised representations that ultimately enable the construction of self-reinforcing information cocoons" (Graham et al., 2013, p. 470)^{lix}. It is as Leighton Evans predicts for the future, "...our seeing of the city would be directed by Google, for Google and its interests." (Evans, 2019, ll. 536–538). The case study in this PhD tests for an increase of awareness of a city's green space via AR, meaning that it is not only vital that these considerations of power relations are in my methodological perspective but that they reinforce the rationale for

practice-based research by making an individual researcher-made piece of software into something which automatically problematizes and questions the current AR ecosystem by being individual work, work freely given, and work that shares all its forms of Boutlon et al's power definitions. These considerations of the AR ecosystem and this research's effect on a user's civic awareness need to be tempered by Venturini et al's '...reality check(list) for digital methods'.

In their reality check, Venturini et al discuss the methodological difficulties arising from the lack of separation between medium and message in digital investigations and then propose eight practical precautions as a guided checklist. Ranging from 'big data' to 'digital interventions' and "the most theoretical to the most practical" (Venturini et al., 2018, p. 4199), the researchers survey and critique investigative digital methods that they define succinctly as "...techniques for the ongoing research on the affordances of online media." Using the Marshall McLuhan school of the term media,^{lx} this quote shows Venturini et al have considered the limitations of our current media and *network aesthetic*. In their guidance, the specific section of the checklist appropriate to this doctoral research defines 'operationalisation' and says,

As we have just seen, the key to securing the adequacy between observed phenomenon and repurposed medium is to handle with care the relation between the scope of your research questions and the traces that you will use to investigate them. In the previous point, we considered such questions 'passively' as if the only thing researchers could do is to choose a source that fit their ambitions. Yet, researchers can also (and in fact should also) actively and creatively operate to align the two. This process is called 'operationalisation' and it refers to the way in which the entities that you wish to observe are defined through the traces at your disposal (see, for example, Moretti, 2013). In digital methods research, this takes the shape of 'an on-going process of assembling, re-configuring, and aligning research questions with digital media and device cultures' (Weltevrede, 2016). (Venturini et al., 2018, p. 4204)

This echoes Bell and Davies' iterative, performative designs of practice-based research but focuses specifically on the affordances of particular digital media and asks the researcher to align the investigative medium with the (message or) direction behind the questions and, importantly to ethnographic considerations, the breadth of the questioning. After defining it, Venturini et al go on to ask two important questions: is your operationalisation attuned to the medium formats? Is your operationalisation attuned to the medium practices? These questions reinforce the need for alignment of active research action (in our case, the creation of a tool) and breadth of participant question – unlike some digital media studies, this doctoral research is working with participants and

their direct feedback (rather than just an online platform) so is able to attune the tool created to AR's practices and the data gathering from interviews (to be appropriate to the affordances of the AR medium and) to meet the needs of human participants. That data can then be used to examine the effectiveness of the key terms created, the tool itself, and – without avoiding operationalisation – to see if AR can help increase awareness of a participant's green space in their city.

Architectural literature and *ambient play*, as new key terms being created and tested within this study, could be considered rationale for practice-based research enough but they also reinforce the importance of generative practice and iterative knowledge creation through the combination of theory and practice. For AR, this also means software testing – in a simple sense – and experience design combined with examining its socio-political effect; balancing practice with theory not only addresses Venturini et al's operationalisation but also helps to understand the limitations of similar studies and the limitations of this doctoral research. Those limitations help to construct the best possible key research questions, interview structures, and methodological design which will now be detailed.

Key research questions

As the 21st Century has progressed, digital methods of investigation and digital storytelling have gained a wide range of methodological proponents from across several fields: from the most obvious in a field like eLiterature [eLit] or media, through a tangential field such as museum heritage (Hoare, 2019), to the less than obvious in something as specific as sexual education (Guse et al., 2013). When we now live in a *network culture* and a *network aesthetic* through digitally *Networked Publics* (Varnelis, 2008) in surveillance capitalism, where so many fields are connected by digital methods of interpretation and storage, it comes as no surprise. The key research questions devised for this study must then accept our *network culture* and build on top of it, only testing the tool developed for this PhD and its impact rather than use scarce time to question the already existent digital environment – in large part because participants already have a great recognition of the digital tools available in the wider software world. Some digital storytelling draws from the theoretical literature on education for critical consciousness (Wang & Burris, 1997). Many digital storytelling processes affirm and emulate the teachings of Brazilian educator Paulo Freire, who posited that the development of critical consciousness — a close examination of one's own experience and its place within a social and political context — is a necessary step toward broader social change (Freire, 2000). These, in turn, echo the work of Augusto Boal that was discussed in the previous section, so we can see a

constant connection between *ambient play* and digital storytelling processes. That is the broad theoretical case on which the key research questions have been built.

The key research questions underpinned both the design of the actual *Here. Now. Ours* experience and the interview questions that were used to gather qualitative and quantitative data for analysis. The case study key research questions are:

1. Is the experience enjoyable, playful, and subtle?
2. Does the experience make the participant more aware of their city's green space?
3. Does the experience make the participant more aware of their city's planning applications?

Alongside the methodological underpinnings and key terms, these questions guided how the case study was devised and the methods that were used. The questions helped shape an interview structure that gave enough room for the participant to freely express a holistic articulation of their experience while indicating the level to which they felt the experience guided them and guided them to an answer to these three questions. The data gathered was threefold: narrative, qualitative responses to interview questions, quantitative route journey data, and quantitative route time data; these were analysed to see where participant's experiences matched over different tests and what the average journey consisted of. The full process and structure of the case study, including interview questions and feedback, will now be detailed.

[The experience, reiterated](#)

As previously stated in this chapter, participants of *Here. Now. Ours* had an on-boarding process that guided them through the operation of the software and then they were then free to take as little time or as long as they desired. The AR poetry would guide them to a green space (via their GPS) and (by recalling data from the City's data portal) the text on screen would then let them know how many planning applications were filed with the City, for that area; participants could roam over the majority of the city and find new green spaces, alongside experiencing the fixity of the AR poetry (that was written, specifically, to reflect Galway's history). When a participant came to a green space, they were encouraged to contact the City Council and find out exactly what the planning applications around that space were. In total, eight participants tested the *Situated AR eLit* and seven chose to respond in interview feedback.

[Methodology – methodology design of the case study testing](#)

The design of the case study testing was constructed in 3 parts: the first was recruitment and on-boarding, the second was the software testing element, and the third was the gathering of

qualitative, phenomenological feedback and quantitative data. Each of these parts will now be detailed.

Participants self-selected from a call-out made to National University of Ireland Galway's [NUIG] students and staff, with a recruitment focus on those with an interest in digital humanities and/or in human geography; this was done by email, through university departments, and in-person request if the participant had an appropriate connection to the fields already detailed. The choice of self-selection meant a further level of Shilkrot's *minimal departure* could be used because the self-selecting participants were likely to either have some familiarity with AR or be curious about the subject and thus willing to be open to *ambient play*. In total, eight participants tested the *Situated AR eLit* and seven chose to respond in interview feedback. In order to gain informed consent from the participants, all were sent the information contained in Figure 1 and asked to confirm that they were still happy to be a participant; at each stage of the process, participants were reminded that their data would be anonymized and that they were free to stop taking part if they ever felt they needed or wished to. As soon as participants had confirmed their consent, a date was arranged for them to take part.

Once a date had been confirmed, the participant was met on NUIG campus and guided through the on-boarding, tutorial process. As explained in the Methodological Underpinnings section, this on-boarding process was inspired by Bell and Davies' iterative approach to practical research and Bell et al's empirical study of immersion. On-boarding is a soft tutorial in the shape, tone, and structure of the research's test; it also explained how the participants would be interviewed, observed, and debriefed about their experiences. The on-boarding for my own test was iterated to expand in the second and third iteration of testing with participants, responding to previous participants' feedback; each time made the on-boarding clearer and the usage of the AR device easier, giving as much time as was necessary to take questions, perform an example walkthrough of the necessary actions and ensure the participant was comfortable with their direction(s). Once the participants were fully comfortable with the testing, they were encouraged to take as much or as little time as they'd like with the device and experience then report back when back on campus. The debrief and feedback interviews that followed then allowed for both quantitative, software testing questions and narrative, qualitative questions on the phenomenological experience.

Before you decide to take part, it is important you understand why the research is being done and what it will involve. The project aims to investigate how augmented reality (AR) can enable understanding of your city's green space. We are also interested in how your experience affects your wider understanding of the city planning process.

Who can take part?

Anyone over the age of 18 is eligible to take part. Unfortunately, this research cannot include anyone under 18.

What will happen to me if I take part?

We will meet you on the NUIG Campus. There you will be given an augmented reality handset and guided through the beginning of the process. Thereafter, you will be free to walk the city and return to campus when you feel happy to. Afterwards, you will be asked to complete a short questionnaire. We estimate your visit will take between 30 and 60 minutes. You will have the option to agree to a follow-up interview to find out more about your experience.

What are the possible disadvantages and risks of taking part?

Participating in the research is not anticipated to cause you any disadvantages or discomfort.

What are the possible benefits of taking part?

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will have a beneficial impact on how you understand your green space, electronic literature, augmented reality, and Galway City's planning process. The experience normally costs; you will be able to try it out for free in return for your participation in the research.

Will my taking part in this project be kept confidential?

All the information that we collect about you during the course of the research will be kept strictly confidential. You will not be able to be identified or identifiable in any reports or publications. Any data collected in the questionnaire will be stored securely.

What will happen to the results of the research project?

Results of the research may be published. You will not be identified in any report or publication. If you wish to be given a copy of any reports resulting from the research, please ask us to put you on our circulation list.

Figure 1 – Informed consent request text and test details

With the creation of new software comes necessary product testing, however as the *Situated AR eLit* piece made for this doctoral research is for alpha (or prototype) development, only, then only simple operational software questions were necessary. Prototype software system testing is a series of trials in which we can measure users' ability to carry out targeted tests using the software so in this research the test questions are:

1. Did the AR poetry display on walls?
2. Did the app give directions, however vague?
3. Did you find more than one park?

These simple operational software questions isolated and tested each component of the software by having the participants do a series of semi-monitored exercises: after their post-experience interview, I was able to crosscheck the location history data and their experience's route stored via the smartphone in order to monitor their route and check it against their reports. These operational software questions meant an immediate level of clear, quantitative data that could be used to evaluate the software; for qualitative data, a looser but semi-structured series of questions needed to be asked. These questions and the form in which they were asked will now be detailed.

In order to understand how much the participants might have felt like an *Augmented Wandersmänner* or felt their *agency & civic will* being encouraged, it was necessary to ask questions which explored the phenomenological experience of how the process of testing felt to each of them. Asking deeper, more personal questions involves developing as much rapport with them as possible so that the participant feels comfortable enough to go into further detail; after all, "...doing ethnography is establishing rapport" (Geertz, 1973, p. 6). Building rapport means that no one conversation (in debriefing and interviewing the participants) could be exactly the same but instead was 'felt out', it was entered into from both interviewer and interviewee as a conversation where both could ask questions that felt like they flow and stem from previous talking points as much as possible. As the interviewer, I tried to ensure the conversation was as wide as it needed to be but also that it included the following questions (or questions with a similar intent to these):

1. How would you describe the poetry? Like graffiti? Sculpture?
2. How did the overall experience *feel*?
3. Did the AR make you feel *more* (?) or *less aware* of your surroundings?
4. Did the overall experience you *more* or *less* aware of the planning applications around the city's green spaces?
5. Did the experience feel curious, intriguing, and/or playful enough to keep your *attention*?
6. Did it feel rewarding?
7. Do you think it might have been better and/or more ambient, with a more natural flow, with a pair of AR glasses?

Other questions and conversation topics may have followed from these but these were the only questions in the qualitative section of the discussion that I was conscious to include. This focus on the *feel* of the experience was important in both experience-design and in how they articulate their understanding of their emotional responses, connection with their environment, and *agency & civic will*; the phenomenological focus in the questions tests the theory that walking, itself, around a city can connect a participant to their *agency & civic will* and heighten their awareness of their city.

The questions and the friendly, rapport-building way in which the interviews were constructed had to be informed by interview methods with a solid grounding in understanding people and place; thus it is that ethnographic interview methods and a methodological perspective on those interviews was used. Ethnography is the study and systematic recording of human culture through qualitative research that can then be interpreted in a rigorous way. The appeal of modern ethnographic methods is their wide-ranging, interdisciplinary, and inclusive approach. Of that approach, Mike Crang says “Ethnographic research reveals, and is often undertaken to question, the erroneous neatness of distanced, abstract, theoretical understandings of cultural, economic and other processes (see Miller 1998b, 2000)” (Crang, 2007, p. 15) and in so doing allows a link between ethnographies and De Certeau’s work that is so central to this doctoral research. If we link the *agency & civic will* inherent in De Certeau’s everyday praxis to an understanding that interview results will not always be ‘objectively’ interpretable, we can understand that rapport-building and qualitative interview results are just as important as the quantitative data in understanding whether participants felt an increased awareness of the city’s green space and an increase in *agency & civic will*. Crang also says,

An ability to engage with, rather than withdraw from, this 'real world' messiness is seen as perhaps the most valuable contribution ethnographic research can make. But ethnographers cannot take a naive stance that what they are told is the absolute 'truth'. Rather, research must involve the struggle to produce inter-subjective truths, to understand why so many versions of events are produced and recited. It is the ways in which people make sense of the events around them, and render these 'true' in their own terms, that is most revealing about how their/our lives are embroiled in larger social, cultural, economic and political processes. Therefore, stories told in the research encounter are not simply to be regarded as means of mirroring the world, but as the means *through which it is constructed*, understood and acted out. [emphasis from the original] (Crang, 2007, p. 14)

Here Crang raises the importance of inter-subjective truths in the connections between people’s *own* truths and the larger political processes, this doctoral research agrees that understanding intersubjective truths reveals how people interpret their real-world experiences of political processes and will evince it with direct examples like people’s awareness of planning applications. This emphasis on intersubjective truths and the way they create our realities reinforces the importance of using ethnographic methods and methodological perspectives in the interview process. In order to find these intersubjective truths well and without losing rigour in the investigation, Crang recommends *theoretical sampling* whereby “In place of the random sampling of

statistical research, this approach involves gaining selective access to appropriate groups of people who may be concerned with, and/or involved in living through, the research problem.” The notion of ‘appropriate groups of people who may be concerned with...the research problem’ echoes Shilkrot’s *minimal departure* and so groups of students and staff that were researching digital humanities, specifically, were notified of the research. Combined with self-selection, this meant that the participants had a wider understanding of the kinds of technology involved and the kinds of questions around the uses of that technology, making them fitting participants from whom to layer and analyse their self-reporting of the *Here. Now. Ours* experience.

Participants understanding of the questions allowed for the implementation of specific ethnographic interview techniques; Crang, Mary Kay Gee, Charlotte Ullman, and James P. Spradley agree that interviewers should start with broad, *grand tour* questions and then go onto specific, *mini tour* questions (Gee & Ullman, 1998). Alongside rapport building, this was a suitably rigorous way to structure the qualitative questions so that the participants knew they could discuss anything that they felt during and, critically, after the quantitative questions; the interview was designed so that the use of the *grand tour* to *mini tour* approach would elicit further thinking and reflection on the experience during the feedback interview. These proved especially useful in encouraging participants to discuss the wider, political processes that the doctoral research is investigating and enabled a deep, phenomenological understanding of how they felt about the absorbing nature of the experience.

As previously stated in this chapter, the Story World Absorption Scale [SWAS] is used to understand how attentive participants felt; specifically, while incorporating elements of the SWAS study, the interview questions were designed primarily around McCullough’s notion of the ambient and asked about the social, potential, and the phenomenological feeling of the experience – the answers are then parsed for attention, agency, and immersion. Though there could be merit in using and adapting an Attention-Value model (for testing and analysis), like the one articulated by Stephen Bitgood in *Attention and Value: Keys to Understanding Museum Visitors* (Bitgood, 2013, pp. 64–68), through the course of designing the test it became clear that that particular model wasn’t as well suited as the SWAS model (with some innovative additions) because it was so focused on the controlled environment of museums and didn’t give enough flexibility to the participant or enough of a phenomenological understanding to the research. It is attention, agency, and immersion that have guided the research questions, the design of the case study, and the inquiry of the theory behind this doctoral research and it is those three that will be the basis of analysis when looking at the Case Study Results.

Section iii) Case Study results and analysis

This section will briefly remind us of the experience of the software, reiterate the interview questions, and present the analysis of the qualitative results, in separate sections. The quantitative answers to the prototyping software questions won't be presented here but, rather, in the Critical Reflection; for the most part, the software worked and participants reported that they were able to use it to the necessary effects and/or restart it should they have felt it wasn't working optimally and so those detailed considerations will be in the next chapter. This section will finish this chapter and convey whether the hypothesis of this doctoral research was correct; to begin, we will need a reminder of the interview questions.

Case Study interview questions, reiterated

The non-technical questions to the participants were:

1. How would you describe the poetry? Like graffiti? Sculpture?
2. How did the overall experience *feel*?
3. Did the AR make you feel *more* (?) or *less aware* of your surroundings?
4. Did the overall experience you *more* or *less* aware of the planning applications around the city's green spaces?
5. Did the experience feel curious, intriguing, and/or playful enough to keep your *attention*?
6. Did it feel rewarding?
7. Do you think it might have been better and/or more ambient, with a more natural flow, with a pair of AR glasses?

And it is from the answers to these questions that we can really begin to understand how absorbed or immersed participants were and if their awareness of their green spaces was increased. We will now see the results and analysis of these questions.

Analysis

Following the position stated in the previous Methodology section that this study incorporates the *attention* element of the Story World Absorption Scale (SWAS) while taking a holistic view of the social, potential, and the phenomenological feeling of the experience, we can take the answers to questions 2 – 6 as indicative of majority opinion of the participants. First, we will examine responses to the more empirical questions 3 and 4 then overlay those with the more phenomenological to better understand the process that participants went through.

All 7 respondents said that they felt *more aware of their surroundings*, when asked question 3. This was often described as being caused by the necessary physical actions of operating the

device, e.g. “You’d be looking around to see if there was a wall you could put it on” and “More like, like an add on, if that makes sense? Looking at walls, very pretty walls, is I thought cool, wonderful, still a little weird but still cool.” (See Appendices, interview transcripts). In these quotes from the debriefing interviews, we can see respondents discussing the physicality of using the device and looking for somewhere “...you could put it [AR poetry] on” (Ibid). There were also respondents who indicated they felt they could “...develop a [sense of] muscle-memory” in using the app and so across the interview responses to question 3, there was a sense of embodiment – one interview said the experience made their surroundings more tangible to them and “I’d say tangible because it was more, it took me for a more personal experience” (Ibid). That participant wasn’t solely discussing their surroundings as more tangible but the City Council data, itself, as more tangible too and so we can see the data as becoming more tangible, becoming embodied, through the process of the experience. From the sheer number and the quality of positive responses, we can definitively say that participants were more aware of their surroundings and the physical engagement, their embodied understanding, added to their awareness when answering question 3.

The responses to question 4 reveal a more complicated position: 4 participants felt the experience made them *more aware* of planning applications, 2 felt it needed further clarity, and 1 felt the same as before; none felt the experience had made them less aware or taken away from their understanding. In most of the debrief responses, further questions were asked about how participants might then see more planning application data – this is encouraging because it identifies a connection between the experience and a growth in attention of the wider societal, planning structures and a desire to continue their increasing awareness of those issues. One participant went further still and discussed how the software and experience might be used to challenge more than City Council decisions but the wider global flow of money from the large people-farmer technology companies discussed in Chapter 2 and this was a profoundly attentive response; the participant discussed, at length, how the software reminded them of the injustices of planning applications that had gone through without community oversight simply because the applicant was working with a global technology company (Ibid). The mixture of responses may also indicate a flaw in the design of the experience and that will be discussed in the next chapter, however the answers to questions 5 and 6 can give us another layer of understanding as to whether the experience was suitably designed.

From the answers to questions 5 and 6, we can see that an experience which holds your attention can also be frustrating. All the participants stated that the experience was *playful* and *held their attention*; some called it curious and, somewhat remarkably, 2 participants called it “wholesome” (Ibid). From the previous paragraphs we know that the majority felt the experience as

an embodied one that increased mostly their awareness of both surroundings and planning applications but now we can add that all the participants felt a great sense of attention – on the *attention* element of the Story World Absorption Scale (Kuijpers et al., 2014, p. 95), this is a successful qualitative result. On being asked (in a follow up question) if they forgot about the rest of the world and being completely absorbed by the experience, one participant responded “I bumped into someone? So yeah!” (See Appendices, interview transcripts). This tells us that the participants were indeed absorbed in the experience and we can link this absorption to their reports of increased awareness through the embodied nature of *Situated AR eLit*. The attention given isn’t, however, solely rewarding; question 6 received a much more mixed response where 4 participants stated that it was *definitely* rewarding whereas others felt it was somewhat rewarding, not rewarding, and one participant felt it was frustrating. With a majority of 4 of 7 participants reporting the experience as rewarding, it is fair to say that the experience was felt as mostly rewarding but a lot more could be done to ensure all participants felt the same positive response. Though discussed in more detail in the next chapter, a combination of technical issues and experience design can be attributed to the frustration felt; the participant that felt it was frustrating said “I’m possibly treating it badly, like it’s a game or something?” (Ibid) and this gamification that is associated with AR, due to popular games like Pokémon Go, is something that the design of the on-boarding tutorial process could have influenced better. To understand the wider and fullest participant response, a wider question will now be discussed and analysed.

In questions 3, 4, 5, and 6, I have been able to take the responses, no matter how they’re put by participants, as quite direct (almost quantitative) answers: *more aware*, *mostly more aware* of planning applications, *attention holding*, and *mostly rewarding* but with notable exceptions; question 2, however, was more of a ‘grand tour’ question, a question put to participants in order to let them phenomenologically detail their unique experience and give this analysis a more holistic and qualitative understanding of the effect of the experience.

The responses to question 2 were so varied and revealing that some will now be analysed to explore the exact connections to and findings of the doctoral research. Ranging from the simple “I had fun” right through to discussing complex political and social issues, all the participants responded that they *felt* different things during the experience. The most important responses to highlight and analyse were those that answered the thesis question in some way or were connected to the wider theories around the investigation – for example, “I thought it was kind of cool because it kind of speaks to the theme of reclaiming public spaces, you know?” and “...like interacting with the place more, tangibly, was really nice. I really liked that but yeah it’s like the city, like, the town is alive so it’s really cool to like bring that out”. When a participant speaks about ‘reclaiming public

spaces' then we can see that they've understood an implicit design element of the software simply through the feeling of their experience and thus increasing their awareness because 'it was kind of cool' and intriguing. That strong sense of feeling is evident in the participant which felt they were 'interacting with the place more, tangibly'; this feeling of tangible interaction is a timely real-world finding that echoes the studies which show embodied knowledge is 'felt' deeper, retained for longer, and helps us better retain a geo-spatial understanding of our locale (Paterson, 2007, p. 77; Van Duppen & Spierings, 2013). So too does this final quote:

"Most apps, you don't feel much...but you approach the space around you differently with this – you find where you're comfortable doing it; you're aware of your surroundings in a different way. You're focusing on the form but then you have to focus on cars, walls, and traffic lights." (See Appendices, interview transcripts)

Here, again, embodied knowledge enables a participant to use the Hybrid, Hertzian space (Dunne, 2001, p. 21) created between software and the real world to *increase their awareness* of their surroundings; letting the participant tell me how they felt about the experience has given a more holistic understanding of their attention, engagement, and immersion, as Bell et al found before me. These findings vindicate the phenomenological methods chosen and show that both quantitatively and qualitatively, participants felt more aware of their surroundings and their public space through their own, unique, phenomenological experiences facilitated by the *situated AR eLit*.

