# Master Thesis

*Being-There: Merging Physical and Virtual Worlds*

Emiel Ruis

Student number: 5493943

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dr Stefan Werning (Supervising Lecturer)

University of Utrecht

**Abstract:** This thesis introduces Interactive Landscapes as an emergent form of pervasive media. These Interactive Landscapes overlap physical and virtual space and imply tangible connections between these spaces within public settings. This thesis explores how these tangible connections offer new ways of experience and production of space, or rather how it affects Being-there. For this, it uses Heidegger's notion of *Dasein*. A comparative affordance analysis of two Interactive Landscapes reveals how these Interactive Landscapes afford different aspects of *Dasein* and constitute a unification of the body, mind and environment. The study shows, how this phenomenon effectuates a substantially different behaviour than mobile hybrid spaces that have been an object of study to the field of humanities for some time.

The embodiment afforded by these Interactive Landscapes allows for a far more direct manipulation of the physical environment than the screen-based interactions of the mobile phone. Through the interactions with these landscapes, people come to know about their surroundings and themselves. By actively engaging with these environments, the user produces the space he is a part of. In this production of space lays the construction of *Dasein*.

**Keywords:** Interactive Landscapes, Pervasive Computing, Public Space, Dasein, Embodiment

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## Introduction

During the spring of 2014, I noticed a set of four swings positioned at the Neude square in my hometown Utrecht, the Netherlands. At first sight, they seemed to be regular swings, but further notice revealed that they were far more than that. It was a musical instrument that played notes as one uses the swing. When all swings were in sync, these notes would form a melody. Further investigation into this phenomenon revealed these swings were a simplified version of a permanent installation in Montreal, consisting of 21 swings and aptly named "*21 Swings*" (Daily tous les Jours 2011).

I was fascinated by this artwork for several reasons: First, the swings were in use 24 hours a day, in fact, people were standing in line to use these swings. Second, the people standing in line were not children, but mostly grown-ups wanted to experience these swings. Finally, and most importantly, these swings completely took over this central square in Utrecht, as it seemed to allow people to experience and take control of this physical space. This thesis seeks to explore this relation between individuals and digitally augmented objects in public space.

The *21 Swings* example shows how computers nowadays are embedded in everyday products. This development was predicted by Marc Weiser (1991) and labelled 'ubiquitous computing', now also called pervasive computing. The essence of his vision was the creation of environments saturated with computing and communication capability, yet gracefully integrated with human users. The introduction of the smartphone has pushed and shaped this idea of ubiquitous computing and pervasive media in a large way.

The multiple extensions of media infrastructures like mobile technologies and locative media that have been installed largely in the city have caused a shift in the way that people use and experience public space over the last years. Urban space itself has now become a complex interface, which is a dominant form of human self-organization and orientation (de Souza e Silva 2006). Over the last years much of the public discourse and research on hybrid space has focused on how it: transcends the constraints of time and space (Richardson and Wilken 2013); aggregates new layers of data (Bouwman, et al. 2013); provides new ways of playfulness, identity and communication (Raessens 2006, Firth 2014, Lasén 2006). In addressing these issues, research tends to focus on the mobile phone, and on how it unlocks the virtual layer as the primary mode of interaction (McQuire 2008, p205). This focus on the phone may lead to an unbalanced academic view of pervasive media.

Although the mobile phone is the most ubiquitous device for accessing the virtual layer, it has huge implications for the way we experience these hybrid environments. Its dependency on the screen forces users to focus on the interface instead of their physical environment, causing a shift in the experience of space. Many vivid and intense experiences have gone from a physical and social context to take place in a private virtual environment. This potentially causes a loss of link with the public space.

Eliminating the identification of the person with urban space impoverishes social life (Gonçalves and Miranda 2012). If citizens fail to understand public space as an essential element of their life experience, it will increasingly suffer more qualitative degradation. When public space loses its function as an element of citizenship cohesion and identity, it runs the risk of becoming a mere decoration with a total lack of social functionality (ibid., 3).

Relying on established media producers and institutions is unlikely to achieve a deepened 'reflexive' potential of contemporary society that includes moments of reflection, negotiation and reciprocity. Explorations by contemporary artists and activists using new media in public space can yet play a critical role (McQuire 2008). In the conclusion of his book, the media city, McQuire posits:

> It is vital to imagine ways of deploying digital media that extend sociability rather than truncate it. This involves developing new and emergent forms of sociality based on living with others in 'media cities' where social networks are not pre-given but constructed 'on the fly' and personal relationships are routinely 'at-a-distance' as well as 'face-to-face'. (ibid., p205)

Inspired by open-source software and cheap and programmable hardware, city planners, architects and artists are beginning to aggregate the layers of data that now permeate the urban environment to reclaim and redesign the physical urban environment for its citizens. This leads to new perspectives on using public space in unusual and alternative ways where real and virtual spaces intermingle. By embedding media directly into the physical environment, public space itself now becomes an interface. The tangible nature of these digital objects emphasises the embodied nature and the materiality of public space. I choose to address these environments as Interactive Landscapes since this term implies a new nature that evolves from technology (Mensvoort and Grievink 2012, Kelly 1995). I have taken notice of the emergence of these Interactive Landscapes over the past years. However, it must be

noticed that most of these landscapes have a temporal nature, as they often are the work of independent artists. Besides the before mentioned *21* Swings (Daily tous les Jours 2011), there are other interesting examples like: *Piano Stairs* (The Fun Theory 2009), *Urban Echo* (LUSTlab 2011), Urbanimals (LAX: Laboratory for Architectural Experiments 2015), Plug-in-Play (Rockwellgroup 2010) and *Marbles* (Studio Roosegaarde 2012).

Whereas in most scholarly research on urban landscapes and pervasive media citizens appear to be given the role of consumers or simply as nodes in the vast network that comprises the city (Hammond and Townsend 2013), this thesis seeks to operate at the level of the individual citizen. To investigate this relation between the individual and public space, I will use Heidegger's notion of *Dasein* (Heidegger 1967, p42). According to Heidegger *Dasein* is situated being, not as an abstract overarching concept that might explain our current embodied state, but rather it *is* our current state. Our everyday experience of the world is what characterises our conception of being, as opposed to the strict duality between thinking and doing. We cannot talk about being in terms of consciousness separated from an agent's particular spatial, temporal and contextual mode of being. Self-consciousness is a necessary characteristic of *Dasein*, as the being needs to be conscious of and concerned with its own *Being*. This makes *Dasein* a suitable term to explore the relation between humans and the Interactive Landscapes. Taking this relation between the individual and the object into account, allows me to focus on how these Interactive Landscapes affect *Dasein*. I take this approach to point out that a focus on mere efficiency alone does narrow the perspective of embodiment and materiality in public space.

Interactive Landscapes are a relatively new phenomenon, which gives this work an exploratory character. I will analyse the affordances (Gibson 1979) of Interactive Landscapes and the possibilities and concerns that are highlighted in the emerging literature. This allows me to make a comparison between these Interactive Landscapes. The aim of this comparison is to find how the affordances of these Interactive Landscapes relate to aspects of *Dasein*. Therefore, the primary research question of this thesis is: How do Interactive Landscapes affect *Dasein*?

The subjects I seek to explore are as followed:

1. Are there differences in the availability of affordances between the two spaces that represent varying degrees of *Dasein*.