Conclusion

The results of the case study can be put simply as: *in the majority, participants stated they were more aware of their city's green spaces through the use of situated AR eLit*. Does this answer the hypothesis of this doctoral research? Yes, the hypothesis was found to be correct but does it fully answer the wider interrogation? Not quite and not without an increase in technological capability; a quick critique of this is necessary now.

Though the technological complications and demands on the research will be detailed in the next chapter, it is important to state that this case study had a smaller number of participants than would be ideal. Of course, many similar case studies within digital humanities (Gold & Klein, 2016, pp. 153–175) have similar numbers of participants due to ethical considerations and participant agreement so this research is not untypical – I would still have preferred to be able to open the testing up for a larger number of people, throughout the city, in order to gain more quantitative data but more participants didn't volunteer and the time within which the case study had to be completed came to an end. Though the complex participant responses show mixed kinds of embodiment, there is also room to improve the study in that area; had the technology been

available in an affordable and accessible way during development, some of the smart-glasses detailed in Chapter 2, Section iii could have enabled further embodiment, immersion, attention and thus increased both awareness and the geographical range of participants' understanding; this topic will be returned to in Chapter 4. These are the immediate flaws in the case study that mean the wider interrogation needs more research to satisfy the question. The hypothesis, however, was answered and so that answer and the importance of its analysed findings will now be presented in precis.

As stated in the previous section, participants were *more aware, mostly more aware* of planning applications, they felt their *attention was held*, and the experience was *mostly rewarding*. To be able to put the findings in one sentence like that is a success of the design of the study; the range of its findings show it has given enough flexibility to design and participants alike, to see where the study could be improved. The hypothesis stated that AR eLit can indeed increase awareness of a city's green spaces (but only through ensuring it is *situated*) and as most participants stated they were more aware after the experience, we can now say that the hypothesis was correct. In both the quantitative and qualitative data collected from software and interviews, participants experience showed a mobile, attentive, and self-motivated response; when participants had used the software to the extent they wished, they returned to the start point and were debriefed. In that debrief, some of the theory behind the case study was discussed and here it is important to state that this interrogation has been conducted with "*methodology as the reciprocal relationship between method and theory*" (Gold & Klein, 2016, p. 155). With that reciprocal relationship in mind, we can see in participant's responses: a sense of ambient play in their attention; embodied understanding in their unique, phenomenological experiences and descriptions; epistemic awareness in their interactions with and through Hybrid, Hertzian space; and an increased understanding of the importance of public space.

CHAPTER 4: Critical reflection

As practice-based research, this thesis and the software created went through many different iterations. From the initial idea to the end result, we can see large physical as well as theoretical differences. These differences will be detailed in this chapter and through 5 sections that weave the history of the software-making with the progress of the theories, that often grew from the making.

This research is inspired by a combination of the Playable City Award (Watershed, 2016) and the need for a subtle intervention that can embolden the individual to challenge the (often global-capital dictated) changes to their city. The Playable City Award was a yearly challenge to digital artists to find ways to make a city more enjoyable and playable. The award ran from 2013 to 2016. I was shortlisted for it in 2014 for a very different project but mixing city council data and digital art to fulfil a civic awareness-raising means stayed with me as an important project basis. Over time and further research, it became clear that it would explore areas I was unfamiliar with – eLit and AR – so require a great deal of study and practice. I developed the argument that it was possible to increase awareness of one's city's planning processes through subtle AR but it needed a fleshed-out hypothesis and that hypothesis needed to be tested.

In the original submission to the PhD, I had intended the work to focus on using smart-glasses so the user would feel immersed in the experience without needing to look through the frame of a smartphone. That proved particularly difficult in the technological design and implementation, the reasons why will be detailed over the coming sections.

Section i) Designing experience cohesiveness and ambient qualities

The original proposal for the work sought to create AR software that answered three questions. Those were:

1. In layering the digital over the physical through augmented reality technologies, where is the line between real and Baudrillard's Hyperreal drawn?
2. In immersing the reader in ambient forms of literature through wearable technology, how private is that intimate interaction?
3. Can these techniques and questions be used to reconfigure wider political attitudes toward modes of consumption, accepted architectural standards, and perceptions of public space?

The work was intended to sit in either the domain of 'The Politics of New Media' or '21st Century Literature and Culture'. The latter, especially, as I knew I wanted to make software for Google Glass

to highlight just how private the spaces we consider public are. Through ethnographic and practice-based research, I had wanted to: learn a programming language and create prototype applications for wearable technologies with Open Data; embed myself within companies from Galway & Bristol's Open City network who are working in these fields and use them as case studies; hold workshops, symposiums, and discussions with the city council, public institutions, businesses, and local people to challenge the narratives of "public" and "private" space. Much more happened to change the research away from the question of the Hyperreal and Google Glass smart-glasses.

The design of the experience truly took shape when, after a 2016 research fellowship in architecture and public space with the British Council in Venice, I realized that my initial ideas for the project were not the best fit. I initially thought it possible to have the reader/user see whole paragraphs of text laid out across multiple buildings or many lines of text on one, tall building from top to bottom via smart-glasses. Still holding onto the original proposal, Google Glass smart-glasses seemed like an underused technology; they seemed like something that could be used completely differently, if the right conditions were available, and so I set out to try and adapt what was a rudimentary, wearable technology to work with the processing power of a much more advanced smartphone and software base - so that the Google Glass shortcomings could be overcome.

The design premise was, in some ways, simple: I would use the smart glasses as a simple camera with which to receive the necessary data and 3D environment mapping points (what is known as a 'point-cloud' in AR design) then use the smartphone to interpret the data and send back to the smart glasses where text should be overlaid; all of this was intended to be seamless and unnoticed by the user because their experience would have been simply to have walked around the city. This seamlessness of a smart-glasses experience was intended to ensure users could relax and let the data come to them as they went about any kind of walk and also so that the text presented would feel like a natural part of the city's graffiti. Within the design of the research, that would have been accompanied by a theoretical exploration of the significance of experience through Jean Baudrillard's concept of the Hyperreal - I had wanted to ask, 'In layering the digital over the physical through augmented reality technologies, where is the line between real and Baudrillard's *Hyperreal* drawn?' Ultimately, this question would become irrelevant because the Google Glass smart-glasses weren't quite smart enough; the system of display on our working models, the first model of Google Glass, does not let text sit at an angle and so didn't layer the digital graffiti in a seamless way that blurred the real-Hyperreal lines. If the 2016 research fellowship with the British Council that focused on architecture, the hyperreal, and public space was too early in the progress of the PhD to fully understand that element of technological design, it was perfectly timed to help me move away from

initially planned but unnecessary architectural theory. Instead, I changed tack and made a focus on what Architectural Literature had been and could be.

Understanding the scale and feel of architectural literature had to be tested before presenting it to case study participants. Though the case study itself was a software test, that was a test of the beta (or secondary) development and in order to get there I had to work up an alpha (or primary) build then test it. The initial software application was developed, designed, and finessed through iteration and still with a hope that it might be transferable onto smart glasses in some way.

Before the design experience and its cohesiveness could be finessed, the basic technical development needed to be done. Together, it took 3 years of design, planning, and thinking. Like many big ideas, the software was initially intended to work simultaneously over two cities in two different countries and comment on one another. Due to good connections with the city in previous work, I had hoped to connect with the Open Data group in Bristol and I was invited to the business-startup-accelerator 'Beta-i' in Lisbon to see whether the work would be a good fit for the Portuguese government's focus at the time. Unfortunately, both groups had very different approaches and focus to my doctoral research and through a series of conversations, global political events, and meetings it became clear that the research would benefit from being focused on Galway city.

I had planned to do tests with hundreds of volunteers through City Council help and some press advertising – unfortunately, the city councils that I contacted were initially interested but soon overwhelmed with other work. Initially I'd planned to work with County Council data from the national governments but their data either proved outdated or far too badly managed to parse in the simple, direct ways needed; this meant that the focus was shrank and I worked solely with Galway City Council data that was freely available, open data, and updated weekly. As mentioned earlier in this section, I had initially planned to cover whole buildings or whole swathes of buildings but in the making of the software reduced those 3D digital models to cover a nearby wall that the user would scan when they were ready and comfortable; part of this was design choice but another part of that choice was tempered by hardware restrictions – scanning a whole street to make an AR point-cloud requires a lot more processing power than some of the best smartphones have, even in 2020. Thus the design experience became more intimate, scaled down, and so became a choice of where the user wanted to scan and was interested to see text. Once the hardware, data, and 3D modelling were ready, it was the end details that could make the difference between a bad experience and Ambient Play.

The end details became very important in tweaking User Interaction (UI) once the alpha build was ready. The size, font, and placing of the text went through many UI iterations (and

technical hiccups) before finding what worked best on the eye and on surfaces found around the city. There were many technical hiccups: sometimes scanning a hedge would make the software think it had found a correct surface and so the parameters for what constituted a surface had to be changed; not all of these hiccups were found before the Case Study testing, indeed a participant found that the hardware crashed if you attempted to scan a running river. Designing an experience, no matter the years spent imagining and planning, needs thorough testing.

Even through the frame of a smartphone, the experience had to feel like a natural UI process and so the software was tweaked to ensure: scanning of a surface didn't take any longer than 7 seconds; text was noticeable but not garish; users could 'lock' the smartphone, put it in their pocket, not think about it until they wanted to; and users were encouraged – through text and on-boarding – to move on to another spot if they felt the experience wasn't maintaining a level of playful flow that they liked. This continual, playful flow was the basis of how I designed the experience cohesiveness. It was a play and the reader/user processual qualities identified in Chapter 2 which guided the choice to leave the AR point-cloud detection on show, within the software for participants to see, but I emphasized its various bright colours so as to let the participant get an ambient understanding of what processes the software was running.

The choices made to ensure a continual flow that, in turn, increased the Ambient Play were bore out in the participants' responses. Without repeating the answers conveyed in Chapter 3, it is important to say that most responses showed participants felt engaged and attentive with the software – many felt it was a curious, fun, and comfortable experience. Some participants took 20 minutes, others took 2 hours, but the on-boarding process ensured that they had that freedom to choose. Embodying knowledge of their city that then gave them a sense of connection to it was regularly described as 'cool' and something they had not had before. That sense of connection – that was their choice to dip into or not, to stay a while or move on – was designed to be an ambient connection, one that they can choose to plug into or put into their pocket whenever they so desired. This sense of a continual flow of choice is an ambient quality that was designed to ensure a slow learning of one's environment but also to ensure no participant felt pressured.

Further ambient qualities were deliberately pursued through the choices made in the poetry written for the project. By choosing topics, vernacular, and references to include that were specific to Galway, the connections between *Here. Now. Ours* and the city were able to resonate in the street names, plaques, and park names that participants would encounter. The participant responses bear this out as effective – one participant said "I remember, in particular, there was one ... [poetry] fragment about the river and stones. That prompt popped up right when I was like,

overlooking the river, you know? That was kind of a cool moment how that worked out” (see Appendices, Interview Transcripts). Another participant noted “...on the Sanna Weir Bridge they [the software] were talking about the last tribes. And I was like, I love that! That’s great. I really like that one!” Here we have two examples where the text, though not written to activate specifically at those places but written just generally enough to be applicable to many places, has caused an ambient and serendipitous response in the participants. The design of the experience and poetry meant that these serendipitous moments could enable a feeling of ambient connection and this is a clear example of the design working.

The ambient ubiquity of information is a very difficult thing to convey in a subtle (ambient) way. As mentioned, I chose to leave in the AR point-cloud to let participants see some of the software processes and each time they scanned they were given an updated piece of poetry with accompanying instruction (that had changed from the previous) but the main indicator of the ubiquity of information was when the participant found a park and were told how many planning applications were nearby. This was satisfactory and most participants acknowledged its impact; I still think, however, that there are further ways to further highlight this quality and these will be returned to in the next chapter when considering how further research might improve on this doctoral work. In this chapter, I can begin that improvement process by critiquing the methodological perspective next.

Section ii) The poetic texts, themselves

Having had experience of writing for interactive games in my previous work, I knew that I could not develop poetic texts for *Here. Now. Ours* in the same way as other poems. My own bachelor and master’s degrees were in English literature and so I had been versed in many traditional poetic forms at the start of my academic and writing life; these became a fertile beginning for the poetic texts that were used in *Here. Now. Ours*. In this section, I will detail their literary inspiration and their development.

Their related traditions

Though it could be argued every poet carries every poet they have ever loved with them and in their work, I wanted the poetry of *Here. Now. Ours* to contain flavours of Galway and the Irish poets I had enjoyed in the course of the PhD.

I had the good fortune to meet the poet Matthew Sweeney at the StAnza festival in my pre-PhD life and there, I found his poetry and his book *Horse Music* (Sweeney, 2013). It was inspiring. It

contains a great many examples of what he called 'Alternative Realism', meaning poetry that is '...open to going beyond the borders of realism' (Marshall, 2001). In a 2001 interview, Sweeney said,

The tradition I come from, the Irish Tradition, is open to what I call Alternative Realism - it's open to going beyond the borders of realism. It's also open to mixing up the humorous and the serious. And in a way that the English tradition is not so open to. And so I saw round the back the same thing with a little bit of darkness added and that appealed to me - European darkness. So I made this big connection and it was wonderful. Exciting. (Marshall, 2001)

Though as a writer, myself, I do not come from the Irish Tradition, I do come from the Welsh lyrical tradition and see connections in the choice to go '...beyond the borders of realism' and 'mixing up the humorous and the serious' so I wanted to work in this cross-Celtic way. Indeed the poetry fragments 26 to 37 (see Appendices, poetry fragments) were created with this Alternative Realism in mind. 'A Song about a Crow' from *Horse Music* was particularly inspiring and helpful in bridging the natural-digital-poetic through animals as sentient actors, as ambient players, in our journeys through cities and life. In the poem, the poet asks 'The boy's bare feet looked at the crow's claws. / Should he go over and help it find worms?' And then goes onto imagine the journey that the boy and the crow might take together throughout their intertwined life – just as in some of the poetry fragments I wrote, crows and starlings scry, twitch, gather, sing of loss, and salt the earth; Sweeney's use of a comedic tone combined with echoes of history, nature, and the nature of Ireland found its way into *Here. Now. Ours* through these crows and starlings.

Though Sweeney was not a Galway poet, he eventually settled in Cork and his usage of lyrical Alternative Realism runs throughout many contemporary Irish writers' work. Ailbhe Darcy's book *Insistence* (Darcy, 2018) contains the poem 'Silver' that is in the same Alternative Realism vein: it is ostensibly about the silverfish insect but in the final stanza reveals itself to be about sex, parental lineage, giving birth, and parenthood. This use of animals and insects as metaphors or metaphoric agents in poetry is something that has ran down the Irish Sea between (and for) both Irish and Welsh poetic traditions – Darcy, born and raised in Dublin, now lives in Wales – so it was a logical and happy field to be writing in.

How they were composed

The technical composition of the poetry used 3 different literary devices – the anchored terset, full poems cut up, and Galway-history-specific-texts – that was then placed within the necessary software-position but all were written with an ambient connection to Galway City in mind.

That ambient connection was prominent in the curious and playful tone that I ensured ran through all the poetry fragments. As discussed in Chapter 3, Section ii), *Situated AR eLit* and Ambient Literature must be written with place and traversal of place in mind, as situated texts, but must also consider Abba's definition, when he said that Ambient Literature is

...a hermeneutic oscillation between the foreground and background of post-phenomenological experience, highlighting the necessary dependence that meaningful actions have on the situations and stipulations of their enaction (writing, recording) and reception (reading, viewing, listening). (Abba, 2017)

This oscillation between foreground and background forces the writer, forced me, to ensure that the poetry fragments could be read in the app and against the walls of Galway but also give the reader pause for thought when recalled on their own. They had to be situated texts but also snippets that might be recalled later in the day, ambiently. This is why the used 3 different literary devices of the anchored terset, full poems cut up, and Galway-history-specific-texts were used.

The anchored terset is the technical term for a 3-word poem. The poetry fragments 15 to 20 (see Appendices, poetry fragments) were created in this form as a way of pushing the boundaries of what would encourage the player to continue on toward a park (that the app is leading them to). They meet the needs of the app by being brief, playful, and open ended in interpretation; they can apply anywhere but seem always to have relevance to a situation when walking. As a poet, they were an enjoyable challenge and a rarity to include in the app.

Poetry fragments 21 to 25 and 26 to 37 (see Appendices, poetry fragments) were initially composed as two poems, inspired by and written in Galway. They were written in homage to the previously mentioned Irish Tradition but also from my observations of how the crows and the starlings – themselves laden with poetic history and weight from our wider, shared European literary history – behaved in Galway, how they interacted with people, and how they interacted with the place of Galway itself; all of Galway's terrain is accounted for in the two poems and I also considered that some players may entertain themselves putting the fragments together, should they choose to then they would be rewarded with two whole poems to sit alongside the other fragments.

Finally, poetry fragments 1 to 14 (see Appendices, poetry fragments) were written with Galway's history in mind and specific to the confines of the space a smartphone can give to an Augmented Reality text on its screen. For these, I researched the founding of Galway, the tribes of Galway, and the possible origins of its name: we can see that research in fragments such as,

5.

Athy Browne D'Arcy;
Deane Ffont Ffrench;
Martin - just some of The 14 Tribes.

6.

Blake Bodkin Joyce;
Kirwan Morris Skerritt;
Lynch - the last of The 14 Tribes.

7.

stone. Stony. Stony river.
Or is it foreigner? Gall?
No, this city is stone at home. (See Appendices, poetry fragments)

Here fragments 5 and 6 may seem like simple lists of the tribes of Galway but were organised for internal rhyme, assonance, and sibilance, for example “Kirwan Morris Skerritt”. The value to *Here. Now. Ours* of including these is that these names are also street names in Galway and even a short walk will take you on, or by, some of these streets; it is with this sense of the ‘oscillation between foreground (digital) and background (physical city)’ that these fragments work to create a feeling of ambient understanding in the player. How this was achieved in the intertwining of the poetic texts with the software will now be discussed.

[Its place within the AR experience](#)

The players of *Here. Now. Ours* first open the app and encounter some onboarding/welcome text that encourages them to take a deep breath (see Appendices, Introductory prose text) and then to go to their nearest park. Along the way, the app asks them to ‘Find a vertical surface’ and shows them a hand scanning as it would like them to scan. When they have scanned a vertical surface, this is where the player encounters the poetry fragments; after each of the fragments, the player is told ‘Go to _____’ and the name of their nearest park is inserted in the blank space at the end. This was not without complication.

Composing the poetry fragments, I faced a choice: complicate the coding process further and geographically lock the specific texts to different areas of the city or ensure every fragment might work, everywhere. I chose the latter of the two options which, in turn, meant some editing but editing that is not so fragile as editing software code – this meant the fragments had to be written in such a way that they could apply, randomly, to anywhere while also appearing to form a

curious narrative or series of leading voices and prompts that take the player from their start to the park. These were tested in the Case Study and, on reflection, were a good attempt but could have been expanded; something I will discuss a little more, now.

A critical reflection on the texts

Writing poetry for transmedia experiences – poetry that, by the nature of the app, needs to be both situated and yet widely applicable enough to seem sensible to anywhere within a city like Galway – is not easy or something poets are traditionally trained to do. The process was long but an enjoyable challenge and I think the fragments themselves do have poetic worth.

The anchored tersets are an enjoyable challenge to both the player and a normal poetry reader: they are dense and yet lyrical; I attempted to take in some Galway vernacular when I wrote ‘swearing wild thanks’ in fragment number 20 (see Appendices, poetry fragments) while also encouraging any player or reader to consider the many interpretations that anchored terset might have, just as I did with all of them.

The poetry specifically written from Galway’s history was important for the experience of *Here. Now. Ours* but, if I am to be utterly critical, may not stand up on their own, outside of the app experience, like the anchored tersets could. They are fitting ambient literature pieces, so situated as they are, and that was enough for the experience.

The fragments it is possible to be most critical of are those created by cutting up two other poems. Though the poems themselves have merit, experiencing them through *Here. Now. Ours* as a player rather than strictly as a reader creates a difficult and sometimes unwieldy read; at the time of their entry into *Here. Now. Ours*, I took great pains to try to cut them so that they were appropriate for the experience and maintained a sense of both intrigue and appropriately situated writing but I can see in numbers 30 and 36 (see Appendices, poetry fragments) that they are not quite as lyrical as the majority.

All of these criticisms are a necessary part of understanding what could be improved but also show the great amount of work that goes into creating a piece of *Situated AR eLit*. In summation, the work was hard but overall I think it stands the test of time.

Section iii) The technical development of the app

In this section, the precise technical development of the app will be detailed. In order to do so, the stages of its development – from initial idea, through iteration and testing, to the Case Study

completion – will be retold and reviewed. Changes to the app will be stated throughout, starting with its origins.

The initial idea

Initially, I had hoped the practical element of this PhD would be made for Google's Augmented Reality (AR) device, Google Glass. I had initially hoped to explore how the boundaries between public and private space are increasingly contested through analysing how wearable technology affects the narratives we apply to public space. I had intended to build an application (app) for Google Glass that tells a story of the city whereby the text is laid out on the walls of the buildings around you. The app and the story told were to be adaptive to the city and the available Open Data about the city – it was intended to highlight any private space you walk through as explicitly owned by a private entity but leased to a city council for public access thus highlighting the phenomenon known as POPS, Publicly Owned Private Spaces. I had also hoped to reveal the network-communication links to data centres that sit in, on, and under Galway City. Finally, I had also hoped to work with some of the larger technology companies like Google to create a gesture-based control system for the app.

In the process of the PhD, it became clear that Google Glass was not the right tool to explore the boundaries between public and private space. One of the problems of wearable devices with a camera like Google Glass is that they complicate any exploration by risking being invasive of the privacy of others. Even if that were not the case, the edition of Google Glass that I had intended to work with was not powerful enough to complete the task. Unfortunately, at that time Google had also stopped work on Glass development just as my PhD was starting and were not available to work with on it so that meant two large parts of the initial idea had to change: I could no longer work with Google Glass or create a gesture-based control system as both required some input from Google. These changes created opportunities.

The process of constructing and developing the app, including platforms and software used

As the app moved from Google Glass to smartphone, the development process picked up pace. I no longer had to grapple with the complex core of Android operating System's use of Java, C, and C++ coding languages but could use other AR platforms for smartphones instead. Alongside this change, I ran a parallel line of enquiry into Galway City's available Open Data and what coding language might be best to utilise that data. In this section I will detail the development of both of those lines of enquiry, starting with the Open Data.