2. How do the levels of affordances - potential, perceived, utilised and shaped - differ in the Interactive Landscapes studied?

3. To what degree can these affordances also be found in traditional (analogue) landscapes?

4. What do the affordances of Interactive Landscapes, as a new specified element of pervasive media, add to the notion of *Dasein*?

Exploring these questions will provide me with the opportunity to address critical issues and interesting opportunities of this new phenomenon that may lend itself to further research. I am not aiming for a conclusive answer to the question how Interactive Landscapes in general affect *Dasein*.

## Theoretical Framework

Before looking at Interactive Landscapes as a new phenomenon in public space, I will start by reviewing some of the available literature on the use, perception, and construction of space. I will outline a theoretical framework that highlights some of the discourse on physical and virtual spaces. I will then position Interactive Landscapes within this discourse to show how these can fill a missing link between the physical and virtual worlds. Finally, I will relate the theoretical discourse of these spaces to the phenomenological aspects of the lived experience of space, by discussing some key concepts of *Dasein* (Heidegger 1967) and Affordance Theory (Gibson 1979).

Sheller and Urry (2006) suggest that historically, travel was separate from the activities they led to, which means that people would go from place to place, with the goal of getting somewhere. The space traversed was often ignored. Urban spaces, within this logic, were mostly used as circulation spaces, where one constantly keeps moving, with the main goal to arrive at specific locations. Space in between lacked meaning. In an attempt to restore meaning to the spaces of circulation of the city, Situationist theorist Guy Débord (1958) developed a *dérive* as a technique to wander through urban spaces. Here, one or more persons drop their usual motives for movement and action, their relations, leisure activities, and work during a certain period and let themselves be drawn to the attractions and the encounters they find in the terrain.

Following this last notion, Henri Lefebvre (1991) notes that spaces are not given but rather constructed. Spaces reflect economic- and power relations present in each historical time frame and, therefore, express social practices. As social spaces are a product of social practice, they can be constructed by people's movement and by the "use" of this space. According to Lefebvre, social spaces are composed of representations of space, representational spaces and spatial practice.

Representations of space express a certain understanding of the place that its designers had in mind when constructing it. It is a coding of the space that is interpreted when inhabiting these spaces. These spaces are always conceived. Since power and knowledge are intertwined in its representation, this space is dominant in every society. Representational space is the space directly experienced, lived space. This space overlaps physical space, by making use of symbols. Spatial practices are practices that mediate between conceived and lived space (ibid.,38 ), although Lefebvre is unclear as to how exactly this mediation takes place. It is closely associated with perceived space and with people's perception of the world, especially their everyday life, for spatial practices structure everyday reality.

These three instances of social spaces (conceived, lived and perceived) cannot be separately understood as they are intrinsically connected to each other. Lefebvre believed that human embodiment was fundamental to the understanding of the social production of space. He argues that 'the whole of (social) space proceeds from the body' (ibid., 405). In conjunction with this emphasis on embodiment, Lefebvre rejects the Cartesian split of mind and body, along with the abstract construction of space this entails.

An early example of this social construction of space mentioned by Lefebvre is the rise of the flâneur in the late 19th century. The term flâneur was coined by the poet Charles Baudelaire and was later popularised by Walter Benjamin (1999). The flâneur wandered and consumed the city with detracted gaze and thus provided a different lens through which to look at and participate in the city (de Souza e Silva and Hjorth 2009). The flâneur symbolised the new dimensions of mobility within 19th-century modernity. He re-territorialized the city through a series of spontaneous actions, re-scripting the city of the late 19th-century and its increasing commodification through participation and observation.

De Souza e Silva (2006) posits that the late 19th-century urban spaces have further developed into hybrid spaces. These are mobile spaces, created by the constant movement of users who carry portable devices continuously connected to the Internet, and to other users. The transformation of urban space into hybrid space has led Robert Luke (2006) to extend the term flâneur into its postmodern counterpart of the phoneur who interacts with the outside world through a mobile phone. In Luke's view, the phoneur is a vehicle for m-commerce and surveillance. Luke paints a dystopian picture of the phoneur as a consumer, unable to break free of a capitalist interpellation, which has been a dominant subject in the discourse on how media affects urban space

(Hammond and Townsend 2013). De Souza e Silva (2006) claim it is through the use of pervasive computing that the phoneur shifts away from the flâneur's distanced participation in the spectacle, and instead actively participates in shaping urban space.

Contrary to de Souza e Silva, I hold that the participation of the phoneur is still a distanced form of participation, since the mobile phone draws the citizen away from the physical space into a separate virtual space. The phoneur emphasises the gap between mind and body and thus impairs the embodied nature of *Dasein*. However, the focus on the mobile phone as the most ubiquitous form of pervasive computing does not do justice to the full spectrum of the term, as is was coined by Weiser (1991).

The term pervasive computing addresses a wide range of ubiquitous computing phenomena within a wide variety of spaces; I choose to use the term Interactive Landscapes for a particular kind of pervasiveness. As the term is not commonly used within the field of humanities, I will start by shining a light on Interactive Landscapes and their relations to pervasive media. For this, I will use the model of Kostakos et al. (2006), which relates the degrees of publicness to three aspects of pervasive systems.

On the vertical axis of this framework is a spectrum that describes degrees of publicness. The ends of this spectrum are either 'private', which implies one person is in control or has access, or 'public', which implies that no single person is in charge of or controls access. The latter term also denotes that there are minimal or no barriers that could deny access. The middle region of this spectrum is marked 'social', which is
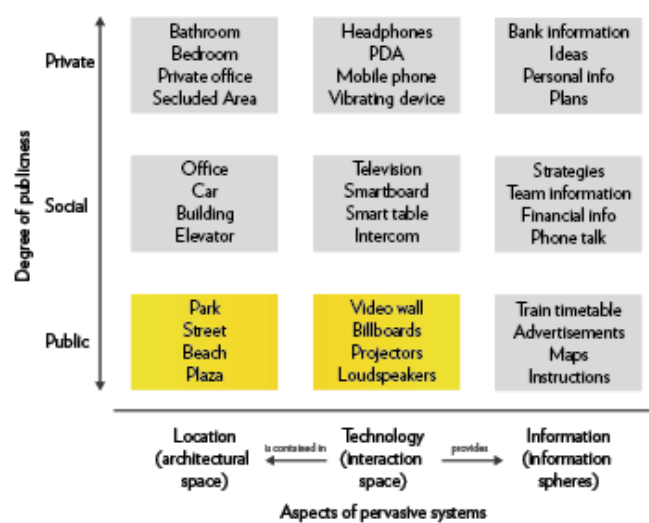


Fig. 1 Kostakos et al. 2006

best described as being neither public nor private. This could mean that a group of people has access and can manipulate barriers to prevent others from obtaining access.

On the horizontal axis of their model Kostakos et al. plot the aspects of a pervasive system: architectural space, interaction space, and information sphere. Architectural space is the physical space in which people and technologies exist. The technologies present within these architectural spaces create interaction spaces. These interaction spaces provide access to information and services, making them available to people within the architectural spaces. The result is a 3x3 matrix, illustrated in Fig. 1.

Within this matrix, Interactive Landscapes are located in public and overlap the architectural space and the interaction space. Interactive Landscapes imply tangible connections between the digital and the physical layer within public settings. These landscapes often function as a manifestation of dynamic relations between the urban space, people and digital culture. The objects that form these Interactive Landscapes embody an environment of tactile technology in which visitor, virtual space and physical space become one.

I posit that Interactive Landscapes can bridge the gap between technology and culture by reconstructing public space in the hybrid urban context. Because this context is as much social as technical, a sociological perspective can help understand the work computation does and the uses to which we put it. I will, therefore, follow the notion of Paul Dourish (2004) in arguing that the tangible aspects of Interactive Landscapes and social computing are based on the same underlying principles. Both draw from the fact that we experience the world by interacting with it directly, and that we act in the world by looking for the opportunities for action that the landscape provides to us - whether through its physical configuration or socially constructed meanings (ibid., 117). Thus, the tangible aspects of Interactive Landscapes and social computing, both take a phenomenological approach by stating that our experience of the world is tied to the how we act in the world. This phenomenological approach can be useful for studying technology as it describes a "lived experience" when using technology. Dourish refers to this as embodied interaction by which he means: "...the creation, manipulation, and shaping of meaning through engaged interactions with artefacts." (ibid., 126).

These phenomenological viewpoints provide a method for researching technology and society. In Husserl's view phenomenology aims at describing the basic structures of consciousness, the features of consciousness that give shape to how the various objects in the world appear to us (Husserl 1999). According to Martin Heidegger (1967), the human existence is not a detached speculative phenomenon but instead a grounded experience that is wrapped up in interactions with the environment.

The most crucial and complex notion in Heidegger's work is that of *Dasein*, which roughly translates to *Being-there* or *being-in-the-world*, where "in" has to be interpreted as involved - instead of or in addition to a spatial relationship. *Dasein* characterises itself as being 'thrown' into a world with which we must cope. Heidegger states that our contextual situation is never ideal so we simply cope with it by the simple way we incorporate things into our lives (Oosterling 2009).

To categorise the various aspects of *Being-there,* I postulate three dimensions of *Dasein.* These dimensions give shape to a basic framework for understanding Interactive Landscapes and to how people deal with them. The dimensions can be interpreted as a way of coping with being thrown into the landscape. I will relate these dimensions to various aspects that constitute *Dasein.* Cognitive aspects relate to Heidegger's notion of present-at-hand (Heidegger 1967, p69). Physical dimensions refer to ready-at-hand (ibid., p73) and embodiment (Heidegger 1967, p143, Dourish 2004, p100). Finally, social dimensions relate to Heidegger's concept of Being-with-others (*Mitsein*) (Heidegger 1967, p112).

The situated nature of *Dasein* allows thinking about certain aspects of the environment as an extension of the mind and things as extensions to bodies, which lays the groundwork of what we have come to know as embodied cognition. *Dasein* is a constant process of engaging with the environment. Heidegger asserts that our everyday engaged interaction with the world is what brings knowledge and understanding. Technological devices have always been the way by which *Dasein* interacts with the environment. We formulate our knowledge of the world by interacting with objects. Paul Dourish notes that: "Embodied phenomena are those that by their very nature occur in real time and real space" (Dourish 2004, p101). This definition incorporates a sense of physical presence, yet it also includes a range of phenomena that may not be physical but are nonetheless present in the world. Thus embodiment also denotes a participative status of *Dasein.*

According to Heidegger, there is no separation between self and the world neither is there a mind/body problem, as they are both inherently linked to the world via engaged interaction with it (Heidegger 1967, p99). Core to Heidegger's thinking about objects is his "tool-analysis", through which he examines the way in which we interact with objects. This centres around two poles of interaction: Present-at-hand (ibid., p69), which defines the relationship with an object defined by theoretical knowledge; and ready-to-hand (ibid., p73) that is the human-object relationship based on active engagement. In this last mode, the object is seen as an extension of the human body.

Heidegger argues that Being-there also means to Be-with: "So far as Dasein is at all, it has Being-with-one-another as its kind of Being" (ibid., p163). Heidegger refers to this Being-with as *Mitsein,* which he considers a priori condition that makes it possible that Dasein can discover things in relation to others. Because of this with-like Being-in-the-world, the world is always the one that I share with others (ibid.,

p154). The public character of Interactive Landscapes makes this notion of *Mitsein* relevant for this study.

According to Merleau-Ponty (1962), the body is the vehicle by which we come to have a world; it is the first of all cultural objects and the one by which all others exist. J.J. Gibson (1979) extended these understandings to a focus on interaction. Gibson laid a foundation for understanding human-environment interactions. His concept of affordance interprets the world as an offering of perceptible structures of possible actions, which are grasped through engaged and not necessarily deliberative action. Gibson developed this concept to account for the fact that our perceptual experience includes not only awareness of the structure of objects and events in the environment but also, and perhaps more fundamentally, an awareness of their functional meaning. Gibson argued that this meaning is directly perceived; that it is objectively specifiable in the environmental information available to a perceiver. A detailed examination of Gibson's justification for his position, as well as the empirical support for it, is beyond the scope of this thesis (see, e.g., J.Gibson 1979, Chapter 9; Heft, 1988). However, the essential characteristics of affordances will provide the basis for the approach to the environmental description that I am seeking in here.

Affordances can be regarded as a graded property rather than one that belongs to specific category (Greeno 1994, see Fig 2). The different levels of affordances are potential, perceived, utilised and shaped affordances. Most affordances in human use are shaped by humans in
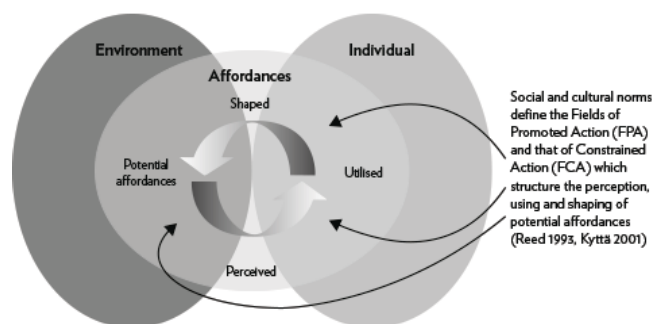


Fig. 2 Greeno 1994

order to supply the types of functions in the environment required to fulfil societal goals  (Heft 2001). In an attempt to give a social dimension to affordances, Reed (1993) distinguished Fields of Free (or spontaneous) Action (FFA), and Fields of Promoted Action (FPA). In the latter, social rules and practices regulate which affordances are utilised or shaped, and when, where, and how to do this. However, it is also possible, that the social and cultural context restricts the utilisation and shaping of affordances. Kyttä (2002)calls this the Field of Constrained Action (FCA). An analysis of affordances will form the basis of the exploration of Interactive Landscapes presented in this paper.

## Method

As mentioned, permanent Interactive Landscapes are not commonplace yet, which allows limited access to these spaces. However, since these projects generate quite a lot of media attention, there usually is information available by means of video material, interviews and photographs of people using the landscapes and how these landscapes came into being. Analysing these sources allowed me to gain a deeper understanding of these landscapes and the affects they had on their users over the past years.

Although there have been several Interactive Landscapes in the past, most are of a temporal nature. Autonomous artist groups like LUSTlab and Studio Roosegaarde and even commercial architectural agencies like the Rockwell Group regularly create and experiment with these kinds of landscapes.