As detailed in Chapter 2, Section iii), open data is data from institutions and organisations that is made easily available and transparent as soon as possible; often this is provided by public and part-public organisations like Councils or Government bodies. I had initially hoped to use the open data from all over the west of Ireland in the app, including elements like the number of cars on the road in Galway that day as a part of the poetry or introductory prose text to the app – unfortunately, that data was not as well kept or as frequently updated as needed and so returned errors. These errors meant my direction with the poetry had to change from being partially made ‘live’ through open data to being poetry fragments that could be read anywhere within Galway and still feel applicable. Thankfully, the data on Planning Permissions by Galway City was well kept and was (at that time) published in easily accessible HyperText Markup Language (HTML) and Extensible HyperText Markup Language (XHTML), rather than the more complex languages – this meant that the planning applications near green, public spaces were easier to recognise and their number could more easily be put into the app. I had initially created some Python code that would interweave Ireland-wide open data into the poetry but that code failed because the data.gov.ie data for Galway was not updated or clearly accessible. Instead, a simpler XHTML HttpRequest was made to request data from the Galway City Council planning platform and this number was then fed into the app. In testing, it was found that sometimes the planning platform returned a Query Error and so, as a backup, I manually inputted the data for the last month so that the app would have something to fall back on (should it ever not be able to reach the planning platform). With the question of how to handle the data answered, it was necessary to get the right AR development platform.

After data, I was able to move onto the AR so I surveyed the different AR development platforms that promised to be ‘easy to use’. In the first instance I tried using Wikitude (see Appendices, App development process pictures) as it was inter-operable across smartphone operating systems (OS). Wikitude held promise in some of its use cases and had a generous student-researcher license for the software but anything created with it meant a watermark text, ‘Wikitude’, ran across the screen whenever something was created – as may be clear already, this was a problem because the focus of *Here. Now. Ours* is AR text and anything that interfered with that, interfered with the whole experience. So I moved on and sacrificed my wish for the work to be across both Apple’s iOS and Google’s Android OS.

Next, I tried using Google’s own AR Elements platform and the Android Studio SDK kit that some developers reported as easy to use. Though I was able to get some of the necessary parts of plane recognition working (i.e. I got the software to recognise walls correctly) and text to display on it (see Appendices, App development process pictures), the SDK environment was not all that easy to use nor approachable and took many more months than Wikitude had. It was when I finally

overcame a point of frustration with this platform that I realised it would take too long to develop for and so I searched for an alternative.

Finally, I found the development platform Unity and it had an extensive library of guides, references, Global Positioning System (GPS) utilities, and even AR starter packs for using it. Unity is both a visual games-making software engine and it incorporates code, easily; Unity's accessibility meant that I knew I could create the app within my timeframe.

The final iteration of the app

Though I had had great hopes for Google Glass, the final iteration of the app happened on Android smartphones. I bought two Android smartphones that I knew had the necessary computing power to handle AR well and these were the devices used for the Case Study that tested the theory of this PhD. Once they were set into Developer Mode, it was easy to download the Android Package (apk) and install it.

The app itself had now become a combination of three main things: GPS, AR, and Galway City Council Data. The GPS of the phone let the app know where the player was so that the app could then find their nearest park and lead them to it; each of the areas around the parks were bound to it and I created a map that sat on top of the Galway City Map, effectively creating digital boundaries that the app used to direct players. The AR was, perhaps, one of the hardest parts to get right as AR is still a relatively new technology compared to GPS and XHTML requests. Thankfully both Google and Unity provided extensive documentation on getting this right and the scanning of walls or surfaces is now an integral part of their AR development. Though Unity shows you your design visually within its app, the UX testing I undertook before the Case Study participants saw it meant I was able to tweak it and make it more comfortable on the eye. As mentioned in the previous section, the Galway City Council Data is more easily accessible than many data repositories and though there were a few initial query errors, the final tests in the Case study worked perfectly to make the planning process less opaque.

Through Unity's AR starter packs and some easy-to-follow guides, I had found the right platform for me. I was able to get a working Alpha prototype made over the course of two months. Thankfully, this only left User Experience (UX) testing and iterating so as to check for any major bugs in the Alpha build (i.e. the first build of the software that would be available for use in the Case Study; the research time was not enough to get it to a steady, Beta stage build and release it to members of the public). Following UX testing, there were 7 additional Alpha builds produced; these were only minor tweaks to the GPS boundaries and the appearance of the app [from fonts to the logo of the app, itself (see Appendices, App development process pictures)].

Critical reflection on the development process

It has been my experience with all app and technological development that things happen slowly at first and then all at once – my development process felt exactly like this. I spent too long on trying to intertwine the poetic texts with open data, through the Python coding language, which dragged out the initial development time; once I had changed direction on the poetry, I researched the methods of AR and tried to work from a blank page, rather than go straight to the ‘easy to use’ options. In short, I could have done things a lot quicker and iterated a lot more or tested with more people but that might have meant I had not fully understood the way that the technologies worked together. Perhaps it is inevitable that we must first research slowly then act quickly to both understand well and get things done.

In the build of the app that was used for the Case Study tests, there were occasionally still a few bugs and this too was inevitable. All participants understood this to be the case and I was thankful of a testing environment that allowed for this. Overall, I was thankful that the development process happened the way it did and for the many people that suggested ideas and offered guidance along the way.

Section iv) Methodological perspective critique and review

As we saw in the previous chapter, participants felt their awareness of their city’s green spaces was raised by *Here. Now. Ours* and they stated they were made more aware of planning applications, too. The focus of this critique, then, is the depth of that newfound awareness, their immersion, attention, play, and reward from the experience; any of the theoretical foundations of the methodology that were either left out, missed in the research, or have only been released recently will also be discussed in order to understand what the research could and would do were there opportunities to take it further.

The measure by which the Case Study examined the depth of participants’ newfound awareness was the follow-up question(s) to question 4, ‘Did the overall experience make you *more* or *less* aware of the planning applications around the city’s green spaces?’ Where appropriate and possible, I would ask if the participant is considering looking at more planning applications within their day-to-day lives in the future, might consider spending more time with the case study software, and/or would discuss some of the design process with them and ask if they would have liked to have a direct link to object to any planning applications they saw, even if it would have taken them out of the *Here. Now. Ours* experience (see Appendices, interview transcripts). In the majority of

responses, participants stated that they would enjoy spending more time with the software and would indeed consider looking at more planning applications. Their positive answers conveyed, to me, that their *agency & civic will* had increased however these answers were often woven through many questions so had I designed the debrief with a *depth* – specifically – of new awareness in mind, I could have been sure to ask another direct question and thus would perhaps be able to measure it better. This is an area of improvement that would need to be kept in mind, should further research take place.

Though the majority of participants said that their attention was held and that the experience was playful and rewarding, had the technology been available in an affordable and accessible way during development some of the smart-glasses detailed in Chapter 2, Section iii could have enabled further embodiment, immersion, attention and thus increased both awareness and the geographical range of participants' understanding. We can see this bore out in the responses to question 7, 'Do you think it might have been better and/or more ambient, with a more natural flow, with a pair of AR glasses?', where the majority of participants stated that they'd like to try the experience with smart-glasses and felt that – with some important reservations – they'd have a more natural flow and interaction if using AR glasses. The reservations given are an important critique to the research and any possible further research: a few participants gave feedback that showed the necessary scanning involved in using *Here. Now. Ours* made them concerned, they were concerned that others thought they were filming (and thus possibly invading other people's privacy). This concern could then be increased were they using smart-glasses as others may think they were constantly filming, just as the initial kickback to Google Glass' release caused some people to call their wearers 'Glassholes' due to privacy infringements (Kircher, 2019; Schuster, 2014). In its original conception, *Here. Now. Ours* intended to use smart-glasses for the Ambient Play to flow subtly, for the Architectural Literature to be writ-large across city features, and for the user to not need to interact with a phone, it was intended to be more accessible to disabled users than the version tested in the case study, and I had hoped to push the limits of the Google Glass technology while grounding it in an important civic-political matter. The topic of smart-glasses will be returned to in Chapter 5 but it's important to note that there are no easy answers around their use: they could indeed enable further embodiment, immersion, and different kinds of attention but they could also cause different concerns and tensions. As an initial Case Study, it was perhaps lucky to not have been able to use smart-glasses because the wider ethical and social considerations are so great as to need a team, rather than a sole researcher. This is a critique of my methodological perspective that would need a study of its own to answer.

When reflecting on any methodology, it is important to include not only what could have been better but what was missed due to timing. Two books that have been released in 2020 would have influenced the both the theoretical and practical software design of my methodology: *Data Feminism* (C D'Ignazio & Klein, 2020) and *Design Justice: Community-Led Practices to Build the Worlds We Need* (Costanza-Chock, 2020). *Data Feminism* asks us to look past Big Data and more toward ethical data and approaches to data that have ethical values behind them, rather than thinking of Big Data as a good in and of itself; this is akin to some of the texts that have been incorporated into Chapters 2 and 3. *Design Justice*, on the other hand, asks us to not only ensure intersectionality in our work but let communities design and lead research – something very difficult for the lone doctoral researcher. Though I have been able to include a small proportion of the argument of *Data Feminism* in passing, I don't believe I've been able to incorporate its conclusions nor its theory as cohesively and fully as I'd like because there just hasn't been time. Looking more at practical methodology, taking the approach advocated by *Design Justice* would mean an almost completely different research project, let alone methodology. Perhaps the constant wish of every doctoral researcher is 'more time' but I can only hope that in recognising these important texts here, I recognise how my time on this research has come to an end.

In this section, the methodological perspective has been critiqued through participants' feedback of Ambient Play, Architectural Literature, attention, immersion, reward, *agency & civic will* increases, and the effectiveness of its technological design. It is also important to analyse, further, what implications *Here. Now. Ours* has for public space and so the next section will do so.

Section v) Implications for public space

The case study for this doctoral research was made as a small, exploratory intervention, one that could then be analysed to be better understood and yet its implications are anything but small. When we look again at the overall responses to find that participants found themselves *more* aware, *mostly more* aware of planning applications, *attention held*, and *mostly rewarded* but go on to combine it with the ways in which participants described phenomenologically reconnecting with their city's spaces, we can extrapolate from the small cohort to wider effects and implications.

Six out of the seven participants found more than one park and all reported that they learned something new about the city – whether a public park location, a business' output, a street they hadn't walked down before, a plaque commemorating something historical, a planning application, or an architectural texture, each participant learned something they hadn't known before. One participant said "I went through there too, which was pretty, I've only ever seen it from

the one side [before]” while another said “I love, like, seeing things like this to do with the city. To, like, learn about it and feel more connection to it” (see Appendices, Interview Transcripts) so we know that participants saw the city differently, saw places they’d never been to before, and felt increased connections to their city. These things have echoes with the ways that the future of public space has been discussed in the book *Public Space*:

New spaces, when they are more than corporate emblems or institutional symbols, create opportunities for increased public life. As the two develop together, the culture of public space evolves...This fellowship in the open nurtures the growth of public life, which is stunted by the social isolation of ghettos and suburbs. In the parks, plazas, markets, waterfronts, and natural areas of our cities, people from different cultural groups can come together in a supportive context of mutual enjoyment. As these experiences are repeated, public spaces become vessels to carry positive communal meanings. (Carr et al., 1992, pp. 343–344)

This quote is taken from the last chapter of *Public Space* and though mostly self-explanatory, it is important to say that it is articulating more than just the development of ‘New [physical] spaces’ and the fellowship of connection ‘in a supportive context of mutual enjoyment’ – players of Pokémon Go have expressed exactly these ‘supportive context of mutual enjoyment’ points as well, and so too did the participants of my case study. It is then logical to say that using AR as a new form of public space, one that is specifically connected to the physical public spaces of Galway City through software like *Here. Now. Ours*, can ‘nurture the growth of public life’ when it is *situated AR eLit* and free from ‘corporate emblems’. This need to separate AR and public space from corporate emblems and corporatism is something that came out in one participant’s responses very clearly and has a great deal of political reasoning behind it, as well as a theoretical basis, that will now be discussed because its implications for public space are also implications for AR and civic governance.

Within many Western countries, there is growing concern around the increasing reach of the global-technology corporatism through companies like Amazon, Apple, Facebook, Microsoft, Netflix, and Google (sometimes referred to as The Stacks, people farmers, and more but they are also collectively known as FANG companies) as evidenced by the growth of research into surveillance capitalism, detailed in previous chapters. Within Ireland there has been a series of recent controversies because Apple was fined a large amount for tax evasion in 2016 by a European Union court, Apple appealed and the ruling was repealed in 2020 – at a cost of 15 billion dollars to the Irish taxpayer yet enabled by the Irish Government (Cooper, 2020). In their feedback, one participant of this research case study raised these growing concerns (see Appendices, Interview Transcripts) and

aligned them to a local matter that was suspected to be a purchase of land near Ennis for a data centre that had been influenced by a FANG company. Much as the analysis of Surveillance Capitalism applies to smart cities, so too does it apply to the actions of FANG companies because they're not solely people farmers that use the data of us as individuals but they are also active, political agents within capitalism that engage in property purchases and tax evasions; the reasons why and the very contemporary state of our network culture within surveillance capitalism are detailed in books like *Code and Clay*, *Data and Dirt* (S Mattern, 2017), *Algorithms of Oppression* (Noble, 2018), and *The Black Box Society* (Pasquale, 2015) which all show that the FANG companies are having an epoch changing effect on wider society. An effect that is reinforcing old, unequal capital, race, and power relations but done under a flag of progress and "the 'state of information' where vast amounts of information are collected and stored precisely so that they can be deployed instrumentally" (Betancourt, 2015, p. 153) as Michael Betancourt puts it in *The Critique of Digital Capitalism*. These 'vast amounts of information' that proponents of Big Data use are often said to be doing a public good but

'Irth' [a software application designed to remove bias from birth in a caring or medical environment and so it] illustrates the fact that "doing good with data" requires being deeply attuned to the things that fall outside the dataset—and in particular to how datasets, and the data science they enable, too often reflect the structures of power of the world they draw from. In a world defined by unequal power relations, which shape both social norms and laws about how data are used and how data science is applied, it remains imperative to consider who gets to do the "good" and who, conversely, gets someone else's "good" done to them. (C D'Ignazio & Klein, 2020, p. 47)

This quote from *Data Feminism* shows us that Big Data is not a good thing, in and of itself, but instead needs proper applications that consider the ethics of the practice. Without those considerations, it is as Mattern, Noble, Pasquale, and D'Ignazio & Klein say: the 'unequal power relations' will be reinforced and, in turn, shift wider societal awareness of the structural machinery of our civic societies away from open, sustainable citizenship to closed, Black Box corporate initiatives like those detailed in Chapter 2, Section iii of this thesis.

Only through Open Data (explained in Chapter 2, Section iii of this thesis) combined with small interventions and DIY Citizenship (Ratto et al., 2014), can the FANGs be de-fanged. That is what *Here. Now. Ours* set out to do by increasing awareness of citizen's public space, as well as the planning applications nearby, and thus inspire an increase in citizen's *agency & civic will*. In their 2014 book, *DIY Citizenship: Critical Making and Social Media*, Matt Ratto and Megan Boler articulate

DIY citizenship as “a twenty-first century amalgamation of politics, cultures, arts and technology that in turn constitutes identities rooted in diverse making practices” (Ratto et al., 2014, p. 18) which Scott Rettberg “extends to the efforts of interventionists, makers, hackers, modders, and tinkerers” (Rettberg, 2020) in a recent essay for the Electronic Book Review. Just as Rettberg lists all the hacker interventions in online space with that recent piece, so too does *Here. Now. Ours* make an intervention in public space that helps expose the structural machinery of our civic societies then lead the citizen to make their own intervention. From the feedback, we can see that participants did indeed have an increase in *agency & civic will* which had an impact on their understanding of public space but, in review, the number of participants would have to be significantly increased in order for such an intervention to reach a critical mass that can then have a wider societal effect. This is something that will be discussed a little further in the next chapter, the Conclusion.

CHAPTER 5: Conclusion

This practice-based research was undertaken to understand both the viability of the software created and whether it is possible to increase awareness of a city's green, public spaces in its citizens through that software. The software was prototyped and tested so the viability of the practice of this research can be said to have been successful; the case study showed us that *in the majority, participants stated they were more aware of their city's green spaces through the use of situated AR eLit* so here, too, we can see that a successful conclusion has been found within the parameters of this doctoral research. More generally, we can say *situated AR eLit has been tested and found to increase awareness of a city's green, public spaces in these participants.*

These combined answers show the hypothesis of this doctoral research - that AR eLit can indeed increase awareness of readers shared public, green spaces, and increase their civic will that, in turn, they act on but only through ensuring the AR eLit is *situated* – has been tested and found to be correct through the feedback of participants. They often focused their answers of immersion, enjoyment, and agency on the specificity and the situated nature of the texts that led them to discover or rediscover locations in their city (see Appendices, Interview Transcripts). Though it is important to emphasise that these findings are within the parameters of this research, we can work back from these clear findings to discuss how this might have wider impacts, especially through the key terms developed in Chapter 3.

The notions of *ambient play* and *architectural literature*, with their particular characteristics, could become a way of discussing something like Snap Inc.'s *Local Lenses* when it is released later this year (in 2020) – participants in the case study discussed how, after using the software to scan and find some architectural literature, they regularly pocketed the phone when they were enjoying the environment or direction they were travelling in, not feeling a need to look at the *Here. Now. Ours* software for extended periods. This speaks to both notions of *ambient play* and *architectural literature* because, like graffiti or government signage, we only interact, play, and look for information in the circumstances when we need and feel a renewed sensibility to your surroundings, just as Malcolm McCullough stated in *Ambient Commons* (McCullough, 2013, p. 3). These terms have great potential to be used more frequently as AR grows and that potential can be seen in light of Google using the term 'ambient computing' in 2020 (Osterloh, 2020). So too is that growth evident in the forthcoming publication of *Ambient Literature* (a collection of essays from the consortium that ran the Ambient Literature research project).

Just as the discourse around ‘ambient’ is growing, AR is growing. Very recent but worthy additions to this research are three big announcements: the Nreal smart-glasses has recently received forty million dollars investment (R. Liao, 2020); Facebook have announced details of their work on smart-glasses (Leprince-Ringuet, 2020); and Nintendo’s latest edition of their famous game *Mario Kart – Mario Kart Live: Home Circuit* [MKL:HC] – uses AR (Webster, 2020). Both smart-glass announcements mean more AR-specific hardware that could mean people use their smartphones less and have a more ambient interaction with digital information overlaid on the real world. Indeed, these aren’t the only smart-glasses announcements to have been made in 2020: Google bought the somewhat successful smart-glasses company North (Osterloh, 2020); and Bosch, the global appliances company, released details of their ‘All day’ smart-glasses (McGlaun, 2020) that they claim are a world’s first. Though not an ambient usage like the others, MKL:HC uses AR to let the gamers scan their home environment and then race specifically built cars (that have built in AR cameras) around their home; this is significant because, just like their work on *Pokémon Go*, Nintendo is cementing the notion of mixing the analogue and digital through AR to play. As explored in Chapter 2 and 3, play itself is both helpful and useful in incorporating change and exploration into individual and societal decisions. With the effects of these felt in the near future, it is possible that software like *Here. Now. Ours* will be more in demand and more in use – this could make the case for further research a strong one.

Though it was clear that a sense of Ambient Play was enjoyed by the participants, going forward with any similar research would need a stronger focus on the hardware enabling a smoother immersion that the participant can forget about and be guided through, without a smartphone framing the experience and with smart-glasses enabling it instead. This further research would require a greater focus on heavy processing done in the cloud, combining differing data sources that ran in real-time and conveyed the data through smart glasses. Like the soon to be released vGIS app which digitally reveals the very infrastructure under our feet (VGIS, 2020), further research could use the work developed in this doctoral research and apply more work on top to create something which shows the great many layers and connections of our environments. This possibility of further research could also relocate the scene of knowledge to a more situated, more multivariant perspective that considers individuals’ connectedness and partial perspectives – just as Donna Haraway calls for in *Situated Knowledge* (Haraway, 1988).

Perhaps these notes for further research show the limitations of this doctoral research and how much more there is to be done but it is clear from the Case Study that what has been found is significant. Even the small cohort, here, has given a vital insight into how *situated AR eLit* can be used. Indeed, it is worth noting the preference evident in new publications like *Data Feminism* (C

D'Ignazio & Klein, 2020) for small data over Big Data – for all the reasons that Big Data is failing 'smart' cities, detailed in Chapters 2 and 3.

In Stuart Townsend's 2013 book *Smart Cities*, he makes some final suggestions for the future of cities. They include "Opt in to Smart...Extend Public Ownership...Model Transparency...Think Long Term in Real Time...Crowdsource with Care...[and]...Slow Data" (Townsend, 2013, pp. 285–318). It was and remains a prescient book because the Case Study of this doctoral research has combined all of those points but found that the 'slow' (or small) data that Townsend called for is still undervalued by the wider, global information technology sector who choose to focus their efforts on Big Data in 2020. This doctoral research will conclude in the same way that Townsend did and with its Case Study's findings to back it up: interventions through small data can and do affect awareness in participants that can and do lead to positive, people-led change in our urban environments. We need more of them and can hope that more doctoral research like this may be the bedrock on which that positive change is built.

ⁱ More on this in Chapter 4, the Critical Reflection.

ⁱⁱ This is a fitting end result because one of the first conceptions of AR was for aircraft construction, as detailed in Chapter 2, Section iv.

ⁱⁱⁱ Ambient, sometimes called ubiquitous, computing is something that will be returned to in Chapters 2, 3, and 4 and is a central theoretical feature of this doctoral research.

^{iv} These terms, reader and user (alongside others), will be explored later in this chapter.

^v The term *Transcoded* is unpacked later in this chapter.

^{vi} Indeed First Generation electronic literature was defined by Hayles as pre-web and therefore standalone (Hayles, 2007a, 2008).

^{vii} For a full definition, its history, and its (electronic) literary contexts, please see Emily Short's essay 'Interactive Fiction' in *The Johns Hopkins Guide to Digital Media* (M.-L. Ryan et al., 2014, p. 289).

^{viii} The ELO is the body that organizes the largest eLit conference in the world, awards the largest eLit prize, and enables the study of eLit, globally.

^{ix} The ELO also notes that 'Within the field of scholarship, though we examine the same objects, there are those who prefer different definitions and terminologies for what we here call electronic literature. Some argue, for instance, the terms digital literature or network literature (net lit) or cyber-literature (cyber-lit) should be used instead. In the spirit of honoring the ELO, we here use electronic literature to designate our objects and our study.' (*About the ELO – Electronic Literature Organization*, n.d.) In this thesis, the term eLit will be used exclusively.

^x Though Chris Funkhouser argues that eLit works of digital poetry were being made as early as 1959 in Theo Lutz' 'Stochastische Text' (Funkhouser, 2007), Funkhouser never argues about the usage of the term 'electronic literature'. Scholars Grigar and Kac agree that the terms 'electronic literature' and 'eLit' were not in use then (Grigar, 2013; Kac, 2007).

^{xi} In Amanda Starling Gould's *Bibliographic Introduction to eLit*, she lists four books as the backbone of a suggested university course on eLit (Gould, 2012). These four are 'the Medienumbrüche | Media Upheavals (2007-2010) Electronic Literature Series'. Though useful, these books provide an overview of scholarship on eLit rather than deliver a strong definition that's needed here. I will, however, return to some of the ideas in those four books.