For this study on how these landscapes affect Dasein, I have decided to perform a deep affordance analysis of two Interactive Landscapes that I have been able to experience over the past years. The first of these is *"Marbles"* by Studio Roosegaarde (2012), situated in Almere, the Netherlands. Currently, this landscape is the only Interactive Landscape that has a permanent nature. This landscape was designed with an implicit intention to change people's relation to the public space. I have visited this landscape for this study, which allowed me to investigate the context and usage of this landscape. I have also analysed video material (e.g., http://bit.ly/29eczm5, http://bit.ly/29ecFdl, http://bit.ly/29cGA9K) of this landscape in order to gain more insights into the artist and commissioners goals of this landscape.

The second Interactive Landscape I will analyse is "*21 Swings*" by Daily Tous Les Jours  (2011), situated in Montreal. This Interactive Landscape has had a lot of media coverage. Viewers from all over the world are attracted by the playful nature of this Interactive Landscape and by the way this Landscape transforms the urban environment. As a result of this success, a retrenched version consisting of four swings is now part of a travelling exposition that visited Utrecht in 2014. Although this did allow me to experience the affordance of the swings myself, this study will focus on the 21 swings in their original permanent setting in Montreal. For this, I have analysed interviews with the creators (e.g., http://bit.ly/297p7ta), reviewed photographs (e.g., http://bit.ly/29jfAmZ) and looked at user videos of "21 Swings" (e.g., http://bit.ly/29ditnH, http://bit.ly/297p7ta).

Both objects have been part of a short object analysis in a previous study I conducted on the subject of play (Ruis 2015). This study showed that the richness of

physical and virtual aspects of these two landscapes in particular, allowed for a further and deeper analysis of their affordances. In this study, I will focus on the richness and quality of the experience of Interactive landscapes, rather than just on the aspects of play.

Besides *Marbles* and *21 Swings*, I make references to other Interactive Landscapes in this analysis. These references serve to strengthen and extend my observations on Interactive Landscapes; they are not a part of the affordance analysis of this paper.

Following Heft (1988) and Kyttä (2002), I will do a comparative affordance analysis of the Interactive Landscapes mentioned above. Both, Heft and Kyttä have compared the affordances of the terrain of children playgrounds in Finland and Russia and analysed how these affordances affected social behaviour of children and parents. The aim of this study is to provide a deep insight to Interactive Landscapes and with that, their relevance to the academic debate. I will compare the affordances of *Marbles* and *21 Swings* to see in what way these affordances constitute *Dasein*.

The affordance analysis consists of the object description, in which I will delineate the object; describe its form, context and materials at first sight. This is followed by an analysis of its representational forms. Depending on the nature of the Interactive Landscape these representational forms can be textual, visual and/or auditory and interfacial. The final part of this analysis will focus on the technical aspects of the designed object. Here I will use the theory of affordances (Gibson 1979) to describe which affordances can be identified (Boomen and Lehmann sd). To what extent are these affordances inherent to the materiality of the object, and to what extent are they built-in by design decisions? What is 'dis-afforded' and which invisible design features can be identified that channel user experiences? Affordances include properties from both the environment and the acting individual. Affordances are always unique and always different for each individual and each specific group of people. Therefore, the concept is well suited for describing the psychologically essential qualities of Interactive Landscapes.

The term Interactive Landscapes implies a form of interaction between the citizens and the environment. I realise that *Dasein* is a fleeting experience that, without a means with which to manifest itself, fades into the background. The key attribute of *Dasein* is being concerned with the surrounding things and finding meaning in them. I will use Heidegger's notion of 'nearness' (Heidegger 1988). In this thesis, 'nearness' refers to the extent to which the Interactive Landscape is part of a user's orientation -

whether that object is in use or not – rather than how close the Interactive Landscape is in physical space. To describe this level of involvement (or nearness), Reeves (2011, p169) presents a general analytic framework (Fig. 3) that summarises the main elements involved in interfaces deployed within public spaces, and the relationships that exist between these elements. Since *Dasein* is a constant process of engaging with the environment, a translation of this framework to Interactive Landscapes can be helpful in understanding the different roles people take when presented with an Interactive Landscape and how these roles affect *Dasein*. In the framework presented by Reeves, the bystander can be seen as a passer-by that may notice the Interactive Landscape but is not actively involved. The audience is actively involved in talking about or looking at the objects or its participants. The participants are physically interacting with the objects in the landscape. Since each of these roles defines a deeper level of involvement with the landscape, it accesses different kind of affordances that influence the notion of *Dasein*. I will make use of video material of these Interactive Landscapes that is available online, to analyse these spectator roles.
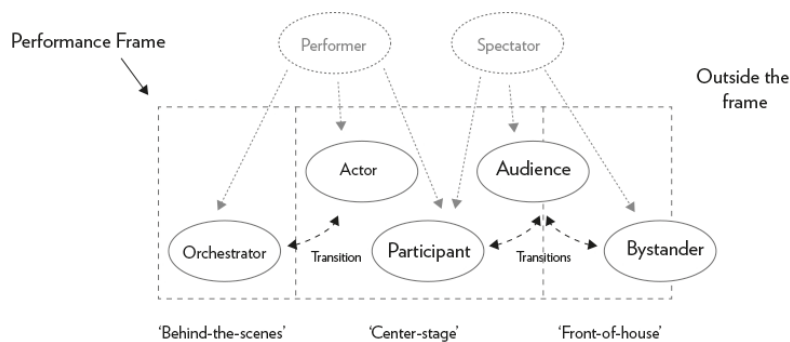


Fig. 3 Reeves 2011

## Comparative Affordance Analysis

### Marbles

Object description
*Marbles*, by Daan Roosegaarde, is a permanent artwork commissioned by Ymere at the C. van Eesterenplein in Almere, the Netherlands. It was intended to turn a 'normal' town square into a 21st-century meeting place (Ruis 2015).



Fig. 4 Marbles

The title has a double meaning, as, by day, the objects appear like six solid, smooth stones of marble polished by time, wind and water. However, Marbles also refers to children playing with marbles, which relates to the playful aspects of this Interactive Landscape. In the evening, the landscape comes to live. The stones turn into shapes with coloured LED lights and sound responding to people's touch and nearness.

Representational forms

*Marbles* are glowing shapes that interact with people through light, colour and sound. Every Marble contains LEDs, ambient sounds and smart sensors that respond to human touch and nearness, changing their mood from 'bored' to 'excited.' The marbles can multiply these interactions between themselves, communicating with each other thus transforming the environment into an Interactive Landscape of light and sound. The landscape is trying to communicate to its surroundings and invites people to respond. People playfully accept this invitation by touching the marbles one at a time, thus changing their colours and sounds.

Although the marbles are fixed objects, they are malleable in a digital sense. This looseness of the landscape enhances comfort, choice, and control over the landscape. The marbles present an open-ended order, and they allow people to change the environmental setting through colour and sound. There are no rules as to how the marbles function. They provide an improvisational escape from routine through which one explores new possibilities of social experiences and space, and one develops new social forms. The way marbles are positioned and shaped they remediate a fireplace setting where people feel warmth and comfort in an otherwise gloomy environment. It brings people together to socialise and share their stories and experience of the environment.

Technical aspects

Within this Interactive Landscape, it is important to pay attention to the role of context and the importance of tacit knowledge, and how these shape intent. In the case of *Marbles*, the elements of peripheral or ambient interactions play a key role in the environmental setting. Of course, as with all Interactive Landscapes, the affordances are shaped, even though the design blends in with the environment rather well. Particularly during the day, the marbles appear like giant boulders that are a part of the environment. The placement of the marbles in an urban setting (i.e. a housing

block) offers variety, thereby a warm contrast in the environment. It is this contrast that draws people towards the objects. The materiality and shape of the objects afford physical behaviour like climbing onto, and jumping off the marble (Gibson 1979). Following Reed's (1993) division between free and promoted action, during daytime the marbles classify as a Field of Free Action (FFA).

When the marbles become 'active' during the evening, they use the physical closeness of people to draw them towards them. The closer one gets, the more aroused the marble seems to get, causing a chain reaction of excitement along the other marbles and luring other people towards them. Even though the environment does not appear to restrict its users and remains open-ended, the social affordance shifts towards a Field of Promoted Action (FPA). The landscape now becomes a subject of the social interaction and something the audience talks about. At the same time, the rules of engagement change as soon as people become aware of the fact that the object is interactive. The object becomes fragile, which restricts the utilisation and shaping of affordances of the landscape. Here we notice a Field of Constrained Action (FCA).

In this case, following the performance framework (Reeves 2011, p169), either the creator of the landscape (i.e. Roosegaarde), the client (Ymere) and the city of Almere, can be considered as orchestrators. However once this landscape was placed at the C. van Eesterenplein in Almere, the role of orchestrator is positioned outside the performance space. This space belongs to the actor (i.e. the Marbles) and the spectator.

In the case of the marbles as being the actors in the performance frame, they seem to be able to take on different roles. During daytime, their role is passive and blends in with the environment; in terms of actors, we can consider them as 'extras' in the landscape. They fill the stage with their presence yet remain silent and in the background. Whereas in the evening, the marbles take on a 'lead role', that fills the stage with its performance of light and sound. This lead role is about attracting spectators and luring them into transitions from a passive passer-by to a social audience to an active participant. Every transition effectuates a stronger sense of embodiment of the spectator and awareness of the landscape. At this point, it makes sense to compare Dourish's notion of embodied interaction (Dourish 2004, p124), with two components of Heidegger's idea of *Dasein*. Heidegger uses the term ready-to-hand (*Zuhandenheit*) to describe the human-object relationship based on active engagement. In this mode, the object itself is a tool for accomplishing a certain goal becoming an
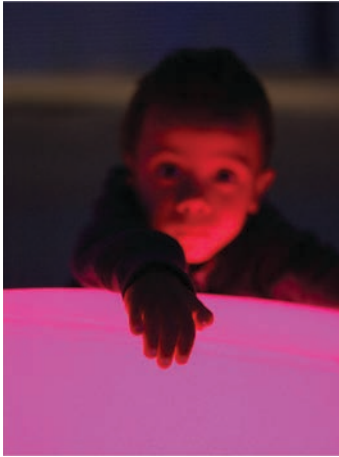
Fig. 5 Marbles ready-to-hand

extension of the user's body. The user acts through the object to attain a goal, as opposed to acting with the object, providing fluidity in the engagement. The object itself fades into the background and is outside the direct consciousness of the user. Dourish's approach focuses almost entirely on embodied or ready-to-hand interaction and neglects Heidegger's notion of presence-at-hand (*Vorhandenheit*). With this last term, Heidegger describes the relationship with an object defined by theoretical knowledge and scientific observations. In this mode, the object is observed as separate from the observer and its context of use. Dourish does not address the relationship between ready-at-hand and present-at-hand, and how we move between them. Marbles, however, does rely heavily on this relationship since using the object is not a means to an end but rather an objective in its own right. There is a strong ready-to-hand relation to the object, but only through observation and reflection can one become aware of the self and its position within the landscape. Here the goal of the Interactive Landscape is to actively create awareness of the (shaped) affordances.

The dual state of passive and active landscapes makes its agency complex. In its daytime state, this object is something that is easily ignored as it immerses in the environment. In its evening state, however, its coded component actively attracts attention and shapes the relation between man and object.

It is the role of the spectator within this Interactive Landscape that is interesting since its progressive state of awareness strongly relates to *Dasein* and thrownness (Heidegger 1967, p167). Heidegger posits that *Dasein* is thrown into the world and left to fend for itself or cope with its surroundings. Thus coping becomes an active way of shaping our conditions and constructing our spaces. *Marbles* shows that not only does the spectator's role becomes more involved as he comes closer to the object, the object itself also becomes more involved. Addressing agency to both actor and spectator clarifies how spatial practices mediate between conceived and lived spaces[1] (Lefebvre 1991). This closeness emphasises materiality and the touching of the

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[1] The Interactive Landscape "Urban Echo" by LUSTlab also actively plays with Lefebvre's notion of perceived, conceived and lived spaces. LUSTlab. Urban Echo. 2011. http://bit.ly/29dbBoD (accessed 07 04, 2016).

environment. It is about encounters with the environment on a small scale and in different spatial relationships to the body through climbing over, or moving through or underneath or even being aware of the slope of the ground. Children discover these affordances for play everywhere within the environment. Adults are often also aware of these affordances, but they are more inhibited about taking advantage of them, about getting close and taking a risk. Their social, cultural and contextual awareness restricts the utilisation and shaping of affordances, turning this into a Field of Constrained Action (Kyttä 2002).

Like Débord (1958) already noticed, adults need techniques to utilise the affordances of space. *Marbles* utilises the physical distance to the objects to motivate the spectator's shift between the different states of spectatorship defined by Reeves (2011) (bystander, audience and participant). The Interactive Landscape continuously reacts to the closeness of the spectator, motivating him to become more involved. It builds on the intrinsically motivated behaviour of the spectator –e.g., curiosity, exploration, and reflection- by constantly addressing different aspects of *Dasein*. *Marbles* challenge a cognitive dimension needed for figuring out how the marbles respond to closeness and touch. We can see this behaviour in all three forms of

spectatorship. Social aspects are apparent in the play between people and social interaction the marbles evoke. Both, the audience and the participant expose these aspects of *Dasein*. Finally, embodied aspects come into play in climbing onto and jumping off the marbles, which can only be ascribed to participants (Fig. 6).



Fig. 6 Physical dimensions of Marbles

*Marbles* taps into latent predispositions (ready-at-hand) and thus, it does not require arbitrary instruction. Their shaped, perceived and utilised and affordances allow for embodied engagement motivated by curiosity, exploration and reflection. Gaver, et al. (2004) describe this form of engagement as 'ludic' since these are intrinsically motivated rather than externally-defined tasks. This strong ludic dimension of the Interactive Landscape can also be witnessed in the landscape of *21 Swings*[2].

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2 This ludic dimension has been a topic of a previous unpublished paper on ludic environments (Ruis 2015). The ludic dimension can be noticed in other Interactive Landscapes like: Urbanimals (LAX: Laboratory for Architectural Experiments 2015) and Plug-in-Play (Rockwellgroup 2010)

Patterns of user engagement (Fieldnotes)

As I have mentioned in the method section of this thesis, I have visited *Marbles* in Almere as part of the exploration of Interactive Landscapes. This allows me to validate some of the findings from the affordance analysis. Here I will briefly reflect on my notions.