^{xii} As of 06-06-2018, Hayles' definition was cited by 146 papers on Mendeley alone. This does not include the books that also rely on her definition. Hayles was also a key figure in the preservation of the ELO by enabling its move to UCLA in 2001 (*History – Electronic Literature Organization*, n.d.).

^{xiii} William Patrick Wend (Wend, 2009), Jessica Pressman, and Stephanie Boluk agree that Hayles' *Electronic Literature* is seminal; Boluk even gives credit to Hayles for establishing a critical discourse within the field (Boluk, 2009). Her influence and legacy is proven by the 2017 Duke University Katherine Hayles Symposium ("The Futures of Literature, Science, and Media: A Symposium in Honor of Professor N. Katherine Hayles," 2017). Indeed some argue that you only need to read her body of work to understand eLit.

^{xiv} Hayles also looks at the term "remediation" from Jay David Bolter and Richard Grusin (Bolter & Grusin, 2000), which echoes this feedback-loop reflexive process, but always comes back to using Manovich and her own terms throughout *Electronic Literature*, rather than Bolter and Grusin's.

^{xv} As of June 2018, YouTube had over a billion users, making it one of the most dominant broadcasting locations on the planet ("Press - YouTube," 2018).

^{xvi} Posthumanism, as defined by Francesca Ferrando, is a "...theoretical invitation to think inclusively, in a genealogical relocation of humanity within multiversality ("post-humanism" as a criticism of humanism, anthropocentrism and universe-centrism)" (Ferrando, 2014) and is fitting here because Hayles has theorized on it too in her book, *How We Became Posthuman*.

^{xvii} A more recent scholar with related publications on posthumanism is Francesca Ferrando. Throughout the course of her works, Ferrando has explored the finer details of how we can understand and use posthumanism in all its iterations. [Like her essays in *Posthuman Glossary* (Braidotti & Hlavajova, n.d., pp. 266–268) and her recent articles (Ferrando, 2016)].

^{xviii} Hayles even goes so far as to write about the 'potent possibilities for intermediations in the contemporary moment' (Hayles, 2008, p. 139) due to how varied each of our, the reader's, levels of engagement with computation technologies may be – even without referring to Heidegger's notion of *Techné* (Heidegger, 1993, pp. 328–340) because she presumes a cyborg/posthuman status quo that incorporates Heideggerian thought around technology.

^{xix} For further reading on the way Hayles defines “hyper-attention” and “deep-attention”, see (Hayles, 2007b, pp. 187–189).

^{xx} Though Bourdieu is most famously known for his work defining cultural, economic, and social capital, Hayles is here referring to his *Outline of a Theory of Practice* (Bourdieu, 1977) and the surprising way its concept of ‘habitus’ has echoes of embodied artistic practices, reading theories (as clarified by Anna Asimaki and Gerasimos Koustourakis in their 2014 study (Asimaki, 2014)), and phenomenological philosophy.

^{xxi} Hayles makes particular reference to Johnson’s *Everything Bad is Good For You* (Johnson, 2006) with its focus on the complexity of twenty-first century computer games and the ways their players must multitask, keeping short and long term goals in mind while mastering complex puzzles or overcoming quickfire obstacles.

^{xxii} Linda Stone calls this ‘continuous partial attention’ (Stone, 2009), but here I focus on Hayles’ hyper- and deep-attention terms.

^{xxiii} Studies on the subject of reading on screens show a more complicated picture than the dualism between hyper- and deep-attention suggests – these will be explored further in section ii of this chapter.

^{xxiv} Hayles had done a sizeable amount of work on the posthuman before electronic literature, eight years prior in *How We Became Posthuman* (Hayles, 1999) so, understandably, does not spend too long theorising it in *Electronic Literature* and focuses instead on the posthuman as a state in which we experience eLit.

^{xxv} Karin Wenz also contends that ‘For digital poetry the processes executed by a programming language is the material the artist uses. Following Burgaud (2006) the user is “reading a process”. With the focus on the processes instead of the “object” reinforcing the notion of a reader/user as someone who is involved in and understands the processual interchanges (Wenz, 2008).

^{xxvi} The most famous example of these kinds of table-top, storytelling games is *Dungeons & Dragons*.

^{xxvii} *Pokémon Go* is also known as a Hybrid Reality Game [HRG].

^{xxviii} There are, however, certain eLit works that purposefully withhold agency from the reader [e.g. *The Princess Murders*] and many which only have a few outcomes and so limit our agency even when they intend to free it [e.g. *Uncle Roger*]. With this in mind, this research will use ‘reader/player’. This is to cover these discrepancies in agency but also to encompass the way eLit makers and researchers use the two indiscriminately.

^{xxix} Around the same time that Husserl was writing about ‘sensuous’ and ‘categorical’ intuition, so too was Henri Bergson but using the terms ‘relative’ and ‘analytical’ respectively (Bergson, 1997, pp. 159–162). Bergson’s theories on Duration and Intuition are an interesting correlate because both ask philosophy whether its focus can understand the term objectivity without noting subjectivity. Both philosophers were writing at the same time but while Husserl operated within German academia, Bergson did so in France. I’m not suggesting an oblique connection here but, moreover, highlighting how objectivity was being called into question all over Europe at this time. I’m also not saying that Husserl’s phenomenology wishes to be the enemy or opposite of objectivity – not at all, rather that Husserl is hoping phenomenology will find the means by which objectivity is at all possible.

^{xxx} As Husserl would later do in his final, unfinished work *The Crisis of European Sciences...*

^{xxxi} Merleau-Ponty’s equation of ‘the perceptual subject with the lived body’, mentioned earlier, is another difference which is key to this study, and will be returned to shortly.

^{xxxii} It also has evidence of its strength in the great many publications that it has inspired: Ashley Montagu’s 1971 study *Touching: The Human Significance of the Skin*, Mikel Dufrenne furthered Merleau-Ponty’s work in 1973 with *The Phenomenology of Aesthetic Experience*; Elaine Scarry’s *The Body in Pain*, Paul Rodaway’s *Sensuous Geographies*, Sobchak’s *The Address of the Eye*, Josipovici’s *Touch: An Essay*, and Drew Leder’s *The Absent Body* to name a few key texts.

^{xxxiii} And continued to note throughout much of her work, none so clearly as her 1997 book *Modest_Witness@Second_Millennium.FemaleMan_Meets_OncoMouse* (Haraway, 1997) which, in turn, encouraged the use of the terms cyborg and posthuman by Aarseth, Engberg, Ferrando, Hayles, Landow, and more.

^{xxxiv} As explored well by Claus Halberg, Luce Irigaray complimented and encouraged Merleau-Ponty’s position but countered that it was a overtly-male presentation that needs complication (Halberg, 2002).

^{xxxv} Paterson does an excellent job of examining the critiques, like Irigaray’s in endnote V, and highlighting how quite a few of those still use much of Merleau-Ponty’s model within their own work – thus balancing out their critique with their use.

^{xxxvi} Derrida’s *On Touching*, Levinas’ *Totality and Infinity*, and Irigaray’s excellent critique of Levinas all show an ongoing, radical expansion of the phenomenological approach to tactility and touch.

^{xxxvii} Their 2018 study (Bell et al., 2018) uses ‘reader-player’ as a regular term for the eLit readers they study and goes into great depth in exploring the merging narrative worlds discussed in this chapter while gaining

qualitative data on a particular text from 14 participants. In addition to their method, I will take some quantitative data in this PhD research.

^{xxxviii} Visible in the governments of The Netherlands and Australia using the Open Knowledge Foundation's CKAN open data platform (CKAN, 2018).

^{xxxix} Facebook has 2.5 billion regular users (Kellogg, 2020) and the estimated population of the world in early 2020 is 7.5 billion so Facebook holds information on about a third of the world's people.

^{xi} Who will be discussed in the next chapter, in detail.

^{xii} And perhaps Ray Oldenburg's "Amateurism is encouraged in third places and this, also, lends to the joys of association" (Oldenburg, 1999, p. 58) and through Michael Mehaffy's modern "*Place Networks: Healthy Streets and Sidewalks*" (Mehaffy, 2015).

^{xiii} Pieprz is particularly astute in his cutting evaluation of public spaces, "Unlike evaluations of art and architecture, there's nothing subjective about public space. Either a crowd shows or it doesn't".

^{xiiii} [that pushes to ensure everyone can live humanely through a *Right to The City* (echoing Lefebvre) and access to green spaces] (Nations, 2016).

^{xlv} Tangentially but of note, it was in 1998 that Kevin Warwick first began his 'Project Cyborg' by inserting a Radio Frequency Identification Device (RFID) under his skin but on the other side of the Atlantic to Starner.

^{xlv} In the previous section, we saw how LayAR could be used to effect by activist-artists like McGarrigle.

^{xlvi} The practical element of this PhD had initially planned to reveal the network-communication links to data centres that sit in, on, and under Galway City but the coding complexity and computing power involved would have been too much for this research, this will be returned to in Chapter 4; there has since been a piece of software developed which does something similar – see <https://www.vgis.io>.

^{xlvii} More on De Certeau in the next chapter.

^{xlviii} "Instead of producing devices which allow the subject to produce any kind of augmentation, we should introduce the fact that our action is not a solipsistic one, but it is strictly related to others and so our augmentations will live among other subjects as well" (Liberati, 2014, p. 72).

^{lix} It is, in many ways, a shame that LayAR could not find a profitable business model and – in 2020 – it is not at all clear whether the big people farmer companies will come together to form a shared AR platform; their processes of development and stifling development will be discussed in the next chapter. Though not specifically AR activism, the website Stacktivism.com and its accompanying catalogue of the invasions of the big stacks/people farmers is an important record and constant reproach to the creeping invasions on liberties by those big people farmer technology companies.

ⁱ [building on a mix of ludic literature (Lee, 2002), the Situationist derive and de Certeau's *Wandersmänner*, Victor Turner's work on the liminal, and Clifford Geertz's work on deep play].

ⁱⁱ Though there is some ongoing work on developing post-humanist practice, I did not feel it was yet right for the practical work of this PhD due to the focus on phenomenology and walking in *Here. Now. Ours*. Within eLit, Alex Saum-Pascal has written on the need for "a material, critical creativity paradigm to the study of e-lit: a creative teaching experiment and two modes of what I have termed "material discourses" as posthumanistic alternatives to rational and immaterial humanistic scholarship" (Saum-Pascual, 2020).

ⁱⁱⁱ [which, itself, built on Ryan's premise that spatio-temporal immersion is "a sense of being present on the scene of the represented events" (Ryan 2001: 122)].

ⁱⁱⁱⁱ For Thon, ludic immersion is "a shift of the player's attention to the interaction with the game and ... the possibilities for action within it" (Thon, 2008, p. 36) and for Ryan 'deep absorption in the performance of a task' (Ryan 2015: 246).

^{liv} See *City Reading: Written Words and Public Spaces in Antebellum New York* for a thorough exploration of how texts wove a city together and guided public debate in antebellum New York, something that acted as a model for advertising in 20th century cities.

^{lv} This is a complex area, well-researched by social-geographers and political theorists alike. For reference, see *The New Enclosure* (Christophers, 2018), *Ambient Television* (McCarthy, 2001), and *The Tyranny of the Filter Bubble and the Future of Public Space* (Boer & Minkjan, 2016).

^{lvi} See his work at Vox, The Guardian, and Resurgence & Ecologist.

^{lvii} Interestingly, Liao and Humphreys also used de Certeau as a theoretical touchstone.

^{lviii} "Instead of producing devices which allow the subject to produce any kind of augmentation, we should introduce the fact that our action is not a solipsistic one, but it is strictly related to others and so our augmentations will live among other subjects as well" (Liberati, 2014, p. 72).

^{lix} so much so that the threat of it and how it might damage societal relations was the topic of a whole book, *How To Run a City Like Amazon, and Other Fables*, with specific attention paid to AR in Leighton Evans' section 'SEEING THE CITY THROUGH GOOGLE'S EYES' (Evans, 2019) which articulates a future where "Thanks to this

consolidated, individual data mining, two people can walk hand in hand down the same street and will have totally different data-mediated experiences thanks to their histories of interaction with Google”.

^k Not simply the infamous ‘The medium is the message’ but Venturini et al quote James W Carey as saying we should “consider media as processes through which ‘reality is produced, maintained, repaired, and transformed’ (2009: 19)” (Venturini et al., 2018, p. 4199).

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Appendices

Appendices, interview transcripts

These interviews were conducted immediately after play-testing the practical element of this PhD and acted as both interview for data collection and debrief.

Appendix 1 – interview with D

B: Did the A.R Poetry display on walls?

D: Yes.

B: Great. Did the App give directions, however vague?

D: It did.

B: Great

D: (something inaudible)

B: Oh. It did actually have that? It did have that as well? That's good. I was considering taking it off but then I realised it's helpful to have all that stuff, "moved" and "not moved", "have you moved far enough". Was that helpful?

D: I thought so. Gave me an idea of how it was working. I wasn't sure how far you had to walk to get to the next prompt but it was good to know it was coming.

B: Great. And did you find a park or two?

D: I found, so I got a little bit stuck near the Lime Kiln, so made it to the Lime Kiln park, not sure what that park is called -

B: I think it's just called the Lime Kiln Park isn't it? Because it's just a small patch isn't it?

D: Yep. just some, you know? Some grass. I just walked around that a bit, kind of went around several different directions, if you will, as I kept getting prompts to go to the Lime Kiln. That never quite moved beyond it, I suppose.

B: Ok. So you just did one park? Just that one.

D: That's the one, yeah.

B: And I'm guessing you've been there before? Which was my next question...

D: Yes. But the augment like what you were saying, I had been there before but I'd never really gone around and paid much attention to it. And that is something that I got out of the app; I went down near the riverside which usually I'd only walk on that one path to university and back.

B: There's the garden over by the river, over that wall isn't there?

D: I went through there too, which was pretty, I've only ever seen it from the one side.

B: That's great. Well, there's one final, technical question. Were there any moments where you felt like the App would have broken or glitched? You sort of touched of something there.

D: There was, I was at the Lime Kiln and just before it given me a prompt to scan the wall, whilst trying to scan a vertical object that's there. It tried to scan a cliff or ridge that's there. That's how it works so I tried to move on and scan the lime kiln itself and at that point I think it must have glitched somehow because I just kept scanning it, scanning the entire Lime Kiln and nothing really popped up, unfortunately.

B: That's good to know because that is important for how I then help the next person understand how best to use the App.

D: Makes sense.

B: So, just before I get into the experiential questions, to start us off, was there anything you want to put out there and sort of describe about your experience?

D: I can't think of anything in particular. I've already interjected into your technical questions.

B: No no, that's cool. That's great. It's not one of those super structured debriefs, it's more of a semi structured, so we get more of your experience of what, you know, the quality of it was really like and I've got a good few questions around that, it's just this one relates to what you said before. Did the overall experience?... Actually this will link up with a technical question that I should ask as well. One, did you see another white box in the park when you got there? About any number of things? And did the overall experience make you more or less aware of the planning applications around the cities green space.

D: Yes. That popped up for me once, although I think only after I walked around the park and came back to the lime kiln itself. And that was meaningful to me because it said that there was at least one planning application in the area right.

B: Ah Jeez.

D: Fair enough.

B: Where would that go?

D: Where in the park?

B: In the park or around it? There is not a lot of room for that.

D: Yeah, the way that I imagined it, I suppose, was, they would be taking some bit of Park and make something there, you know? It seems like prime space for any number of things.

B: So how would you describe the sort of overall process, the feeling of using the App. Was it tricky? Normal? Ok?

D: It was, I mean at first trying to figure out which vertical services to use was tricky, like it took a second. But once I had that down, it was pretty straight forward from there. I was impressed that I was able to use it sideways or what do you call it - Portrait and landscape. That was useful to me because I was able to hold it easier, you know, so that was good.

B: The poetry - did you kind of, hopefully it wasn't all the same, could you get a few fragments?

D: Yeah. A few different ones.

B: What did you think of? Did it feel like it kind of blended in, was an ambient part of the walls, ...or did it just feel like digital graffiti? There is no wrong answer obviously, just how you feel about it.

D: I thought it was cool because it kind of speaks to the theme of reclaiming public spaces, you know? I don't know if I'd call it "graffiti" especially since it's something so impermanent, which was neat as well, but really I think added to the experience. I remember, in particular, there was one about - one fragment about - the river and stones. That prompt popped up right when I was like, overlooking the river, you know? That was kind of a cool moment how that worked out.

B: Something that I'm really aiming for as well, it's kind of, serendipitous moments where if you write in such a way, you can apply that and hopefully you can engineer those spontaneous but semi structured moments.

D: Yeah

B: It also comes from the fact, there is debate around what Galway's original names was and where the "Gall" comes from. If it's about the two different original meanings of that sound in different languages, because you know "Gall", is much like a sort of French or European, Latin version, it's like the "Pays De Galles" is the original tribe of "Galls" like Asterix and Obelix - If you know them? But it's also another word for Wales. In lots of languages, like French is Pere De Gallas, Portuguese is Peyes De Gales. So the "Gall" in Galway might have come from that but other people might say that it might come from an original word meaning "Stone"

D: Oh I see. I didn't realise it was playing into that but very interesting to know.

B: All this pretty much, overlaps. And you said that the AR made you sort of, kind of lean toward this taking back the city. Did that feel curious, intriguing, playful enough to keep your attention for a while? And if so, how long do you think? And was it playful enough?

D: I thought it was quite playful. I mean, in some sense it was fun to be able to cover with the scanning even or when it was asking to find a flat surface. I found once I've been walking with that by my side towards something, it would be tracking the entire time that I was doing it so when I looked back through the reality, there was this line right there, so that was kind of intriguing to me. I thought that it was playful. I didn't look at my regular phone expect other than to check the time. So it's not like I was, my immersion I suppose was complete.

B: Good. Did it feel rewarding? Just to kind of experiment with it, play with it but also get to that green space and have a little understanding of the wider planning stuffs, or do you think they could of, or something that you personally would have added?

D: It was, I thought it was rewarding when it completely worked. I was a little bit frustrated that I had to try it a couple of times actually but when it worked like it was supposed to, I thought it was really cool, that the added information is like a plaque in real time, it's there on the phone, you know?

B: That's great. Thanks man. Really nice way of putting it.

D: I don't know, I don't think I would add anything because you don't want it to be too cluttered, you know? I like that it was kind of minimalistic, you know? A supplement to the experience rather than trying to, hijack it, if you will.

B: Great. That's good to hear, that's precisely how I felt about designing it as well.

D: Oh Good. Good.

B: There is a school of thought emerging in the kind of cross point between technology and city design and information design and also digital humanities around ambient experiences and ambient

literature, and in a perfect world, I said to you before the interview, I would have loved to design it for virtual augmented reality glasses, so you could just walk around and have it occasionally pop up. The final question, apart from anything else that we chat about, because we've still got another few minutes if you want them: do you think the experience would be better, more ambient with a pair of augmented reality glasses? Or? What's your perspective on that?

D: I think that augmented reality glasses would have added to the experience, because, well having not tried it, I think holding the phone in a particular area or having to point it at a particular area, you know? Interacting with it another way than just looking, you could say that's a bit jarring or immersion breaking, right? With the glasses, I think that it would be smoother, but like I said, where it was like putting dots on everything right? One potential issue with that could be I think if you have too much of that going on. You know... to overwhelm I suppose but I do think that it would be a good addition to the experience. When you're on the App, does tapping on the screen does nothing at all?

B: Not really, you can long press to get rid of the longitude and latitude in the corner and the how far you moved and stuff. So you can make it even more minimal, if you want. I was a bit worried that people would go "Oh no. its broken" it gone to the camera or something, without having *anything* on the screen.

D: Yeah, I think that's how I would have felt.

B: This is the difficult user interaction thing, there. Having tested it myself a few times, I thought if it's there then people can get a reminder, if its not then it's much more minimal so it's a difficult balance to get that right but I think for the moment, I think until technology has caught up with the dream of putting on augmented reality glasses, then it has to have just a little something. That's the strange thing about augmented reality at the moment is, everyone has got these amazing dreams and ideas but even something like Microsoft HoloLens, which is quite an advanced AR system, it really needs a lot of battery power, it needs a lot of processing power, and to almost constantly be connected to the internet and that's something that you can kind of develop because I know of some developers who have made something like a version of the original Mario Brothers, that you can walk through and jump on the little goombas, punch boxes, and stuff -

D: Sounds Fun.

B: Yeah, yeah, but the scanning of the AR to then make clear that, you know, it's a subtle interaction, is again jarred again in a sense - it's disconnected - because you're in this giant head, Microsoft HoloLens thing rather than a pair of glasses, so it's a big toss up at the moment.

D: That sounds very important?

B: Yeah and your descriptions now are really important to understanding those user interactions; you know, the question around is it easier to hold a phone then it would be to wear what essentially looks like a big VR headset.

D: Yeah

B: We need to figure out, which is more appropriate and more socially comfortable. I mean, did anyone stare at you as your scanning walls I guess, up close with walls.

D: I think I heard people laughing, I'm not sure it was me but it could have been so? And I suppose I would have been stopping and scanning along. It made for some interesting moments.

B: I once was scanning a wall and a light switched on, they're at the window, and I've looked up and caught their eye and I realised that they might think I'm trying to video them so I just moved on, very quickly.

D: Yes. Yeah you would have to.

B: It's at that strange moment - That's where we are at.

D: I'm curious, are you recording the data from the phones in terms of locating spots. Could you use this as a virtual way of Galway Parks, you know what I mean?

B: No, I'm not. You've kind of touched on the 3D modeling that the App understands but no I'm not. Partially because it's a lot of data to hold to too and understand but also I wanted to make it as minimal and anonymous as possible. I'm approaching it from a sort of citizen service so that political, individual, and online perspective and I'd hope very much to in the future, even though it's only beta release software, for anyone who wishes to use it - even though its not much to me, it's up to the institute - and I'd like people to be able to use it for more than just planning applications. They might use it for any number of things. You know, say, grab the data from say, the number of cars in the city and how many have gone through your area and how you might be able to input suggestions on how to lessen those cars and therefore clean the air.

D: I think that's great.

B: This kind of stuff, the only thing I am recording is just the locations because I'm trying to encourage with each test for more people to go further and further. I have done all of the parks that you can walk to, from campus within 40mins, you can go anywhere north or south, all the way to South Park or example, right by the extend-y bit that I always forget the name of.

D: The file?

B: It's in between the Galloway Docks and Salt Hill - It's got that long, begins with M, I think of it as Moons Pier or something like that. That area.

D: It goes way out there?

B: It does. It's quite a big park, so I'm hoping at some point someone in the test will go all that way.

D: Yeah, I would have liked to be able to have seen some more parks but I wasn't sure if the App wouldn't have progressed if I went to another park.

B: Ah, I should have made that clear. At the moment, it doesn't yet cancel the operation of the one park when you've done it. I'd offer to do that because you might want to go back and test out more fragments, more poetry but yeah, I'll have to instruct the next person and that's really on me with the intro and tutorial to walk a while away from the park, in order to get another park

D: Great

B: Or, if you're interested I can also send you a link for the BETA and if you're phones Android 8 and above, you can download it and if you've got developer options open, you can install it yourself and play with it whenever.

D: Ok! Yeah. I'd love to. Thank you

B: No problem. Thank you, that's great.