I arrived at the C. van Eesterenplein at dawn when the marbles had just turned active. There were about eight people around, mostly young kids around the age of twelve. Some of them were just sitting on the marbles while others actively participated in the Landscape. The marbles response to touch and nearness seemed to be completely random, yet the kids that were participating had made up some kind of game that involved running between the marbles. When the marble turned red, they were out of the game. Although the technology fitted inside the marbles made them look more fragile as I expected, I noticed the good state the marbles were in, and how they were treated with care.


Fig. 7 C. van Eesterenplein, Almere

The C. van Eesterenplein is situated in a residential area with a few grocery stores it is not a place that one visits when one doesn't need to be there (Fig. 7). This may explain why I did not notice any people being surprised by Marbles. Everyone there seemed accustomed to them and their interactive state. The environment had absorbed the marbles.

**21 Swings**

Object description

*21 Swings* (Daily tous les Jours 2011), by Mouna Andraos & Melissa Mongiat, is a project where swings are placed in the Montreal's entertainment district, Quartier des Spectacles. The Promenade des Artistes separates a major music


Fig. 8 21 Swings

venue complex and a science faculty. It is a 170m long piece of land that had been closed for several years. The objective of this project was to create a new meaning for this piece of land by creating a playful Interactive Landscape open to all audiences and connecting the art and science worlds.

This Interactive Landscape exists of seven, numbered installations that each hold three swings. The installations are placed in a straight line along The Promenade des Artistes. The swing's seats have bright colours and light up from below at night. Above each swing, a brightly coloured metal box contains a speaker that produces an audio signal when the swing is used.

Representational forms

Each swing functions like a musical instrument. As people swing, they hit a different note depending on how high they swing. Instead of using contemporary electronic music, the sounds refer to music boxes and the melodies they play. Since almost everyone can identify with these sounds, the swings communicate to different age groups and backgrounds. Using all swings together, they compose a musical piece in which certain melodies emerge only through cooperation. This cooperation does not come from an individual's decision. Instead, it emerges from interaction where the behaviour of each participant depends on the decisions of the rest of the group (Ruis 2015). Daily Tous les Jours paid a lot of attention to making the technique (i.e. gyroscopes, accelerometers, Arduino's, speakers and wires) invisible, and to making the swing appear as a normal swing.



Fig. 9 21 Swings at night

The swings create a sense of nostalgia, throwing people back to their childhood. Moreover, the choreography of a line of colourful swings in constant motion, lit from underneath at night creates a powerful invitation (Fig. 9). Taking swings out of their closed playground environment and placing them in an urban environment, creates a distinct variety in the urban landscape. The repetition of this disturbing physical element 21 times, however, provides comfort for using it, as it connects participants to one another.

This project explores the concept of cooperation that emerges when the behaviour of each individual depends on the decisions of others: it is a social game where one constantly needs to adjust to the actions of others. This instinctive way of

creating music by using one's entire body stimulates people to experiment and play. Besides, it leads people to become aware of the Landscape, each other's experience, and to converse and exchange. The swings are also a metaphor of maintaining harmony in the busy urban environment.

Technical aspects

The 21 swings stand out in the Landscape rather than that they blend in. This makes sense since the rest of the immediate landscape was built around these musical swings. The naming of the immediate landscape, The Promenade des Artistes, refers to the close link between the Interactive Landscape and the citizens, where everyone is considered an artist and everyone is aware of itself as part of the landscape. It is a place that is created for promoted action (FPA) (Reed 1993), in which the promoted action is a contemporary way of flâneuring (Benjamin 1999). This is paradoxical since the act of promenading allows the stroller to take in the city all the while granting a sense of autonomy. There is an individualization of both the practice of promenading and of the urban space (Turcot 2010). Following these principles, flâneuring is intrinsically free and individual and should therefore normally take place in a Field of Free Action instead of a Field of Promoted Action. This reinforces the notion that flâneuring and with that embodiment, is becoming a lost art. Like Guy Débord (1958) put forward we need techniques like the dérive or Fields of Promoted Action to regain awareness of the self in the environment, thus to regain *Dasein*.

Swings, in general, have a strong affordance. When you sit on a swing, it is nearly impossible not to swing. As with all manmade objects, these affordances are shaped. Whereas the perceived and utilised affordances of regular swings are may vary from sitting, to standing, to jumping off, the utilisation of some of these affordances has been restricted. On all of the swing's seats there is



Fig. 10 21 Swings warning

a clear warning: "Danger no standing, no jumping, hold on tight… -be good-" (Fig. 10). By restricting the utilisation of affordances, this landscape also is a Field of Constrained Action (Kyttä 2002), which detracts from the notion of ownership of the landscape. This restriction is interesting since the word "danger" implies that some of the perceived affordances (i.e. standing on and jumping off) are dangerous for the participant. However, we do not see these notices on regular swings. Therefore, it is

likely that this message is meant to protect the object, which is filled with fragile technology, rather than the spectator. Focussing the content of this message on the spectator instead of the technology enhances the notion of a regular swing, yet it reduces opportunities for embodiment.

I will apply the performance framework (Reeves 2011, p169) to address the different performative roles of the actors and the spectator afforded within this Interactive Landscape.


Fig. 11 A disruptive setting

Following Reeves, the 21 swings take on the role of actor within the performance framework. Through their affordance swings naturally attract people and people immediately know how to use them. Normally, the strong ready-to-hand relation between a participant and a swing causes the object (i.e. the swing) to fade into the background and to become an extension of the body. In this case, there are multiple ways the object actively breaks this pattern. First, the disruptive setting of the swings in the urban landscape (Fig. 11) instead of their traditional playground setting shifts the embodied awareness towards a contextual awareness. Second, the surprising production of sound through engagement with the swing focuses attention on the object and the act of swinging. It raises questions like: What sounds does this swing make? How does it respond to other swings? How can we create a melody and actively produce space? By raising these questions about the relationship between the actor and the spectator, the object and the environment become present-at-hand.

The spectator's role in the performance framework is somewhat diffused since as mentioned before the 21 swings are placed in a larger space intended for flâneuring. The passer-by is thrown into this larger landscape. Even when the passer-by may consciously or unconsciously ignore the swings, the promenade in itself is a performance frame that emanates human embodiment. Here *Dasein* cannot be ignored since the passer-by is by default either an audience or a participant in flâneuring. In this, we notice that in the structures of its *Dasein* one always finds an implicit reference to other humans. According to Heidegger, this *"Being-with"* (*Mitsein*) is essential to being human (Heidegger 1967, p112). The ability to recognise the influence of our social surroundings on our behaviour and the capacity to decide whether to go along with it or not, to a large extent, constitute *Dasein*.

In this case, the 'traditional' landscape affords embodiment on a general level whereas the interactive aspects of the landscape offer an opportunity to reach a deepened state of embodiment. The Interactive Landscape provides a tool, ready-at-hand, to actively produce the landscape.

The role of the audience is somewhat in between states of participation. The audience of the swings does not actively participate in flâneuring, nor does it participate on the swings. Thus, in this case, the audience is the least embodied role in the landscape. It is solely a present-at-hand state where one theorises the object and the landscape by observation and reflection (Fig. 12).