D: I think my phone can run that.

B: Great. Thanks Bud. Is there anything else you wish to add to the interview? It's about 15 mins.

D: We're beyond it, sorry!

B: No. No rush. I'm more worried about your time to be honest.

D: No. Nope, nothing in particular. I think it's great, it's a great idea and, like, I love the idea of augmenting reality. Trying to take the best of both worlds, if you will. Like you mentioned your political activism, that's the part I'm really interested in and why I'm studying individual cultures, you know? So, great. Keep it up man.

B: Thank you.

D: No problem

Appendix 2 – interview with L

B: So, Technical questions first. Oh and I should add, obviously, I've said it before but just so it's on record, this is mostly anonymised so all I need is a first name and you know the drill. Ok. So... did the AR Poetry display on walls? Yes or no?

L: In between.

B: So tell me more.

L: It displayed on certain types of walls. It seemed to be very dependent on texture, if that's the word, and colour. The brighter it is, the harder it was to display, in my opinion, from what I saw anyway, and the bumpier it was, the easier it was, if that makes sense? Spikier?

B: Yeah. Yeah.

L: Smooth walls, no it wouldn't show up. Yeah.

B: Ok. Thank you. Question two, did the App give directions, however vague?

L: It did give directions.

B: That bit worked. Did you find more than one park?

L: Yes, I did. It led me initially in the direction of Nuns Island and then somewhere else, I can't actually remember the name of, but yeah, it worked.

B: That's great. I will find it. Four, had you been to those parks before?

L: I've been to Nun Island, yeah.

B: Any other parks you went to that you've been to?

L: Yes, I've lived in Galway for 5 years so...

B: Yeah, of course. Were there any moments where you felt the App might have broken or glitched?

L: Yes, there was. If you display on a corner wall, i.e. a wall that kind of goes into a point, the hand motion on the screen will go over any text displayed.

B: Ah. Thank you. Ok, that's a bug, I'll need to hammer out. Ok. Well those are all the big technical questions, I've only got one more, important technical question and it kind of ties into everything else; so really the most important question that's sort of in the chat now is how did you feel the overall process, the experience, felt?

L: It was good overall. I think the sense of adventure almost was good but I think the point of poetry is to give you the sense of adventure. So mixing the physical reality of actually going out and doing it versus the kind of reality of sitting around reading a bunch of books about the place. I think what you were going for was geographical based poems. I'm alright with that but yeah, it was fun mixing the two, it went quite well actually. It gives this sort of, this feeling of like, we're humans and to want to be able to achieve something almost always, there's that in a certain sense.

So when you finally do get it show up like 'Da Daaaaaaa'. Zero point four kilometres or whatever - that's a great feeling. If there were sound cues, I think that would be really cool and maybe the colour pallet switched out? Because blue on white doesn't work, yeah. I know that's aesthetic things but...

B: No, it's important, it really adds to the feeling. That's interesting as well, it kind of raises the question, did you ever feel that the poetry or at least the style of text could have been more or less attached to a building? Did you feel it was architectural, did you feel it was like graffiti? Did you feel like it was anything you'd felt before?

L: How to describe it? It felt like disassociation... but in a good way, not the traditional type of disassociation. More like, like an add on, if that makes sense? Looking at walls, very pretty walls, is I thought cool, wonderful, still weird but still cool.

B: Why weird in anyway? Just because the scanning process?

L: Well generally I don't see texts written on walls. It impacts thoughts, that's a lot of letters.

B: Yeah. Ok ok. That's fair, now that raises an interesting one: did the AR make you more or less aware of your surroundings?

L: Maybe more, I mean, I nearly get run over a lot! And this made me go, oh no. Wait, A road. Yeah, it made me look for things specifically just like, 'Oh where's the wall? Oh that's a cool wall. That's a nice church'. It works really well on churches.

B: Yeah, that's the old stone.

L: Yeah.

B: That's cool. That's good. So I hate to ask but how would you describe the actual poetry? Like graffiti? Sculpture? Like fragments? Like whispered conversations? What do you think?

L: For conversations, you mean like, you walk passed a crazy person and their just rambling but like in a great way. Like an NPC in an old video game.

B: That's interesting. Yeah, I understand that. That's cool, Oh yeah, an important one, its related to both technical and sort of the experience: did the overall experience make you more or less aware of the planning applications around the city's green spaces?

L: I'm already pretty aware just because I'm doing geography, but no, I think it's certainly a good idea. Maybe even specifics, for some way to add links? But I know its probably still in its early days of developments, but to have a brief overview of what's being planned and how it might, maybe not might impact because you want the person to find out themselves and figure it out, help themselves but certainly a brief overview of 'This is what is being planned'; I guess that's a lot of work but like.

B: Yeah, I had considered in putting in a link, relating to the Galway City Council Planning section. 'This Zone is this link', whatever. But the App really doesn't allow for it without taking you out of the App.

L: That's grand.

B: Yeah but you're absolutely right, I did consider it, I was just worried that people would then go to the website and then be like "oh, I'm done now" and not visit another park. You know what I mean? It's a difficult balance but you're absolutely right, if it was possible within the App. The tech at the moment isn't quite ready to then... I had these wild dreams about, you know, if you could click it, scan and place the building where they might be in the planning or whatever, like in a kind of Ikea sense? But that's such a large processing thing, ah yeah. But that's a good point. It would be lovely, especially for someone doing geography. That's really important - Cool.

Only really a few more direct questions from me, then we just chat. Did the experience feel curious? intriguing? Playful enough?

L: Playful. Definitely, it's almost like a game, if that sense.

B: Like a mini game?

L: Yeah. Sort of, not maybe in the video game sense. Almost more like, going back to primary school and be like 'Oh make up your own game in your head, and go out in the field.' It felt like that. Kind of like vague objective is I think a good way to go with it.

B: Like poetry. A vague objective of poetry. Cool, so quite rewarding then?

L: Yeah, yeah, absolutely. There's like, you have numerical value there so there is something to work towards, so it's always going to be rewarding.

B: So on a semi technical thing, I'm guessing the numbers in the top left corner were helpful or?

L: They're helpful if you know what they are.

B: Ok... Too much?

L: Yeah. Would they satellite coordinates? Or GPS?

B: Yeah, GPS as well as how much you've moved from the last park or point or mark of GPS recognition.

L: I figured that I'm used to mapping so I would try and get someone, a friend that isn't involved with geography. Because I already know the numbers. They might do at a guess, but it's not intuitive.

B: Ok. I was trying to just leave it there as the sort of, experience and interaction, I didn't want to design it so that people were, ever felt like they had gone wrong with having nothing on the screen.

L: Fair enough.

B: So the user would get that.

L: That's fair.

B: But that's interesting,

L: If you had a longer map, compass in the corner. It's a small thing but a lot of people know what it is, and a surprising amount of people know what it is.

B: Yeah, I get that, good point. Ok, so its semi-rewarding. And just one last thing, and then we can just chat. Do you think it might have been better and more ambient experience, if it was done on a pair of augmented reality glasses? Like you could just walk around and it would just happen.

L: I might look like a gobshite.

B: yeah, google glass may help with that. Do you think they make sense?

L: I don't think it makes much sense, and in anyway would it be improved. I mean, you'd have a wider FOV.

B: Depending on the device.

L: Yeah but if it is what I'm thinking, like the google glasses, something along those lines, (not exactly because copyright) but the field view would be better but then also you're a bit of a nuisance because if you have that on you, you're not going to be as aware of users around you unless they fall on your face.

B: Interesting. Ok.

L: So I think there would be an almost danger element to it, it would. You might be a safety risk then.

B: Yeah. I thought about it, I don't know if you know them but I've thought about the Microsoft HoloLens, it's sort of a, both V.R and A.R. Its mixed reality.

L: Oh god.

B: They look like a crash helmet.

L: Yeah.

B: It will completely surround your head, and I wondered if, because they, so basically the tech at the minute for example that the google glass cannot handle the same kind of A.R you've just experienced but Microsoft HoloLens might be able to, however, it would require a massive amount of processing, huge battery pack, this kind of thing and a constant internet connection as well. Which this App doesn't have and I wondered if it will be really all that beneficial or if you'd feel socially, especially, because your walking around with a big device on your face and environmentally all that different? And it's a tough one to call, I don't know if you had the opportunity, would you do it?

L: That's the thing, it's opportunity. If you implemented, wouldn't that be gatekeeping? If people can't afford it... it's only for people who have augmented reality headsets.

B: Yeah, That's a really good point as well. How do you? Because obviously somebody who is looking at planning...

L: Yeah, this is inherently for the people who need it like.

B: One with a smartphone, or who wants a smart phone of least a decent level. Like this smartphone that you used, is, I would say, middle grade.

L: It's got it all, its grand.

B: It was not massively expensive. It was what I would usually pay for a smartphone and I would never pay more than £150 for a smartphone. And I know that's quite a lot of money but at the same time, like, it was just because it seemed the most reasonable for testing.

L: Everyone has an iPhone now, so it was like 'go harder'.

B: And at least, I think most people want to be aware of these things, so if you can get to this point where if you can make an App that works across things rather than requiring a certain amount of hardware, that means more accessible.

L: Its more work, but yeah, you can do it. It's just recording stuff... Ah god, yeah.

B: Was there any where you went where people were looking? Was anyone kind of looking at you weirdly?

L: People thought I was recording, I physically avoided the kids park, because that was like “Ah shite.” - So I knew where I was going, I’ll turn the other way now. So that’s the only issue is that it does look an awful lot like you’re like...

B: Filming everything. Yeah. Interesting.

L: I don’t know how you’ll overcome that. Just see.

B: Well, maybe in instruction. I could encourage people to turn it off, not to turn it off proper but to like, lock the screen? Put it in their pockets and then walk a bit more and then take it out?

L: Yeah, maybe?

B: So there’s always the question of balancing the instruction with the freedom of the user, what you might want to do with it anyway? Because I know that some people enjoyed the sort of dots, the look -

L: Oh I love the dots, they actually make it aesthetically pleasing. Right now. It looks like a bloody BETA test.

B: It is a Beta test.

L: Yeah. Like -

B: But you like the dots... That's interesting.

L: Yes. The fooking matrix thing it does, like all the lines... That’s great! Keep that.

B: Well, I wanted to keep that precisely so you could be aware of when you’re really finding the wall rather than just dotting.

L: Yeah, that's great! It's also looks cool as shit! In the most unparliamentary language. Next..

B: Ok. So it’s interesting as well is that you think it wouldn’t think it be improved by augmented reality glasses because some people obviously have very different relationships with screens, and some people would want to be able to have it as a sort of semi reminder.

L: That’s the thing, having used augmented reality, virtual reality headset things, because of like different conventions and things, when you’re just using your arms it’s great fun because obviously it’s mainly just for video games or at least for my audience anyway. But the second you start using your legs, its dead. Its dead in the water, it won’t work.

B: It’s virtual reality.

L: Yes, but if you have that headset on, because the second you put that headset on, you're disconnected from your actually reality, it doesn't matter if its augmented, virtual or whatever. In my opinion.

B: Yeah. Yeah.

L: Because the second you start using your legs, I think the App or whatever, its dead in the water. If you use it... In my opinion.

B: Alright, ok... I see yeah, I can see how a headset can produce those sorts of problems, ok. cool.

I hadn’t really thought about that.

L: Video games, eh? That's good.

B: Yeah.

L: Works out finally.

B: As the queen of AkumaCon and all the other coms and festivals, it makes sense. That's really interesting to me because I've always presumed that with the right level of AR tech, in a glass, in a pair of glasses, it might help?

L: I don't think it will ever work. There has been so many attempts, all from. My favorite one was a kinda like "Rolla Platform" full of ball bearings and like that...

B: Yeah. Yeah!

L: Even then, they still needed a massive harness, a helmet and like.

B: Yeah.

L: I'm like this is awful, just give them a Wii Motion Plus, then fooking glasses. Like, it's grand. Yeah, legs are complicated.

B: Most are doing it slowly, like you did presumably?

L: But even then, it wasn't a headset, just with a phone. It's different, a very different experience.

B: Interesting.

L: I think it. Have you used a headset before?

B: So I've used google glass but I've not used a VR headset.

L: I'd recommend trying it just once, to just see what it's about.

B: Well I have tried a VR headset for 15 mins but not for a virtual reality move around thing. I've literally been sat down, headset on and told I could go forward and backward and that's it.

L: A totally controlled environment?

B: Yeah, Yeah.

L: The second you go out in the street, you kill someone.

B: Well. Yes.

L: Yes. Exactly.

B: Wow... So much to...

L: Unless you want lawsuits out your hole.

B: No I'm good.

L: I figured. I'd stick with the phone.

B: Thanks. Thanks.

L: The phones great! I'd keep the phone, I'd think a lot.. Wait, Are we on the casual bit?

B: Yes, we are. We have been for a while.

L: Ah good. One fooking thing that annoyed the shit out of me was, if you're using cardinal directions, put a fooking compass in it. God.

B: Yeah...

L: Its doesn't have to show you the way, just show me where north is and I'll work it out.

B: Ah, good point. Yeah!

L: Yeah..

B: Damn, I was trying to sort of create, so there is this idea within the surrealists of a kind of *derive*; you sort of walk the city and the city walks with you. You talk to the city and the city talks to you. So I didn't want to be too specific.

L: I get it.

B: I was just like - Just go south west man.

L: I get it but philosophy is just old white men, arguing. Also, you want it to look practical. Come on.. I dont want to be - also! Your App recommended to trespass on a school.

B: Oh no!

L: Oh boy, I was like, 'Aright! No, I won't do that, I'll just go around the corner'. But yeah it was a minor thing to happen and I knew it was going to happen because it happened in Pokemon Go. Which is obviously not the same but it's in the same world.

B: Yeah kind of touches on the same stuff.

L: Fun story actually about Pokemon Go, in Bosnia the government had to release an official statement because people kept walking into land mines.

B: I remember this!! Yeah -

L: Yeah. So that is maybe something to look at if you're planning a location based one.

B: Yeah. Good point. So you might like to know the design for it?

L: Yeah.

B: So it isn't based on a specific GPS but rather based on groupings; a wider city map and then it produces the poetry fragments, not in a semi random way on any surface but the direction of the parks, which are fixed, not the kind of overall, you know, like in Pokemon Go you have to go to a specific spot to get a thing or reaction...

L: No, I get that.

B: With me or with this app, it's specifically random so you can do it anywhere.

L: No, I get the, I like the wandering aspect of it. But with one aspect of it is I get why you're hesitant about a compass.

B: Yeah but I also think that, you know, if for example you think that you would like to, like, I'm going to share this link to the App if you want to when you get a new phone and then you will. And if you wanted to, you can then download the App and use it at your leisure or on your commute to work.

L: Does it only work in Galway?

B: Yes. The App icon is actually the Galway city shield with “*Here. Now. Ours*” imprinted on the top. Because the public spaces are ours. I mean, that raises another question: do you feel like those green spaces are yours?

L: No, I don’t.

B: But you should! They are yours!

L: Are they?

B: They are!

L: I get that they are! but you never really see that they put any seats down, don't put any bins down - I mean, there’s a lot of fooking bins in Galway, christ.

B: But not in the parks, right?

L: Yeah, exactly. So.. Oh sorry. Oh shite. Yeah, it’s a case of: I get the idealised version of being like “oh, its our space, we can take it back!” - you have to rally the troops, somehow. I guess the App would be a good way to do that, if it took off. And be like “Oh, wow” I would always suggest maybe get my, not facts but -

B: Maybe historical information?

L: Yeah. I mean like, we had cannons in Eyre Square. People kept telling like, the councils themselves told a student in NUI, ‘Oh the cannons were used, the Ra used them’ - they didn’t, they were Spanish cannons.

B: I was going to say, the Ra is pretty far from here like?

L: Yeah. Also, the Ra didn’t use cannons.

B: Yeah, right! They didn’t have that much.

L: No, they used a fooking Kalashnikov.

B: But they didn’t. Strange.

L: So maybe something like that although poetry’s always good but maybe something about Galway’s something. I know a lot of them were your secured in your phones.

B: Yeah but they were written for Galway.

L: Yeah exactly..

B: But, I know what you mean, I was tempted with the idea of individual histories, of individual parks.

L: I’m sorry to say, people are always inherently more interested in history than they are in poetry.

B: Yeah but I just didn't want people to spend twenty minutes in a park when they could be walking that twenty minutes to another park to understand, you know? How much of the planning process is around those places and those surroundings.

L: Yeah. That’s the issue.

B: And it is a difficult one but I like your thinking on this, I do! You know if I was going to Alpha production of this App, I would definitely put that in, that would be a thing, that would have to be a

thing in lot's ways because it would then encourage people to, not just use the App but to think how important public spaces is, like, issues on as well as the actual green space.

L: Sort of like, cultural market availability?

B: Yeah. Gorgeous cultural heritage, that they value. It's theirs.

L: But even on the travel, because even in Galway, you could actually point out the trade routes, the famine trails, like, that would encourage them to walk - just like "Hey, you're walking this way, guess what? Your ancestors, way back when".

B: Historically...

L: Its grand but it's a tough one.

B: There's so much you could do with it but I was trying very hard to make the App minimal - did you feel like that was the case?

L: It was very minimalist, almost to a fault.

B: Right.

L: Yeah. That's one. Also, so when it hits on a surface, like, one it wants to hit on, it will get it straight away, like that. If water, when going on water it crashed by the way.

B: Oh, did it?

L: Yeah, it did crash once.

B: Oh ok...

L: When I managed to get it back up, it was fine.

B: Ok. Ok.

L: But sometimes I was waiting there for like a minute. Just being like, very pretty but like.

B: Yeah yeah yeah, I should have advised you really, if you feel it's taking too long, move on, try a different kind of surface. I'll note that down so I've -

L: So water fucks with it.

B: That's interesting, so in green space it doesn't, it would be the same so in water, ok, water is not good.

L: It's all come full circle, we're back to cavemen. 'Not good, no. Kill family, no.'

B: Yeah yeah. So it crashes the App... and was there another technical note you wanted to add?

L: Yeah, when it wanted a surface it wanted on, it'd hit straight away but sometimes it took so fooking long. If it was a smooth surface, a bright surface, basically a surface it didn't agree with. One time, I got it to work on the floor, I don't know if that was supposed to happen?

B: No! Damn.

L: Yeah. It was a very rocky floor.

B: Just a thought, it might have been the surface. Ah, that's not good. Damn it.

L: Yeah, happened once.

B: Ok, ok. Well, that's interesting, good to know.

L: Yeah, get the bugs out.

B: Horrible. Ok.

L: Yeah. Like I said, just ascetical stuff like: the font, maybe in being slightly more apart and white text with a black outline, so you can see the black outline, it will show up a lot better. Anything else? Yeah, the colour of the dots. There's a lot of potential there, maybe if you can customise it? - Yeah, I know it's a minor thing but like

B: For the city?

L: Yeah or like just for the user, say someone's colourblind for example.

B: Ah yeah! Yeah yeah.

L: Like my friend's colourblind, there is fuck-all Apps for the colourblind. It drives him up the wall but its grand. It's a minor thing though.

B: If the App ever got funding to go bigger or whatever, it would be as important.

Well, anything else to add?

L: Not that I know of. It was alright I think that's everything I have to say.

B: Thank you so much

L: I did it.

B: You did and that was one of the best interviews I've had.

Appendix 3 – interview with Ed

B: Ok. Testing, Just to make sure everything is musical and stuff. Ok, Great. So technical questions first. Number one: did the AR poetry display on walls?

E: Yes. Sometimes, yes.

B: Sometimes? Do you want to elaborate on sometimes?

E: I'd say the vast majority of the times that I'd hold it up against a wall, it would. The dots would appear, and then a subset like, less frequently the wire frame would appear and then most of the time wire frame would disappear without any words appearing.

B: Oh damn.

E: I didn't know how far away or close, it seemed to not work it I was quite close to a wall. It seemed to work best if I was about 2 metres away or something?

B: Yeah.

E: But it came up a couple of times. Yeah, I got sort of some words appearing at the Lime Kiln but I wasn't sure if they were the right things and then in Eyre Square as well.

B: Ok.

E: And it was kind of, yeah it was definitely the poetry stuff that was like 'Breathe the air' or whatever.

B: That's grand, that's good. Ok so sometimes is the definitive answer. Ok. number two. Did the App give directions, however vague?

E: Yes. That was probably one of the issues that I would have with it. So, especially when you get quite close, so it would, you remember at the start when it was like, you know, 'Point four of a kilometre to Lime Kiln' or whatever, that's fine but when you get there it's kind of like, I'm standing at the stone thing and its likes, travel zero point zero four kilometres north west to the Lime Kiln and I'm like – I'm at the Lime Kiln.

B: Yeah

E: You know, is there a specific spot so... that's like forty metres or whatever so I kinda felt that if I was forty meters from something, it should show just like, work or whatever.

Like if, there should just sort of have a bubble within which there should be a margin of error or something?

And then the second part of that is, I suppose, just the use of cardinal directions. I suppose I would look for, if you could put a compass in to it or something? Like, I don't know, like I vaguely know like, which directions, yeah, just because I know Galway, otherwise, like I know the coordinates are on it but I had to read those, several times. I didn't really know how to read those.

B: Yeah

E: I don't. I didn't really know which direction I was supposed to be pointing in so I was kind of just walking in random directions, hoping it worked. Yeah. That would be my kind of...

B: That's great, that's a good one. Did you find more than one park?

E: Yeah, I think so. Well, there was The Lime Kiln was one and Eyre Square definitely; it had information that was, you need to be there.

B: Good stuff.

E: Yeah it had like two things, like there was planning permission or whatever. So that did come up. Yeah.

B: Right. Had you been to all of the parks that you went to before?

E: Yes.

B: Grand. And were there any moments, I mean, you've described some but were there any particular moments where you felt the App might have broken or glitched?

E: No, not fully, no. There were plenty of times that I've kind of pointed it at a wall and nothing would happen but I didn't feel it ever, it didn't crash at any time.

B: Great. That's honest.

E: Yeah.

B: Ok. Those are all the technical questions, nice and easy, nice and quick. And I will just sort of start us off on a conversation. Just about the whole experience, like, how would you describe it?

E: Kind of nice but also kind of frustrating, I suppose? Like, I don't know if I'm coming at it from an incorrect mindset or whatever where I'm kind of like -

B: There's kind of *no* mindset.

E: Yeah but I see it like: I kinda have to go to this place and then something has to happen, then I go to the next place. I'm kinda like, I'm possibly treating it badly, like it's a game or something? For outdoor goals or objectives to feed. I cheat and maybe that's not quite the point?

So when I'm in a place and something didn't appear, which was happening, I got frustrated or whatever. And then, yeah... So... But then I suppose it was kind of nice to, like I've never really inspected the Lime Kiln thing properly so I never actually read the plaque that said that it was a fever hospital or whatever, that's kind of what I learned.

B: It was kind of one of my questions to feed in, was, did the AR make you feel more or less aware of your surroundings?

E: More aware, yeah, because actually in the process of walking around out there, I never bothered to go over the other side of Fisheries Field, where the wall is next to the river.

B: And the garden behind that wall there, which you can get to, if you go around...

E: Yeah, I didn't quite realise that. I walked all the way down to the gate but didn't, I saw there was some kind of flower bed on the other side but I was mostly looking at the, I don't know the technical, the dam or whatever?