Fig. 12 Audience vs. flâneur

The social aspects of *Being-with*-others are also key to the role of the participants on the swings. A single swing affords the production of individual tones and embodiment through the act of swinging. Using multiple swings affords an awareness of the self and its relation to others (*Mitsein*) and the production of a melody. It is the creation of this melody and thus the social interaction with others that provide people with a sense of ownership of public space[3] (Lefebvre 1974).

Perhaps the most striking aspect of *21 Swings* is the playful engagement it sustains among groups of erstwhile strangers who come together in this Interactive Landscape and discover that, by enacting a collective embodiment, they can affect the ambience of the landscape. *21 Swings* occupies a liminal terrain. Passers-by aren't sure what to make of this Landscape; the interface is striking and has a strong affordance, yet the digital component of the Landscape is not immediately comprehensible. It suspends habit in favour of experimentation.

The experience of *21 Swings* is evenly spread over the physical, cognitive and social dimensions of *Dasein*. There is obviously a high physical spontaneous aspect that is afforded by the swings and requires participants to use their entire body to play this instrument. In this, we can see the embodied nature of *Dasein*.

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3 The Interactive Landscape "Piano Stairs" by The Fun Theory uses the same technique of collectively making music to provoke interaction and sociality within the urban environment. The Fun Theory. Piano Stairs. 2009. http://bit.ly/Lwg6Pj (accessed 07 04, 2016).

The swings also make an appeal to the cognitive dimension of *Dasein* to figure out how the swing responds to speed, height and the other swings. This shows how the body-object relation continuously moves between ready-at-hand and present-at-hand.

Only when the cognitive dimension of *Dasein* is clarified can one tune in to the other swings, which invokes the social dimension of *Dasein*, as participants need to attune their rhythms to each other. This social dimension emphasises how *Dasein* is always closely related to *Being-with* (*Mitsein*).

## Comparison

Comparing the two analysed Interactive Landscapes to the different roles of the spectator (Reeves 2011) and mapping these on various affordances of *Dasein,* leads to the following matrix (Fig. 13).

| LANDSCAPE/STATE | AFFORDANCES | LEVEL OF ENGAGEMENT OF THE SPECTATOR | | |
|---|---|---|---|---|
| | | PASSER-BY | › AUDIENCE | ›› PARTICIPANT |
| **Marbles passive state** | Focus on physical affordances of the landscape | | | Affords climbing on<br>Affords jumping off<br>Affords slidding<br>Affors running between<br><br>**Affects Dasein through**<br>Embodiment<br>Ready-to-handness |
| **Marbles active state** | Adds a cognitive and social dimension to affordances | | Affords sociality<br><br>**Affordances to Dasein**<br>Mitsein | Affords touching<br>Affords listening<br><br>**Affects Dasein through**<br>Embodiment<br>Ready-to-handness<br>Present-at-handness<br>Mitsein |
| **21 Swings passive state** | Focus on physical affordances of the landscape | Affords flâneuring<br><br>**Affects Dasein through**<br>Embodiment<br>Thrownness | | Affords swinging<br><br>**Affects Dasein through**<br>Embodiment<br>Ready-to-handness |
| **21 Swings active state** | Adds a cognitive and social dimension to affordances | Affords flâneuring<br><br>**Affects Dasein through**<br>Embodiment<br>Thrownness | Affords sociality<br><br>**Affects Dasein through**<br>Mitsein | Affords music making<br><br>**Affects Dasein through**<br>Embodiment<br>Ready-to-handness<br>Present-at-handness<br>Mitsein |

Fig. 13 Comparative Matrix

### Embedding vs. Invading

It is interesting to see how both Interactive Landscapes use the affordances of the objects that are placed in the environment. The open-ended nature of the software used in *Marbles* allows for scripted incorporation of random responses of the object. This enables the Marbles to exhibit characteristics of an organic nature. This organic

form can also be seen in the shape and the use of materials for the marbles. The object blends in with the context, rather than it invades the given space. This blended character of *Marbles* is used to lure the spectator towards the object to become aware of the affordances. In their active state, we can notice a shift in affordances. The digital aspect of the marbles builds on a cognitive dimension, which turns the object from being ready-to-hand into a present-at-hand object that has to be figured out. It is also noticeable that the active state of the objects remediates a campfire, which turns the landscape into a social landscape that affords *Mitsein*.

This is different from the *21 Swings* Landscape. Here the initial approach of the Interactive Landscape is to stand out, resulting in a stronger sense of thrownness. The dominant presence of 21 swings invading the landscape makes it almost impossible to escape. The fact that the Interactive Landscape is embedded inside another embodied landscape (the promenade) strengthens this sensation of the dominance of the landscape. The physical affordances of the swings are always present regardless their active or inactive state. The digital aspect of the landscape does not offer new physical ways of coping with the environment. Compared to regular swings, (which was not the object of this analysis) the techniques used in these swings actually reduce their ready-to-hand, physical affordances. This is compensated by the added value of cognitive and social elements that affords the present-at-hand and *Mitsein*.

Extending the focus of affordances
The case studies of the Interactive Landscapes show that the affordance levels of the landscapes go beyond a one-to-one relation of the object and the user. At the user level, affordances of these Interactive Landscapes refer to functionality, representation and dialogue. Yet both cases suggest that even when a system is technologically functional, usable and efficient, there are contextual aspects that may affect the use of the system. Obviously for *Marbles*, and to some extent for *21 Swings* as well, the time of day has to be taken into account since they affect the availability of some of the (shaped) affordances. But also the different roles the spectator can take on have big implications for the affordances. Within these Interactive Landscapes participating spectators are active creators that shape affordances for others. So as they act, they influence others, and these others learn about possibilities for action.

Given the fact that Interactive Landscapes are not commonplace, they have a very clear tangible boundary. Even when new participants come in, or old participants leave, the affordances remain specific to that Interactive Landscape. Yet to become

aware of the affordances added by the interactive aspects of these landscapes they, to a large extent, rely on the participating role of the spectators – e.g., *21 Swings* affords the individual user to produce tones (user-technology), yet only other users afford the production of melodies (user-user). This requires future research into Interactive Landscapes look beyond the one-to-one relationship between users and artefacts or technologies.

Towards embodied augmentation

The case studies show that all of the affordances (potential or shaped) for *Dasein* are omnipresent within the Interactive Landscape, both in their active and inactive states. As I have mentioned before without a means with which to manifest itself, *Dasein* fades into the background. There is no evidence that the ways for Dasein to manifest itself in physical space have been reduced over the past years. However, the emergence of hybrid spaces and the ubiquitous ways to access the virtual space, have caused a shift in awareness of affordances from physical space to ubiquitous personal devices (de Souza e Silva 2006). Thus, the optional manifestations of *Being-there* now have to compete with the ubiquitous '*being-somewhere-else*' affordances of the mobile phone.

Augmenting the analogue landscape is something that is not new. Thus far these augmentations mostly relied on the screen-based devices. As these devices stand in between the self and the environment, attention focuses on the screen instead of the actual tangible space. These cognitive augmentations divert the attention from the physicality of the landscape.