B: Yeah, it's gorgeous, isn't it?

E: You get so much closer to it there than you normally would be. And the water coming through it, the sunlight was very nice. I didn't know that the buildings over there were part of some kind of fishery colony or something?

B: So that's real interesting.

E: Yeah, I'm learning all those things I didn't actually know.

B: Yeah. That's at least something. That's great so kind of following on from that, how do you, I mean how would you articulate how the poetry felt? The fragments you saw, would you feel it was

like, I guess as a knowledgeable literature student. Would you feel like its fragments, whispers? Graffiti? Sculpture? How would you try and kind of, articulate it?

E: I don't know, it only came up like twice or three times, so I don't really... there was something about the air, something about space and boundaries and that kind of idea that this all used to be green space so I don't know if I really saw enough of it to give it that kind of criticism.

B: I'm not looking for an essay, don't worry. I'm not looking for 'Is this concrete poetry?' That kind of thing but just more of, because you know, this is more of a chat about the experience and how you sort of went about it, I mean it's really interesting to hear, you know? Someone say "Ah but I didn't really look at this space before" and it's kind of unearthed the history of the Lime Kiln or it's made me look over that wall or stuff like that. You know? Whenever I'm in Galway I always try very hard to walk past that dam, it is just gorgeous because of the full flow, the force of water there. It always amazes me about how, like, a difference in one's quality of attention, can completely change an environment and I guess that leads me onto another question: did the experience feel curious, intriguing, playful enough to change your attention would you say?

E: Yes, I would say so, because I'm in that space with a different mindset, to how I'd normally be there so I suppose that, that is play I suppose, the kind of exploration, kind of, walking around. 'What happens when I stand in this spot, compared to this spot over here... why normally that Fisheries Field, I'm just travelling through it to get from one place to another'. So to, kind of, be there as a reason in itself was different to a normal experience.

B: Yeah. Sure. Nice.

E: For sure.

B: Cool. That's good. So you've already, kind of talked about frustrating but playful but interesting. I guess the simple question is, did the overall experience feel rewarding or fun? Or just interesting I guess? I guess that's quite a long line of things, from like a scale of interesting to...

E: Yeah. I suppose more interesting in terms of my own experience in this place, rather than the App, yeah. Just because I didn't seem to be able to get it to work.

B: But that's good because I think, what I'm trying to do in some ways with the App is sort of enable that kind of play, that kind of ambient play, you're both in... and that's where the augmented reality rather than virtual reality, I think, can be both really useful because your kind of in both in the digital and physical world. Where both will make you pay more attention to one rather than the other. Which kind of leads me on to another question I had, I'm guessing you've read a little around augmented reality glasses, like Google Glass and Microsoft HoloLens and stuff like that. Do you think it might be better with a pair and do you think it will be more ambient, i.e. more natural to walk around with those kind of glasses on and not have to worry about the mechanism of the phone?

E: This is interesting. Yeah. It is an unnatural pose to be kind of holding a phone in front of you and sort of looking through it at the environment that's around you, rather than at the environment. I was kind of self-conscious that it looks like I'm kind of taking photos of things because that's how you would be normally holding the phone that way, which I suppose would be an anxiety with, I mean was the anxiety which shut down like google glass or whatever. Its creepy to have a camera that people can't really see if it's on or off. So I think, yeah, regardless of that aspect if it was an immersive glasses or a headset or something, that might be a bit more natural in terms of how you're using your body, I suppose because it's more like looking around rather than kind of, rather holding your arm up in an unusual pose of whatever.

B: Yeah. ok, that's interesting. Have you got much or any experience with augmented reality or virtual reality or stuff like that?

E: No. Well I've used the virtual reality, the [Google] Cardboard. Where you put your phone in and -

B: Yeah. That's virtual reality still.

E: Those are fun. As far as augmented reality - not really, I don't think. I never played any of the games.

B: Not Pokemon Go and what not? That's interesting. Yeah, there is a lot of tech at the minute that's sort of trying to do augmented reality justice but it's still not quite there on the level phones are, and the phone you used is really a middle grade phone but it's almost as powerful as some of the more recent Google phones and it cost about an eighth of the cost and I'm hoping that, in some ways, developing an App, instead of saying 'We have to have this hardware and we have to have that' is somewhat more accessible. Like, that does make me ask as well, if there was more time and the user interface was a little bit smoother, i.e. the scanning only took three to four seconds rather than five or ten and that happened every time, would it be an App that you would spend more time with?

E: Yeah, I think so. The speed isn't even necessarily, like I don't mind spending five to ten seconds standing there if I knew it was going to work, like, that's not really a problem. I suppose, yeah, my request would be for a compass or some kind of arrow or something pointing. That's almost like a video game, that's almost like...

B: Like GTA.

E: Yeah, Like GTA or something - yeah. You're going this way to the quest or whatever.

B: Yeah -

E: I dunno, maybe that's... I dunno.

B: Yeah, I know that google have introduced it to their maps services now, you know you can flip it over. But what I wanted to try and do with this is try to remove that, remove some of the elements of feeling like it's a lot like a game, you know, your GTA thing, more sort of, so it's your choice to go experience this in this way but you're absolutely right. You're now the second person to say that I wish there had been a compass on the screen, just so, however vaguely, to make my way and I might try and introduce that by next week. If I can.

E: Yeah. Because the phone should do it. I guess it's a lot of hardware.

B: I guess. And I could also put a sim card in there and advise anyone who wants to, to flick over to Google maps or something and do it that way. I wonder about that.

E: Yeah. I used that. I cheated because I took Google maps out on my own phone

B: Ah ok.

E: Because I didn't actually know, like with the Lime Kiln, I didn't actually know the name of it. When I saw it on the map, I was like "Oh it's that big stone thing" but I've walked passed it five hundred times, like I didn't know that that was what it was called.

B: Yeah, yeah. No but that's good. That's good. That's really interesting to find out because everyone always finds their own way to do things and I really like that.

E: Then I was just vaguely walking into town and I was kind of going like 'I don't know parts', I was going to walk down by the river but then I was like, 'But there won't be any walls'. So I went into town and I thought instead, 'Right ok, If I was making this then there would be something in Eyre square so I'm going to go to the square' - even though I don't really like Eyre Square. But yeah, you're kinda like looking for walls and there's a lot of like, glass. And the city centre is not... I don't really like the city anyway.

B: Yeah, that's fair because it's not exactly a nice peaceful walk.

E: Yeah

B: Most just kinda want to stand around and take it in and stuff. Interesting yeah, I guess... It might be, and you can tell me if I'm wrong, but It might be useful to advance the tests next week with a sort of do a mini-tutorial, where I walk people to the Lime Kiln and then you know, we go to that first bit as you would in a tutorial of a computer game maybe?... Would you find that would be helpful?

E: Yeah.

B: Yeah

E: Yeah, I think there were probably times where, I think, even though I could have texted. Did text you, it was like, 'Oh, I wish I could just turn around and be like am I doing this right?' You know? So...

B: Well that's really helpful because that means now, yeah, even. I'll have to make the choice whether or not to include the compass because again, that's sort of a

E: Imposing, kind of. You don't want to be telling people what to do.

B: Right, yeah. Or it's putting a limitation or an excess as well; it's such a complex thing, to add one thing, it's massive - it's a stone in the water, you know? Massive ripples.

E: I know.

B: So I'm trying very hard on the App to be as minimal as possible. To be like "Oh yeah, I can wander over there and I can switch it off or whatever". So I think that you're absolutely right, I should walk through the first section with someone just to get an idea and kind of, yeah.

E: May I ask what the other things on the interface are? So I know the coordinates obviously but the number underneath, is that a total of distance per travel?

B: From the last point you scanned pretty much, yeah.

E: Ok.

B: And also the last location you register, so that you. So you might wander like, 'Oh have I gone far enough away from the park, to be away from that park?'

E: Ok

B: Also, it's kind of a debug for me because at various points if someone gets stuck, they can always like, say, text me or call me - whatever - to say, and I know that you're tech savvy enough just to send me a message, just to say, "This is what the screen says" and take a photo or screenshot or whatever. So that's on there so I can go, 'Oh well, you've only moved a metre from the previous park, so move ten more metres and you'll get a new poetry fragment, that kind of thing'.

E: Yeah

B: But I also included the option to literally turn it off, but then you get this like, when this disappears, you know, you'd have - "I'm sorry it's not going to work on glass". But then as soon as they have a "Look for a vertical surface" text disappears, then you'll just have nothing on the screen

E: Yeah

B: I know that when I was just testing it out with a couple of people, that totally freaked them out, as soon as that text disappeared and especially if no text then appeared in its place on the wall, they were all like "Oh, I've broken it" and so I was umming and erring about whether or not to take it off

completely like, you can long press but I just thought, 'No, leave it'. So then people know that it's still

-

E: Doing something? Yeah. And it's not just, like, gone into the camera lens.

B: Yeah! Exactly.

E: And what does the "NONE" mean, in the top right corner?

B: That, I have to remind myself, is. Oh! That's internet connection or as well as Wi-Fi so if you wanted to, basically, you know, could operate this and you could put it on a different series of networks so it would know where it's connected. Like for example if, my thinking was, if you lived in the city, more often the not, you go to a different bar and you connect to the Wi-Fi and get the password for that place so then it would kind of help you locate or orient yourself in regards to the Wi-Fi that you've connected to in the past. So it might just say "McSwiggans"

E: Sure. Yeah, yeah.

B: So you're near McSwiggans but you still need to go X to the south, you know? But I could just replace that with a compass, which is like, yeah, sort of *derive* idea of poetic placing. I don't need a compass because I'm...

E: Wandering...Taking a stroll...

B: Yeah. A two-hour stroll of the city and how the symbols affect me, rather than presuming to dominate the space but it is, yeah... it is a strange one and it's all part of the development really so I'm really thankful for you testing it bud.

E: Thank you, I was glad to try it out and give it a whirl and sort of see this thing that is theoretical that I was talking to 2 years ago. It is quite amazing how fast technology has moved on, it's like as you say this is a mid-level phone and it's creating this wonderful images when it works.

B: When it works... yeah and completely scanning the environment when it's strong enough and got a good camera and stuff like that, yeah. Yeah. Cool, is there anything else you want to add? Last minute stuff.

E: No, I think that's it. Thank you.

B: Thank you, bud.

Appendix 4 – interview with EM

B: First question. Did the AR poetry display on walls?

EM: Yes, it was mostly walls. Like I went down, it did a lot on Salmon Weir Bridge actually which was annoying because I'd just stop and people would be like - but it was very responsive to the bridge part, you know with the pillars and stuff? And then yeah, a lot of it was on walls, and going up, kind of, I think it's called Abbey Gate Street and as well like, Lynch's Castle, Kirwan's Lane, like there was a lot of stone walls, yeah.

B: Good. Thanks. Did the App give directions, however vague?

EM: No, it was mostly telling me to go back to the Lime Kiln and once it was like, Nuns Island. But that's all I noticed away, it might have given me more, but I wasn't looking.

B: No, that's great. I mean, those are relatively vague.

EM: Yeah...

B: Did you find more than one park?

EM: Yes, but I think there was the park that I was originally in by the Lime Kiln and then when I was over by Mainguard Street, it told me there was a park but I wasn't actually in a park? It might have been, is there a park near Mainguard Street?

B: Yeah, just off.

EM: Yeah, ok. But that's where I was.

B: That's sort of a buffering zone around the more, sort of, hidden ones.

EM: Yeah.

B: And then you look for it as well.

EM: Ok ok.

B: That very well leads me on to my next question, had you been to any of those parks before?

EM: No.

B: That's cool, that's interesting. And number five, were there any moments where you felt like the App might have broken or glitched?

EM: Yes. It did. It stopped immediately after I left you by the Lime Kiln, that was fine. Oh no! It immediately froze again over on Kirwan's Lane. And then there was a few times where there would have been like a white or a green stripe, but it just kind of like, yeah, it would glitch, wouldn't stop working but there was a green stripe.

B: Ah. That's new...

EM: It might have been when I was moving it quickly or something?

B: It could also be something to do with the development environment. This is the phone that I basically put it on first and it's technical but I installed it in a specific way which might not be as clean as I the other way I did it on the second device, which is the same phone but it's had less problems.

Which is really interesting and I think probably to do with the restrictions that some environments have. So technical questions, done. Thanks for that, I will be able to specifically use that hard data to compare to other testers. And the experience: how did it feel?

EM: I really liked it because, personally a couple of years ago, I wanted to move out of Galway really badly and I did for a year and then after the end of the year I really want to come back to Galway and then, since then, I've really appreciated the whole place a lot more so even like, going around and like reading stuff about and even stuff like interacting with the place more tangibly was really nice. I really liked that but yeah, it's like, the city, like, the town is alive so it's really cool to like bring...

B: Bring that out?

EM: Yeah, it's cool.

B: It's interesting that you say "Tangible" as well.

EM: Yeah

B: I mean, do you feel like the poetry kind of helped bring that out, as I said in the introduction to the App the poetry is written specifically for Galway.

EM: Yeah.

B: But did you feel it was a little like graffiti might be? Like if graffiti was more specific rather than just random tags?

EM: It's funny because I actually tried to scan some graffiti that I saw

B: Did it work by the way on the graffiti?

EM: No. I didn't do it on that one, it was not a big graffiti, it was like that but... I don't know, I wouldn't say it was kind of like graffiti, so much as... and it's funny as well that I'd say tangible because it was more, it took me for a more personal experience or something?

B: Yeah, Sure, yeah. Because no one else can see it...

EM: Yeah, exactly!

B: Like reading?

EM: Yeah! Exactly, like when you're reading a book in a certain place where you really like to read, it was like that.

B: Ok. Ok. That's brilliant.

EM: Yeah.

B: That also leads me on to this question, which relates back to the parks and stuff, do you. Did the AR make you feel more or less aware of your surroundings?

EM: More. Definitely because I was like, 'Oh you can put it in your pocket and stuff like that', because I'm way more. I really like that kind of stuff, like seeing things through a different perspective, even if it is just a phone. And I was definitely looking around more and specifically going to certain places that I wanted to see if there was, you know? If there was poetry. So, it definitely made me way more aware of my surroundings, even though I try to be aware but... more so.

B: Yeah, it is hard, isn't it? Doing everything all the time.

EM: Yeah.

B: And did the second time or the other times you went to parks, did that show you the planning applications in that area and did you think that was maybe making you more or less aware? Or was it not quite so effective on that level?

EM: I mean, because the only park that I was aware I was in, was the first one I did like it. I had no idea those things were happening so I did like it but the other one I saw it and I was like 'I'm not in a park', so I didn't really pay attention enough to see it. I like it because I don't know a lot about planning in this town that much and I'd like to know.

B: Yeah, I think very few people do. Yeah, I won't go into all of that but it is a hard thing to get the information to, you know? When it's not your job really like. People spend so many days of the week, who think it's important whether it's planners, house builders, property developers, builders, anyone can get them with an interest in cities.

EM: Yeah.

B: They will spend the time doing it but yeah, getting it out there is difficult and keeping attention around that stuff is hard. Did the App, did the whole experience feel... I mean, how would you describe it in a word if you could? Would you say curious? Intriguing? Playful? Strange? Bad? Difficult?

EM: I would say...I had a word; I was thinking about it on the way... not...

B: I gave you a few words...

EM: Yeah, and I mean like, not exactly wholesome but like something like that because I felt good but I love Galway and I love like, seeing things like this to do with the city, to like, learn about it and feel more connection to it you know. I mean what word can I...

B: Your word wholesome and connected - you're the second person to use wholesome.

EM: Oh yeah?

B: Yeah!

EM: Ok, I don't feel too bad.

B: Yeah, yeah, That's good. I mean connected is really interesting because that kind of, to me, that would say and tell me if I'm wrong but say a kind of rewarding feelings, that rewarding connection because you're getting to know more, like you say.

EM: Yeah. Absolutely because being in Galway in general to me is rewarding because I just love being here and it's like, cool I get to be more connected to the town. Like even on the Salmon Weir Bridge they were talking about the Last Tribes and I was like, 'I love that!' That's great. I really like that one!

B: Yeah. Hopefully... I mean, again, when people spend more time with it, there's a lot in there about the, not just the tribes, but the origins in the name, the origins of the tribes themselves, the origins of all the, also the, because like, languages, the Irish name as well and some of the, sort of, designs that were different in the history and stuff like that.

EM: Yeah.

B: So, it's gorgeous. I think Galway is a place where there's a history.

EM: Yeah, I mean, me and my friend went for tea and in Goyas which is down Kirwan's Lane, we were just looking at these weird lanterns that were there, were trying to, like 'Why? Why were they here? Who was here?' And like we found out it was a marketplace, Kirwan. Like did Kirwan owned it or whatever? Yeah!

B: Someone told me the history of that once -

E: Oh yeah?

B: It's really fascinating, yeah. My history PhD friend who has now left Galway.

EM: I'll never find out, I'll never know.

B: I wish I could remember. I remember we were drunk and he was like, 'These Lanterns, THESE!'

EM: WAIT! He told you about the lanterns?

B: Yes.

EM: Oooooh!! And I'll never know. My friend Miles will be devastated.

B: Well, you can ask the history department.

EM: I might, I might do...

B: They'll know. Just a final and, sort of, hypothetical: did you think that, well, would you think, in a hypothetical situation, the App might be improved or not, by augmented reality glasses if the glasses were as powerful as the phone? Or more powerful. Or would it be more ambient do you think it might be something you could do for a longer length of time, that you were able to, you know, tell your glasses to active, *Here. Now. Ours* and play with it for a long walk? What would be better do you think? The phone? Or the glasses? There's no right answer, obviously.

EM: Personally, I'm more of a handheld console kind of person anyway so I'd like the way this was like, even again being able to do that set up using my face. I do think the glasses would be good because it's just more in general interesting to have that kind of words...

B: Interaction -

EM: Interaction yeah. So I don't know. I think, I don't think either personally. I would probably prefer the handheld but I do think there is, but I do think it would be good to... either would be very good.

B: To just experience it?

EM: Yeah.

B: And you mentioned there about, sort of, the physical motion of waving and 'conjuring the text' from the history of the city. Did you have any particular perspectives on the physical process of the walking? The waving? The feeling and interacting on a bodily, physical presence sense. Did you think, 'This is a refreshing stretch of time and movement?' Or did you just think, 'I'm just doing this because I'm interested in the phone.' One thing I'm trying to ascertain is, how can connected did you feel as a body as well a mind?

EM: I think. I don't know, I don't think I felt too physically compelled in anyway, but like that's also my personal experience like that sort of way. But...

B: Did you ever forget your, you know, did you ever focus on the App and the experience so much that you stopped thinking – 'Oh I've got to be sure of this path', I know Galway has some very small paths.

EM: Yeah -

B: You know, did you get into the experience so much that you weren't really thinking about anything except the experience? Is my...

EM: Oh yeah. Because I went over to... like, I had a plan, I was like this is where I'm gonna go and then I was like, 'Oh nah. I'm gonna go check out these other places', that I wouldn't have normally gone. Then I just didn't, yeah. I just didn't really think about it at all. I went over to the Cathedral specifically, which I would never normally go, because I don't know I just wouldn't normally go there. And then I guess, I just went, like, where I usually went but that might just be because it's my usual route anyway, and I wanted to see... It's my favourite, like I have my specific favourite route and I wanted to see what the App might tell me has been written about it. So in that way, I wasn't thinking about it. But yeah.

B: Yeah yeah. Very interesting. Well, that's everything I have to ask. Do you have anything final you want to add?

EM: No.

B: Alright great. Thanks so much.

Appendix 5 – interview with K

B: Question one, did AR poetry display on walls?

K: Yes

B: Did the App give directions, however vague.

K: Yes.

B: I sense some hesitation there in that answer...

K: It would,

B: Was it too vague?

K: Yes, rather too vague. We tried to get to one but it just told us if we were getting closer or not so...

B: And you didn't feel like that was quite enough to feel...

K: No we started heading up to the motorway, I think? So...

B: Oh wow. Sorry about that. Ok. Definitely should probably include a map or a compass or something. Ok, number three. Did you find more than one park?

K: Yes.

B: Thank you and had you been to those before?

K: No.

B: Oh great and number five: were there any moments where you thought the App might have broken or glitched?

K: A few times, it would stop the like, it's not like the thing would freeze and then everything would just kind of disappear. The dots that would be scanning and stuff.

B: So you didn't get any texts?

K: No.

B: Damn. Sorry about that. That does happen when it doesn't quite get enough purchase on the surface or other things happen but that's good to know that those are bugs which are identified so, thanks again. So those were all of the technical questions, hopefully nice and simple. But yeah, there are some sort of, experience questions but I just want to know what you thought? How did you feel about the App?

K: I had fun because I'd normally do this kind of thing, we'd normally just explore and if we find a new place, it'd be fun so it was nice to know like you've... It was cool to know, you've scanned around them all and there would be a place for you to find. It was fun.

B: Cool. Great. How would you describe the poetry itself? I mean, don't give me a lit crit as such, I just mean, did you feel like the poetry was graffiti? Sculpture? I mean, obviously it's digital but did you feel like it was intimate, just for you guys? Do you feel like it could be anything? How did you feel about the poetry itself and the way it looked?

K: It was kind of different because it would be where you scanned, you'd have to look for it sometimes. I mean like, one time we were scanning the wall and it appeared like, under the window.

B: Oh. Ok.

K: So it was, it was interesting, it really was. I'm not really a poetry nut so I won't know how to describe it.

B: Sure but that's still interesting. Would you sort of describe the experience as, onward from interesting, would you say it's, like, intriguing? Curious? Playful? Or would you think it's not as playful as something like Pokemon Go or things like that. How would you kind of, describe it, if you had to?

K: Curious.

B: Curious?

K: Like for people who love this kind of thing, I think it's really interesting. Like, I was interested in just finding the places like, we had the map, like we had Google Maps, but it was fun to know like we were heading in the right direction and stuff to find it.

B: That's great. Yeah. It is so, if you cut out (I mean I was trying to make it minimalist so if you cut out) certain things, it gives you certain parameters so it makes it almost more intriguing to try to not to look, do you know what I mean?

K: Yeah.

B: You play by the, sort of, confines. A bit like certain types of poetry or certain types of theatre where you can only do certain things. So you made it to a few parks, did the AR make you more or less aware of your surroundings?

K: It was a bit of both. Like it wasn't like *Pokémon Go* where you'd be constantly down. You'd be looking around to see if there was a wall you could put it on or if you were far enough into the park where it would register.

B: That's interesting. Did the, did the experience make you feel more or less aware of the planning applications in those areas?

K: Yeah, like two of the parks had no planning applications and the one that did was like the one by the...

B: The Victoria one?

K: Yeah. Like, it had crashed on the way up and we logged, when I went back into it to test it out again, before we came, it instantly recognised we were at the park... and logged it on so...

B: That's good, ok. And do you ever check that kind of thing? Planning applications in the area or?

K: I wouldn't normally but my parents would sometimes like. One of the parks where my mum lives, we keep an eye on it because there is meant to be a road going across it but the community didn't like it.

B: So the community stopped it?

K: Yeah.

B: That's good. I mean, it's a difficult thing isn't it? And one of the purposes of the App is to explore how much do we, as individuals, try to get that information or do we leave it to people who read their local papers? Who read their local things? But it is all online so that's good to know. I've only really got one more question: do you think it might be better and more ambient (and in the environment) with a pair of augmented reality glasses, if they had the same power as a phone?

K: Hmm...

B: It is hypothetical so feel free to wax lyrical.

K: It is very hypothetical. Maybe if it was like, I have the Google Glasses in my head, like that's the closest I can think of it. But...I'd say, yeah, because you'd be like, looking around rather than looking at your phone and stuff. Probably.

B: It's interesting, isn't it? It's a tough one to call.

K: Yeah.

B: I ask because it's kind of connected to the physicality of waving the phone and whether or not you enjoyed that? How did it feel when you were, kind of, in the moment? And you said that you pocketed it a few times?

K: Yeah.

B: Now that's interesting because you're one of the few people to do that during the testing, a lot of people are kind of really just interested in watching the white dots just appear and stuff.

K: We turned behind us once and we just saw this trail of dots following us...

B: Yeah. That's part of the, I mean, you know, it's designed like that to let you know that it's still computer vision working and also, you know, when you're using the App, you're not worried it's died whilst you're using it or something; like 'it's just the camera', that some people were worried about in initial trials. Did you ever - I guess this is building on the physicality question, did you ever, sort of - I guess, forget about the rest of the world? You know? You're just using the App?

K: I bumped into someone? So yeah!

B: That's interesting.

K: Like, yeah. What was it? By the second park, there were walls with paint on them and automatically I was like, 'Will it register?'

B: And did it?

K: Yeah! It went on two of the walls, I think. And it was completely covered in like, different spots of paint so.

B: Ah, interesting. I haven't really yet thought about colour, I just done the mapping and... right great!

K: These are pictures are for you.

B: Oh, thank you; that's amazing.

K: From the App. Wait, did you take a picture of the paint??

[Anonymous (friend) contributor]: Of the painted one, yeah.

B: That's incredible. That is very generous! I love it! That's great, very interesting.

K: And that was on the walls it hit on, So...

B: Ah, brilliant.

K: It was just to kind of see if it would and automatically, straight away, the net started appearing.

B: Quite a good sense of the different colours and well as the texture of brick.

K: Like, there was one across from it, it was a smooth stone, but there was all sorts of erm... it was like it was polka dot and it was all together so it probably just registered that as that.

B: Yeah, because that's pretty much what it does when it looks, it looks for the space between as well as the points and, I mean, polka dots are a good example it. Ha, wow... brilliant, you are fantastic testers! Anything else you want to say? Any last input? Anything you thought of when you were walking around and you thought, 'Oh! I should tell this...'?

K: Was there? I don't think so, like, apart from the paint on the walls.

B: Yeah, that's great. Thank you again.

Appendix 6 – interview with EL

B: First question, did AR poetry display on walls?

EL: Yes.

B: Did the App give you directions, however vague?

EL: Yes.

B: Did you find more than one park?

EL: Nope.

B: Ah, was that just a time constraint?

EL: Time constraint and I think I messed up. I went up towards Salt Hill instead of towards town and then I realised, nothing was coming up other than Lime Kiln. So I doubled back and then, time caught me.

B: Had you been to the Lime Kiln before and had you known it was the 'Lime Kiln'?

EL: No.

B: Ok. Five. Were there any moments where you thought the App might have broken? Or glitched?

EL: A few.

B: Yeah?

EL: Yep.

B: Do you remember any specifics?

EL: One it just kind of, crashed. When I was trying to read one of the poetry lines on the wall and it could have been because there was ivy on the wall or something but yeah?

B: Yeah, it's still in Beta so that will happen. Grand, those are the technical questions. Thanks so much. Nice and easy, so just to ask you, with the few minutes we have: how did the overall process and experience feel?

EL: The poetry was quite nice. I really liked that, also, the reference to the fourteen tribes and information about Bell, that was really cool. I think it would be cool if there was a point system on it or something? Like, I'm quite goal driven and the reason I tend to download Apps, unless they're for a very specific purpose like email or whatever, is because it can distract me, I can get points, it feels like I'm doing something productive, even if it is Mario Kart.

B: The accomplishment kind of thing?

EL: Yeah, but even if it was just like 'Hey you've scored a point' that would be cool.

B: Right. Ok. Well, if you have an android phone, I can actually send you the App but I don't remember if you do and that can be a reward, should you wish? Quick question, did the AR make you feel more or less aware of your surroundings?

EL: More.

B: Great, great. And did it sort of make you more aware of the planning applications? Well, in an expanded way, if you have time to do it. Do you think it would help you understand the planning applications around the city's green spaces? Or is it too much of an off-hand, soft approach?

EL: It's a bit too much of an off-hand, soft approach. And maybe if there was a map that tracked your progress of where you've been last. I think that's something that you *couldn't* do?

B: Not necessarily, as I *could* get the data of Google Maps, which would have recorded where you've been, so I could get it off that, if you'd like? I guess the final question really is, did the experience feel curious? Intriguing? Playful enough to keep your attention?

EL: Intriguing and curious? Yes. It didn't feel very playful, it felt very specifically like, 'Go to learn about these things' but at the same time it didn't feel like a classroom so yeah.

B: Really interesting, an in between space. Oh! I guess there is one more I'd really love to ask: do you think it might have been better, or more ambient (more of a playful experience, or whatever,) with a pair of augmented reality glasses?

EL: Those are the ones that your head goes into?

B: Not necessarily. So there are augmented reality glasses being made at the moment, which look just like sunglasses but can do as much as a phone can do and so though previous iterations, like Google Glass, don't have the appropriate processing power, more modern ones that are being developed right now say that they will be able to do what you just experienced. Do you think not having to hold the phone and this is really about, sort of, the physical interaction as much as the question in curiousness and playfulness. Would it be improved by, because you wear glasses, would it be improved by just being there sometimes? Or do you think would be a sort of...

EL: I think it would be improved with the glasses, yeah, because it was awkward to try and hold the phone and it's like 'Oh the perfect space', I needed more space, whilst I was trying to step back and give it more space, step closer and it just got slightly awkward whilst holding the phone I think it would be so much more easier, you'd actually be able to just see it.

B: Yeah, yeah. I fully understand. That's great. Well, thank you so much. Brilliant. And you still have a whole four minutes to get to your meeting.

Appendix 7 – interview with A

B: Question one: did the A.R. poetry display on walls? Yes or No.

A: Sometimes.

B: Ok. Any other details you want to put in? It's up to you.

A: I felt it either worked straight away or not at all. One of a few things happened: either it displayed almost immediately, or it kept trying and trying and trying and then had a screen like it's going to display but it didn't... or it just kept trying so long that I got frustrated and started walking.

B: Really good answer, thank you. Two: did the App give directions, however vague?

A: Yes. 'Walk here' or 'do this'. It wasn't vague at all, actually.

B: Okay. Good. Three: did you find more than one park? After the first tutorial kind of Lime Kiln Park.

A: I think I found three altogether.

B: Wow.

A: I think the last one was. I wasn't sure - I think it went so fast but it's like... Because it was the one that we found (one planning permission) then Eyre Square I think had two and then one had three...but I actually - oh, it said that 'This area has 3 planning permissions' – but because it flashed so quickly, I was trying to avoid traffic as well. Yeah, I realized that this was probably a new location. I didn't have time to fully engage with it. That's the urban space problem that you're possibly dodging.

B: Yeah -

A: As far as other people are concerned, you know, your attention has to be divided.

B: Yeah, yeah. That's interesting. I think you're in the top scorers of people who've found the number of parks.

A: Oh right. Not that it's a competition.

B: No. That's also relevant to just how much time as well. I think most people haven't spent an hour, would you say you spent an hour?

A: Yeah. How long were you waiting for? Just slightly over an hour? Yeah... and I actually lost track of time so all of a sudden, I realised 'Oh, it's nearly 5' so I had to rush back.

B: That's interesting. Four: had you been to all of those parks before?

A: Yes, I think so. Not all the places or the routes that I took to get there.

B: Last technical question: were there any moments - I know there are so please list the technical moments – where you felt the App might have broken or glitched?

A: Yeah. When I was waiting for the text to appear. I wasn't sure. A few times I just didn't wait for it to do something so...but it was taking a long time so I'm not sure if that was a glitch or impatience on my behalf. And a couple of times it made me expect the pull of the text to come on screen because it lost the grid but then it didn't. And then one time it kept trying to read a surface that it saw as a wall even though it was turned towards the ground; I kept walking but it couldn't read a wall. So, it took me quite awhile to let it make it believe that this is not a wall.

B: And you said you reset it. How many times did you reset it, do you think?

A: I think three or four?

B: Was there a specific location, roughly? Can you remember?

A: I don't think it was location specific. I don't think things really changed when I moved around the city centre.

B: Adding to our conversations before this interview, proper, what's interesting there is: obviously the longer your test, the more you encounter, the more it risks and also breaks and needs a reset.

A: Yeah. I suppose you start resetting it more easily because first time you're not sure like 'Am I doing the right thing? Or does that restart the whole thing?' So once you've done it once, then you realize that it does keep going after that. You haven't made it crash permanently and then you get a bit more brave about, you know, restarting it as soon as.

B: Yeah. That's true of all apps really but yeah. That's good. Alright, thank you. Those are the technical questions. So moving onto sort of experience: well, in your words, how did the overall experience feel?

A: I suppose like with most technical devices and apps, you don't really feel much at first because you're just trying to get the feel of the technical operation of the thing. But I suppose you approach the space around you in a different way because you're looking for surfaces and you're looking at vertical spaces. Not only the ones that it might be able to read because you realize it doesn't like white and smooth, it doesn't like when... but also where you're kind of comfortable doing it; there was a rowdy bunch of people drinking on the terrace near Eyre Square and I thought 'I'm not going to go there because I'll end up in a conversation with one', like 'What you doing? Where are you going?' So, you're aware of your surroundings in a very different and I wasn't even thinking in terms of this 'Is a positive or negative experience?' You just trying to, kind of, you're trying to follow materials more than anything else.

B: To traverse and find the safe way -

A: Yeah.

B: You said before about 'Distributed attention', you also lost track of time -

A: Yeah. So, you're focusing on the phone, I lost track of time; you're focusing on the phone but then you have to focus on cars and walls and traffic lights. What happened quite a few times was that I'd found a wall and in Galway, footpaths are quite narrow, and even though it was a street where there wasn't much traffic, if you stand in the middle of it...some people sometimes.... so that thing of 'How much distance do I need to the wall' and 'This is how wide the footpath is' so 'How far can I move without actually stepping into the road or tripping?' Because I don't know where the edge is. Those kind of things you become much more aware of. There were some walls near the Town Hall and the Courthouse but they had two big Guardi Cars and a minibus with, you know, it was prisoners and guards minding the area I was walking through with my app so, yeah, when there is restrictions to the use of public space and you're trying to follow instructions on an App that's designed for public space, you know it's quite interesting. All of a sudden public space can all of a sudden become restricted or private because there's a commercial interest or security thing. Then you have to find a way around it so, for example, in Eyre Square I didn't know exactly where the point where it was trying to get me was, but I think it was in the area that was closed because they were building for a festival.

B: That's really interesting. Even that example about the Guard is really fascinating to me.

A: They didn't actually block my access but I was wondering, they looked like they don't want anyone here. I was trying to sneak by and look very innocent.

B: Like a tourist, maybe?

A: Yeah, yeah.

B: That's interesting. Did the overall experience make you more or less aware of the planning applications around the city's green spaces?

A: More, yeah.

B: And do you think you might check out Galway City council's [planning] website?

A: I might. I might, yeah. I have a guess what the first one might be like I totally knew where they have the Rowing Club, like next to Macnas, and next to Houston, there's this big building that I've been eyeing myself. Because they do need to make a planning application even when they are renovating an old structure. Yeah, say it's in an area as densely built as Galway City centre, a lot of times it's less about building on an existing green area than tweaking what's already there. Yeah, be interesting to know.

B: You never know how it builds around those already existent green spaces. Whether it obstructs views or changes the, sort of, feel of the space.

A: Exactly, yeah. And one thing with planning permission is, it doesn't have to be a building. It may be that there are things that you do to green areas that are not building on actual, you know – like an actual apartment block or something, it also requires it so. Yeah, the function of the space is going to change somehow.

B: Interesting. Just a couple more questions for me and I'll end with a technical one. Did the experience feel curious, intriguing, or playful enough to keep your attention? Or would you describe it in a different way?

A: I suppose it did considering that I lost track of time. If I get bored, I look at the time all the time – every two minutes - so the fact that it was 'I realise I have to rush back!' So it's safe to say it was engaging enough that I kept doing it.

B: That answers my next question anyway but I guess I'll ask my final technical question (but then you can totally just tell me anything else you have thoughts about), my final question is: hypothetically, do you think the experience might have been better or more, or made you more ambiently aware of your environment, with a pair of augmented reality glasses as powerful as a phone? (And that's, again, hypothetically imagining them to be not outlandish, looking like a normal pair of glasses but having the same capacities as the device you used.)

A: I'm not sure. Usually, I'm not a huge fan of glasses. Like even VR, single user; maybe it's just me but I get –

B: It's not just you.

A: I get frustrated when something is on my - even my glasses that I actually need, I keep taking them off because I never got used to having something on my face.

B: Right, that's interesting.

A: But also, weather might play a different part in that situation because if it rains a lot, like it did now, for your eyes it doesn't matter. You see exactly the same in the rain even though you might be a bit wetter and frustrated. I mean obviously the phone screen has its own challenges, it gets very wet and slippery but then you don't have to worry about that if you have glasses. If you have glasses and it rains, that makes it much less likely to work. I would say that I prefer the screen on a mobile rather than glasses. Yeah, that's partially because that's just the way I am but also, especially in a city like Galway that has very intense weather. I think they might be, they might have challenges that are weather specific.

B: Yeah, the question sort of came about because originally I'd hoped to design it for AR glasses but the technology hasn't been there yet in specifically AR glasses. Some mixed reality, like Microsoft's HoloLens, might be able to do it but they have to have a battery pack and, like you say, they're very unwieldy; walking around with what is essentially a helmet, you know, the -

A: Not a lot of test subjects would volunteer to do that in Galway rain.

B: I'm not even sure you could get a HoloLens rained on because it's so sensitive. So yeah, it's a tough sell but it's an interesting thought because, for me this kind of goes back to the tutorial bit earlier where I said you can definitely pocket the phone and use it in slower ways if you want to, I sort of hoped that an augmented reality pair of glasses (if there was one as powerful as the device) would be able to then just sort of give the text in a natural flow, you know, without having to do all that much. Apart from maybe pause, take in your environment, have a look around, scan the horizon, it finds a wall semi-automatically... but as you've already shown, almost all the tests have shown, not even a relatively strong device is at the point where it can do it, you know, so smoothly, so automatically, that it's easy to do now so I do wonder how much of the physicality of sort of waving the mobile at the walls is, at the moment, a part of AR. The physicality of it, did it change or did you feel about 'I like this, I don't like that' as you were doing it?

A: As in, the whole experience or...?

B: Yeah. Just sort of handing the device itself. Yeah and did you feel, like I remember you saying before we started recording, about your hands getting a little cold.

A: Yeah.

B: But on top of that, was there anything that you know you realized 'Oh, I might just take a five-minute walk here and not get the phone out my pocket' or...

A: I did do that once or twice toward the end. You get less, less tentative and less...you know, you start thinking 'Okay maybe it's okay to put it away for a while or maybe I'll just try these quick walls, quickly'. At first you're very conscious of wanting to do it 'right' because you're not sure how it works and then, yeah, you have more courage the longer you spend with it and stop worrying if it crashes. You know you can turn it back on again and so on. I suppose I knew that I'd been doing it for a while so even if it did switch, I could turn it off and turn it on again.

B: Still good to know.

A: Yeah.

B: Okay all right. That's all my questions, really. Anything else you want to add?

A: No.

B: Or we can just keep talking on record if you like?

A: Yeah, yeah, yeah, that's fine. There'll be a lot of munching on the tape. Yeah look, one of the things was when it said '...go in this' – was it Corrib Terrace?

B: Yeah.

A: One of the locations and I wasn't actually entirely sure where that is and then I realized that my sense of north, south, east, west direction in the city is quite poor.

B: Yeah.

A: So I came in again then I think I went slightly in the wrong direction - you'll probably have the data there first and then thought, 'Okay, there's Corrib'. There's this and that in that direction and then 'Yes, of course. That's east and that's west' so I did, like it made me aware of my sense of direction in

the city in some ways but Galway is also built like that. You don't have that clear...there is no city plan, basically.

B: Yeah.

A: And then if the sun isn't out, you can't... you know you don't even have that for an additional reference.

B: I'll have to check the data on people that did it on sunny days and people that did it on rainy days and see if there's a massive correlation of 'I felt less aware of my...'.

A: Yeah.

B: Yeah.

A: Yeah, how many people actually have a sense of north and south? For example. I don't know if people usually do. But I think -

B: Did you use the separate maps app at all?

A: No.

B: Just didn't want to?

A: Yep.

B: It's interesting isn't it? I've done it a few times when I just felt 'Actually, I just want to wonder. And I'll get a rough bearing of north and south.

A: And I also didn't feel that that kind of functional approach was really necessary because you said that 'Okay if you're going the wrong direction or if you just ignore it, it will follow you or it will find new instructions in your place' so I thought that kind of frees you to go somewhere else and I did a few times I realized 'Okay maybe technically I should go that way but I don't see a lot of walls there that look promising'. Because I tried...or there's too many people or too many cars and it is going in the wrong direction. Where I have to go so I made a lot of choices based on how I move through the city. Things that I wouldn't think about, at all.

B: Sort of a new mediation.

A: Yeah, the materiality of the walls. It's a strange thing, like 'I'm not going there because it's all white and glass so it's pointless' or 'I won't go there because there's a bit of a wall but hardly any footpath and loads of people going past'. Sometimes I, like, even though I was informed by the App – you know, my direction was informed by the app - but a couple of times it wasn't the instructions that it gave me, it was the thing that it was telling me to do that made me go against the specific advice.

B: That's really interesting. I suppose that is a kind of tightening of that distributed awareness because if, for example, Galway had a new financial centre that was all glass buildings, well then you'd want to avoid to avoid that because -

A: Because it wouldn't read it. Definitely. Yeah, it depends on your approach. Do you want to - it's not a game so I'm not going to try to reach a high score but - do you want to use it as successfully as possible in terms of what it tells you to do that you achieve the goals that it seems to give you or are you playing with it, are you trying to see what it does? If it does this or that? Or do you feel that it's more important to find a wall that works than reach your destination?

B: Yeah. Your choice is open. You choose whatever way you want to go.

A: Yeah. But I think it allows for that kind of 'veering from the mission' in a way that you don't get this feeling that 'Unless you go the right direction, it'll get confused or awkward or just boring because it keeps telling you the same thing like some GPS'.

B: Yeah yeah – angry GPS.

A: Or not even angry, more like Hal 9000 approach that 'I can't let you do that'.

B: Yeah, minimal avoids the threatening robots.

A: With a robot voice, the more benevolent and calm then the more creepy it sounds.

B: That reminds me: was there anything unusual about the aesthetic of the poetry itself and the A.R.. It was white text with a slight black shadow. A particular font was chosen after testing a few fonts. Some of which kind of worked, some of which didn't work at all when I thought they would. So yeah, I have asked before - the testers - whether they thought it looked like a sculptural thing, a graffiti thing, or did it remind them of anything. Or was it entirely -

A: Not really. It was clear. And it was like it had a tiny bit of a shadow so there was a little bit of that three dimensional thing but not so much that you felt it was an object in the space you were following so it was, yeah, I think it worked quite well. Well enough that I didn't pay too much attention to question the font and design.

B: That's great. I guess sometimes the best compliment you can give is -

A: 'I didn't notice because it didn't bother me'?

B: Yeah, yeah.

A: Yeah. But the one thing was that I tried to scan the walls vertically because that seemed to be the only thing that worked and then I had to turn the phone horizontally to read sometimes but that wasn't disturbing or anything. It was kind of interesting, actually, like 'You're in a different view now'.

B: Yeah, a different framing.

A: Yeah yeah.

B: That wasn't intentional because the text should have scaled. I must have missed something. But I always included the ability to just turn it around to see it properly so I'm glad that that bit works.

A: Yeah, I suppose because you're literally hands on with what you're doing that it's that kind of embodied knowledge or whatever you want to call it. It's like a child that's trying to learn how to use a touch screen. I remember my two year old did that; I was quite clumsy with smartphones still, I went ahead by myself but she just took the phone and – she was still in nappies – she was just kind of fumbling a bit and then she was flying! I thought it was really creepy at that stage. That's the way it goes, we've become conditioned but it's kind of the same thing. You juggle it, you turn it around, you get this kind of almost like muscle memory of 'It works like this'. As long as it's very smooth and it doesn't at all matter that you have to do that.

B: That's interesting. I like the idea that you can develop a muscle memory around it.

A: It's a motoric thing. Yeah.

B: Interesting. Well, I have had an idea about I sort of sending it to Galway City council and being like, 'Hello. You can send this to people if you want and have them enjoy it. It's free to use, it's for you, or whatever' and get results from that.

A: Knowing the Galway political process, they might actually... sometimes they just want to keep things quiet and hope nobody complains. Irish local politics are strange. I tried to find information on another huge data centre they're trying to build near Ennis.

B: Yes. Just read about that

A: Yeah and I don't think planning permission has been granted but I tried to find information on the company that was mentioned in the press releases. And I got quite creepy. What was it called? 'Data Solution' or something or some very basic name and then it was given an address somewhere near Dublin. I look and I think... I looked up the address on it's like 'Greenfield, One House' like really... and there's a small kind of business park nearby. And Lucas, or the name of the person who filed it and it was...Mr. Delaney or something like that. And I did a lot of digging, enough to find this solicitors called Mr and Mrs Delaney... oh and the same person has/is a manager or CEO of six hundred and something other companies.

B: What?

A: And then I found that 'OK, there's Mr and Mrs Delaney solicitors' who are – you know, I googled all kinds of things with the addresses of, yeah, who are - solicitors and their address is marked as the same address, so they're basically a post-box company. Then I googled all kinds of things and the only reference I could find? Finally, I ended up in the Panama Papers, Panama leaks website, and the company was listed as one of the...and they do have this disclaimer. So I was talking to Paula Gilligan who's in Dun Laoghaire and she's talked about 'data centres in the secret' and she's from Athenry and she's looked into the Athenry thing –

B: The headquarters thing.

A: Yeah. And she said 'Oh, it might be Amazon Web Services because they're the most secretive and most dodgy'. But I was thinking, this is the information and they said 'There's this brilliant company is coming and promising jobs' like, who are these people?

B: Yeah and are they paying taxes?

A: Yeah but also Amazon Web Services are a really dodgy company who do all kinds of U.S. Government espionage.

B: Considering they're an American company, they then take that data over to America which is against European privacy laws.

A: The government doesn't want to engage. Their view is that 'We give the permission and it is up to the company to follow legislation on our end and we actually don't really care. So we presume that they will, unless otherwise indicated' but there's huge money at stake. So I'm thinking of the value of your app like this, when you have these data planning processes going on, you're on site and you're given the information but also you're made to think about it differently. There are interviews of people in Ennis and if you think, it's a fairly rural area, I've driven passed where it's going to be, it's trees and green fields and Ennis is the gateway to Clare and a tourist are and there were quite a few people who are quite unsure what this actually means. And they said there will be jobs but they would all be so many for the construction but that's quickly done. They said 'Two hundred somehow involved and employed' maybe. For how long? And then also the moment they find a way to

automatize that and the secrecy around the project as well. Do you know Paul O'Neil? He's done creative projects around data centres and he takes people for a guided walking tours near them. But they are so...the security level is so high that the moment you are even near one and you start taking photos you've got the security.

B: That's fascinating to me because at one point in the app development, I wanted to have the app show you where the fibre cables are in the city. As well as highlight, basically, the digital infrastructure. It's really hard to get computer vision as well as the actual core data.

A: Yeah.

B: The fibre optic cables, you know there's some available but not all of it. Obviously, most of telegraph are the old telephone stuff that's available but proximity of data centres? They're very shut off about that.

A: Oh yeah, yeah but they do have to file planning permission so...so somehow bring it but they don't want publicity and that there were interviews in the clerical whatever it was saying 'Well, we don't want another Athenry'. Whereas I would think 'That's exactly what you want. You just don't want this next door to you.' If you live across the road and this high-security, crazy multinational is going to be built, the last thing you want next to your home is that. Especially in a community that relies on tourism for the long term, more sustainable jobs. This is not that kind of industry. Tourism, at least, it's locally based and locally owned mostly.

B: Unless there is a secret body of software engineers waiting to be employed...

A: No.

B: Yeah, like you say it's more like throwing a castle into the middle of a farm.

A: Yeah, so in terms of local population, they are either low-skilled jobs that will go the moment they find a way to automatize it or they're high-skilled jobs and how many in that community will actually have those skills? The benefits... but then the rhetoric is wrong. 'Data is the new oil, data is the new gold' – it's this distilling of this idea of high-end tech innovation society while actually behaving in a very colonial mindset of 'Let's exploit the resource here as long as we can until it'll be better somewhere else'. This was my ELO key note so I keep repeating it, you know, 'How capital flows into an area and it becomes the centre of everything' like Fillinche Island with the telegraph or Connemara with the first transatlantic flight and Marconi the Scottish so all of this goes in and the attention of the world is on that location.

B: Briefly.

A: And there's a buzz and we are, you know, the pinnacle of progress and development. Well there might be a few jobs like they were there were some on Valentia Island. Then the technology changes. So the infrastructure is no longer viable or the location might not be useful anymore and the companies move on because it's (I can't remember the name of the scholar, he talks about 'digital flow') the flow, capital flows to the region but it doesn't actually stay there so whatever little peanuts you get (in terms of some individual jobs) you are likely to lose more. In Valentia Island, even though the telegraph system was highly profitable, 1880s (I think it was the end of the eighteen eighties) basically the local population couldn't pay their rents and couldn't sustain themselves anymore so two big ships came to Valentia Harbour and took a couple thousand people away to The States because they had to go. If the landlord pays your way and you can't pay your, you know, that's the only option. And I can't remember the exact numbers now but, like, the local national

school did have nearly two hundred pupils before then and they had 30 or 40 after; so basically it kind of decimated the population. This is one of the highly profitable -

B: Yeah –

A: So this kind of structure exists all the time and then the cable, of course, finally shut down so even that wasn't there so there is a weird layered -

B: Yeah, experience of history. Yeah. It's funny that you said 'oil' as well because you know all of the stories, the history, the references around oil rushes are exactly like that.

A: It's like a consumption of everything and then they move on.

B: And then the landlords, or whoever, has gut the specific resource is the only one left with profit –

A: yeah. Once it goes then it goes –

B: Yeah. Fascinating, yeah.

A: But this 'selling of technology' and 'a multinational corporation involvement' as 'bringing of wealth and jobs' it's a trickle up effect. In the short term, it might benefit certain part of the population. Enough that they can build their house and get their mortgage. But in the long term it's not sustainable and it's likely to be environmentally difficult. Just the energy, the amount of energy that these data centres need is huge. And Ireland relies mostly on fossil fuels still, it doesn't have –

B: Yeah, that's a huge thing –

A: Yeah, now their carbon footprint is insane.

B: Is there not...hmm, I suppose because Amazon is an American company there isn't a demand on them to make their business 'zero-carbon'.

A: There probably is and I can't remember...it wasn't Amazon.

B: I know that Google are taking good steps –

A: They're taking good steps but then I can't help thinking that 'Okay, let's say you have wind power and the CDC show regions and so on. Ireland, as a whole needs, to move away from fossil fuels and that energy infrastructure is not entirely unproblematic. It takes up a lot of space and there's all this discussion so –

B: Even the grid itself.

A: Yeah, exactly, so if you think that you have these individual companies who build these huge data centres that need a huge amount of energy and then they build giant wind farms off the coast, they might fuel their own operation with that. Well, what about the same again that is needed for the rest of the Island? Like where is that going to be and who owns it? How about building this energy infrastructure for actual use by your average citizen? And then, on top of that, if there is something left or something what can be done. You know, there's a lot of land, a lot of area needed for this as well.

B: Really good points. I guess this points to the need for companies, as well, to be responsible not just for their own input and output but for the communities they're in. I know that a particular energy company in Wales - Wales now produces twice the electric it uses – and of the electric it uses –

A: From?

B: Oh, a good a good mix now. And of the electricity it uses, last year it was 50 percent renewables. Really good for a small country.

A: Where does it mostly come for? Is it wind or...?

B: Yeah, wind off the coast. It's a lot of wind, a lot of solar, but we do still have one nuclear and some coal and a lot of hydro as well. There's some big dams and stuff. There's a mountain and it gets flooded.

A: Yeah, mountainous countries are good. Yeah.

B: The thing with that is that the biggest installer of wind in Wales, the electricity company there, they have a training program for local people as well as community funds to improve the community itself and ensure various things continue. Unless those are mandated, either within the company's policy or anything else, ethos or anything else, well like you say if it's a Wild Wild West situation and the government doesn't ensure it's there, yeah things will be left to either flow away or to get exploited.

A: Yeah. There was a – I think it was a cable landing station in Mayo – I think it was the new pathway cable. It's a huge project that's connecting The State's with Ireland and the Nordic countries 'pathway', that's the name for the cable. And the locals objected to it. The rhetoric they used was clearly hijacked from, you know, the national political rhetoric. They are opposed to the landing station because they had issues with the construction process and so on but they said that 'It has no strategic benefit to the community', strategic benefit, because that's the official line they keep repeating, 'It's a national strategic infrastructure' so, you know, it's like 'Conversation over' when you say 'That's a part of national strategy' so you can't...nobody cares. So it was exactly that phrasing that whoever filed the objection to the planning permission used. You know, 'It has no significance from the point of view of the strategic development of the area'. And then they would just kind of overruled by saying 'Yes but it has national strategic benefit' so that was it.

B: These are the things that, yeah, you have to make citizen engagement apps that challenge, I hope.

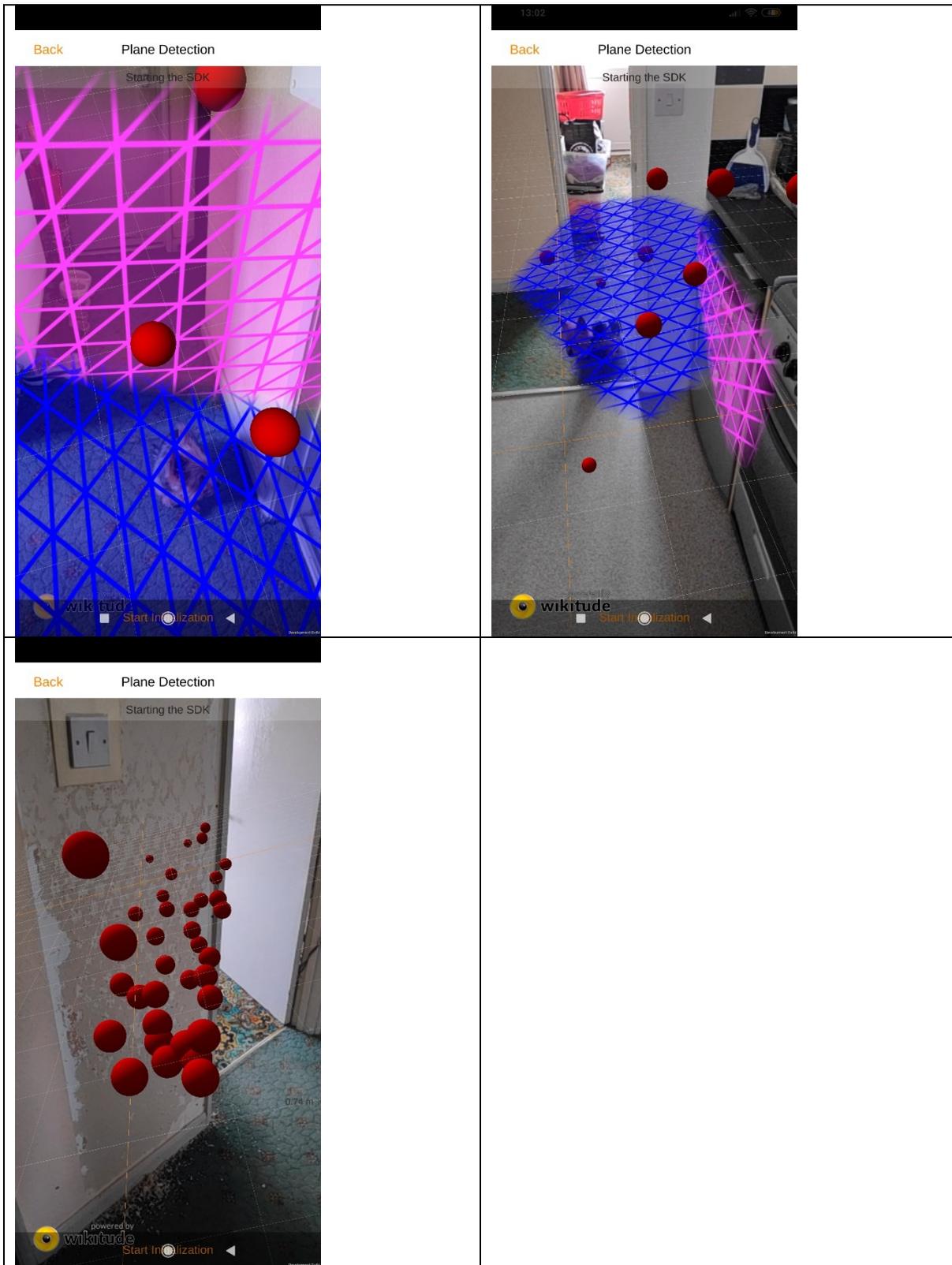
A: But I think there's a huge, like, there's a the whole in the 5G network. I was reading an article on one of the directors that this company is building. Talking about 'Complete coverage for ubiquitous computing, internet of things, and constant A.I.' and it was like the worst dystopia scenario but he was selling that as a kind of 'Look, we're going to develop all this' and is like, 'Coverage is going to be strong, everywhere, all the time' and I'm like 'That's not what we need'. But because there's no opposition, there's this (again) this rhetoric of 'Jobs and profits and look at us, we're at the centre of the world now' that it's very very hard to challenge. Oh I need to run because I need to get my kids from the creche. We can continue this conversation, I think it's really interesting.

B: Well, thank you for your time and thanks so much for testing.

A: Yeah, this was really nice.

App development process pictures

(Abandoned) Wikitude platform

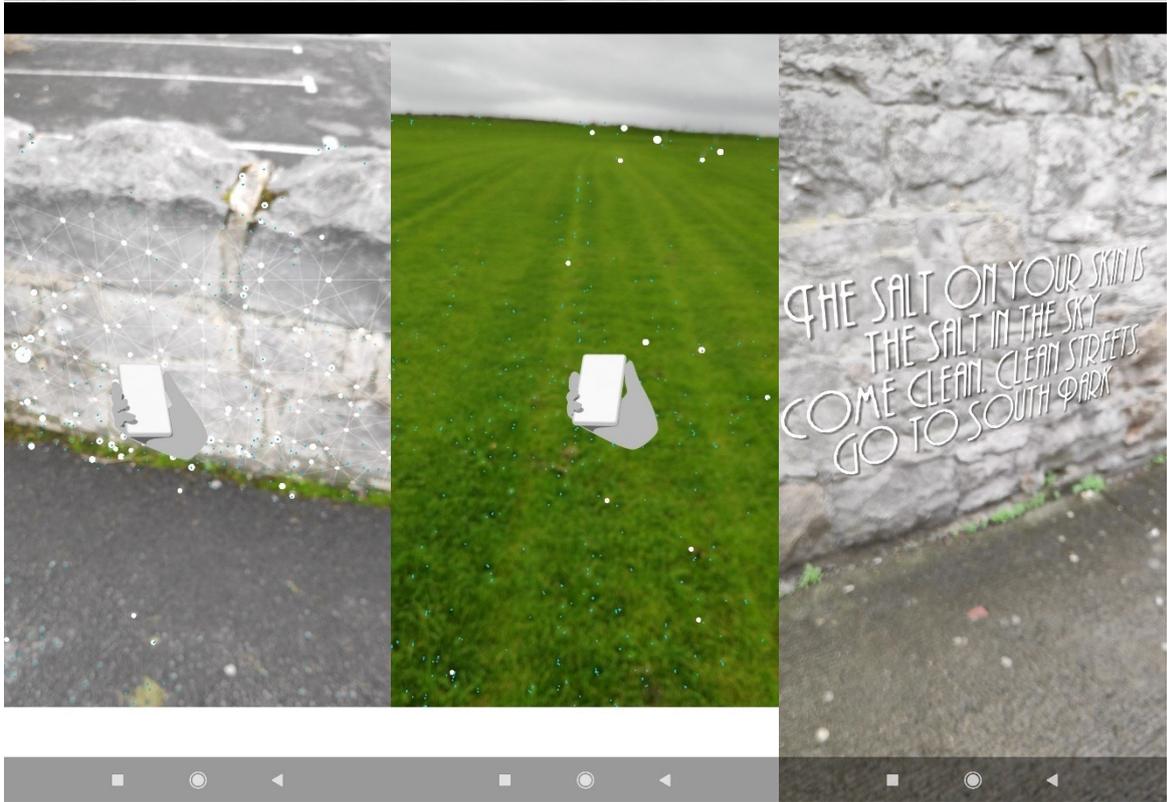
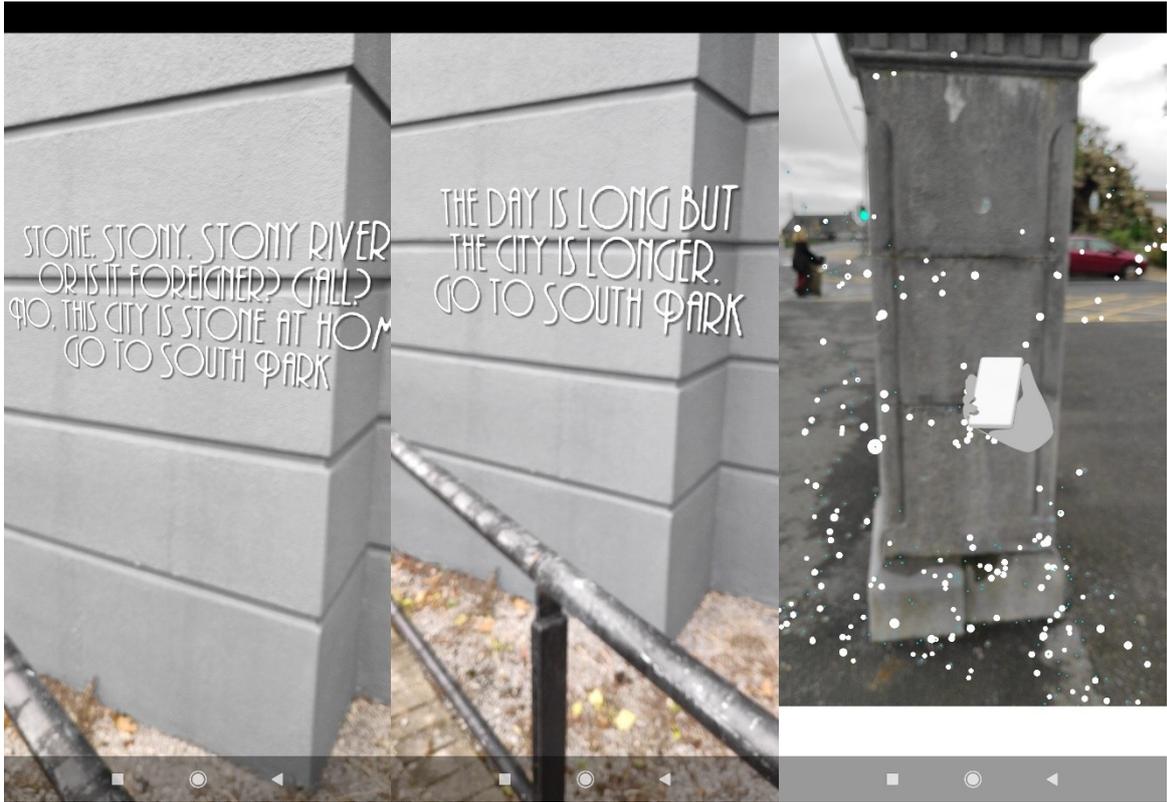


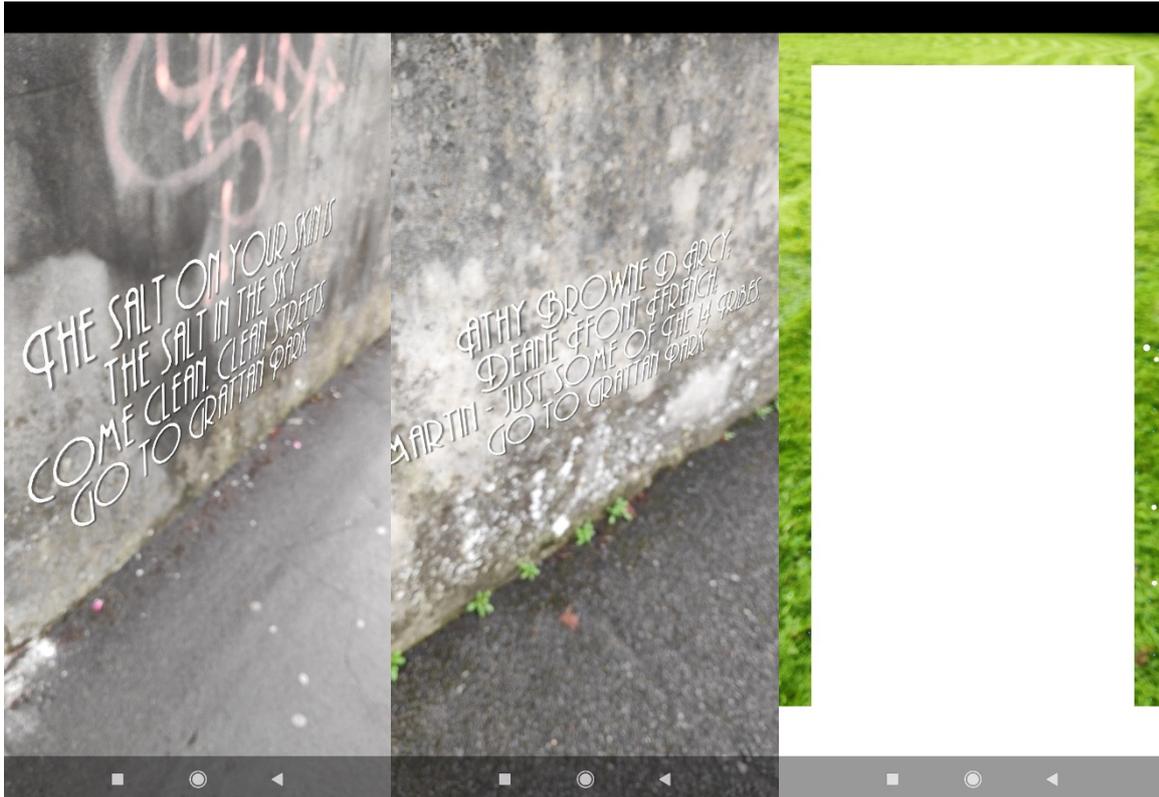
(Abandoned but incorporated) Google AR core AR Elements platform



Final platform choice, Unity, and testing in Galway









Poetry and text fragments written for the App

There were 3 types of text written for the App: an introductory prose text, poetic fragments for guidance toward a park, and a park-arrival text.

Each text left a blank space for where the appropriate data would be inserted by the code: these are indicated in the texts by '_____':

After each poetry fragment, there would be instructional text to 'Go to _____' where the closest park name was inserted. There were 37 poetry fragments written, these are numbered below.

Introductory prose text

Hello.

Hello, you.

You're *here*.

Thank you; go raibh maith agat; diolch; gracias.

You are reading this, doubting but hoping.

You cannot be sure so you persist.

You might look azure in the light but
your focus is here.

You are unquestionably what might be.

You are breathing...and that is an undeniable good.

Now go be here, go to _____ street.

Poetry fragments

1.

The air is changing. Changed.

The streets are changing; slower but soon.

2.

How well do you know our streets?

Our spaces. Each feathered twist.

3.

The salt on your skin is

the salt in the sky

come clean. Clean streets.

4.

Amending Galway's salty soils with sulfur, lime,

or calcium can help by removing or replacing

the sodium in the soil.

5.
Athy Browne D'Arcy;
Deane Ffont Ffrench;
Martin - just some of The 14 Tribes.

6.
Blake Bodkin Joyce;
Kirwan Morris Skerritt;
Lynch - the last of The 14 Tribes.

7.
stone. Stony. Stony river.
Or is it foreigner? Gall?
No, this city is stone at home.

8.
the day is long but
the city is longer.

9.
from the river, to the gall;
the edge asks them to call.

10.
simple returns. heron's ferns -
they use them to scratch & fibre.

11.
Never expect, only react.
We all steal space where we can.

12.
A new leaf, anew.

13.
You're my exercise and my ear.
I, stone of the city's name.

14.
The things we do to save space.

15.
silt weaving broach

16.
actors like pilgrims

17.
sooner soonest rather

18.
quarried nail call

19.
forgiven wording thrift
20.
swearing wild thanks
21.
All the old fadas of Galway
have a smell and a look and a pace
22.
and if I ever take it on,
it'll be sure to end me.
23.
The trees grown only
on one side cast a field's
24.
coffee cup shadow, tide
telling the cups they're
the only
25.
the only thing that grows
there. Now. Here.
26.
Two scryed crows twitching
27.
searching for only / Eirreann knows what
28.
but unmoving when I approach
29.
even when I'm between them
30.
they're calling, figuring –
31.
is it a field above / they're searching?
32.
/ Or for a sign of memories to come /
33.
or for a melody lost to some
34.
The starlings gather

35.
every night in Ragoon

36.
to sing of nights lost

37.
and saltings to come

Park-arrival text

All our parks were bigger once.
Enclosure makes for building-creep.

This place was first green in 1270 AD.
It has become smaller since.

Is it accessible?

There are ____ number of planning applications in this area.

This park is ours, you know.
Be watchful, be careful, be kind;
know your public space.