Within Interactive Landscapes, the objects in the landscape are augmented through embodied interaction with the landscape itself. It is this embodied character that, to a large extent constitutes *Dasein*. This study does not reveal the intentions of the users when using the landscape. It is likely that to the user *Dasein* is a by-product of this embodiment, rather than a goal on its own.

To create awareness for *Dasein,* we can no longer rely on the affordances of Fields of Free Action as defined by Reed (1993) and the potential affordances of the environment. By promoting embodiment and the physicality of the environment, we shape the affordances to make them stand out in order to make the affordances more perceivable. Still, both case studies show that mere perception of the affordances does not seem to be enough for the affordances to become utilised. For this, a strong dependence on playful characteristics like curiosity, exploration and reflection for utilising these landscapes is needed. The open-ended nature in which these playful

elements are presented provides a sense of ownership over the landscape that it lacked before (Lefebvre 1991). By making people drop their usual motives for movement and action, their relations, leisure activities, and work and by drawing them to the attractions of the environment, both of these Interactive Landscapes can be considered as a contemporary dérive (Débord 1958). In its modern form, the agency of dérive is shifting from the person towards the interactive objects in the terrain, as they now actively draw people in.

## Conclusions

In the introduction of this paper, I have pointed out that many experiences have gone from being developed in a physical and social context to take place in a private virtual environment. In this thesis, I have introduced Interactive Landscapes as a specific form of pervasive media, which may form a turning point for this dissocializing trend.

By doing an affordance analysis of two Interactive Landscapes, I have revealed that objects that form these Interactive Landscapes embody an environment of tactile technology in which visitor, virtual space and physical space become one. In these landscapes, there is no separation between the self and the world, as it can be seen in Cartesian philosophy. I have used Heidegger's notion of *Dasein* to show that there is no mind/body problem since both are inherently linked to the world via engaged interaction with it. Whereas traditional landscapes only reveal themselves when *Dasein* manipulates it, Interactive Landscapes take on active agency in revealing themselves and invite users to interact with physical space. Both case studies showed that the identity, structure and meaning of the landscapes present an open-ended order and leave room for the citizens to create their own spaces and activities.

I hold that the embodied interaction present within Interactive Landscapes touches and manipulates the physical environment far more directly than the screen-based interactions of the mobile phone. Through the interactions with these landscapes, people come to know about their surroundings and themselves. Besides, by actively engaging with these environments, the user becomes the designer of the space he is a part of. In this designing of the space lays the construction of *Dasein*.

The case studies show that Interactive Landscapes meet the criteria of McQuire (2008) as referred to in the introduction since both Interactive Landscapes offer new ways to extend sociality. These social networks are not pre-given or mediated through dominant interfaces but rather constructed 'on the fly'. By affording reflection, negotiation, and reciprocity, Interactive Landscapes allow for a deepened

'reflexive' potential of contemporary society. This is unique to this form of pervasive media, and what makes this phenomenon a profoundly different experience of hybrid space than mobile phones.

The focus of this thesis was to explore the phenomenon of Interactive Landscapes and its significance to the field of humanities. I have chosen to relate the physical aspects of the landscape to some key aspects of *Dasein*. Clearly, *Dasein* is a far more complicated and multifaceted concept than presented here. However, the main goal was to show the embodied nature of the interactions these Interactive Landscapes facilitate.

I have decided to use affordance analysis as a stepping-stone for introducing Interactive Landscapes as a form of pervasive media. This allowed me to focus on the experience these objects provide and how they affect *Dasein*. As this analysis has pointed out, it is valuable to look beyond the one-to-one relationship between the user and the landscape. For this reason Actor-Network Theory (ANT) (Latour 2005) may offer an alternative approach to analyse the concept of Interactive Landscapes. ANT may also help to understand the role of agency in the relation between the Interactive Landscape and its users. This seems very relevant in the case of embedding media in physical urban space. When designing Interactive Landscapes, users cannot be looked upon as mere puppets being thrown around by social forces. Users are true actors who can create their path incorporating those influences. Public space is assembled of multiple complex social, political and economical networks that overlap and are catered by the Interactive Landscapes, e.g., the presence of the warning signs on the seat posts of *21 Swings* raise awareness of the complexity of the Actor-Network. Looking beyond the object-spectator relation, the network extends from the various people, materials and disciplines involved in its creation to the various roles of the spectator, their backgrounds and age, etc. As this will certainly reveal many new insights to Interactive Landscapes, using ANT is recommended for further research.

This first study focussed on two Interactive Landscapes and has shown to deliver such rich insights an extension to other Interactive Landscapes seems warranted. Extending this affordance analysis to a wider range of Interactive Landscapes like: *Piano Stairs* (The Fun Theory 2009), *Urban Echo* (LUSTlab 2011), Urbanimals (LAX: Laboratory for Architectural Experiments 2015) or Plug-in-Play (Rockwellgroup 2010) will undoubtedly reveal more or different ways these Interactive Landscapes affect the notion of *Dasein*. Given the globally scattered presence of these Interactive Landscapes, this may require an international study.

To create a broad understanding of how a phenomenological concept like *Dasein* is affected by Interactive Landscapes, ethnographic research is a highly recommendable method for further research on this topic. A limited access to these landscapes did not allow me to perform a deep ethnographic analysis of the users in these landscapes. As mentioned I have visited *Marbles* once and used the exhibited version of *21 Swings*. Besides that I have analysed video sources, photographs and interviews of the landscapes. A good accessibility to one or more Interactive Landscapes will allow for a deeper ethnography. This may allow capturing intensions, behaviour, and motivations of people within these landscapes.

There is also great relevance to the political aspects of these forms of pervasive media. Questions like: Who commissions these kinds of expensive landscapes and for what reason, and who gains from these projects, are very relevant to the debate on the political economy of new media like these.

Finally, I also see the relevance of a deeper comparison between Interactive Landscapes and more common forms of pervasive media like the mobile phone regarding agency or politics in the interfaces. As this study shows, Interactive Landscapes effectuate a substantially different behaviour than mobile hybrid spaces. The field of humanities needs to pay strong attention to the effects of how people access (i.e. public or private) these kinds of media.

## Bibliography

Benjamin, Walter. *The arcades project*. Edited by R. Tiedmann. Translated by H. Eiland and K. McLaughlin. Cambridge, MA: Harvard University Press, 1999.

Boomen, Marianne van den, and Ann-Sophy Lehmann. "Material Object Analysis." *New Media Studies Method Reader* 9-14.

Bouwman, H, M De Reuver, N Heerschap, and H Verkasalo. "Opportunities and problems with automated data collection via smartphones." *Mobile Media & Communication* 1 (2013): 63-68.

Daily tous les Jours. *21 Balançoires*. 2011. http://www.dailytouslesjours.com/project/21-balancoires/ (accessed April 26, 2016).

de Souza e Silva, A. "From cyber to hybrid: mobile technologies as interfaces of hybrid spaces." *Space & Culture* 9, no. 3 (2006): 261-278.

de Souza e Silva, A., and L. Hjorth. "Playful Urban Spaces A Historical Approach to Mobile Games." *Simulation Gaming* 40, no. 5 (2009): 602-625.

Débord, G. "Theory of the Dérive." *Internationale Situationniste*, no. 2 (1958).

Dourish, Paul. Where the action is: The Foundations of Embodied Interaction. Cambridge, MA: The MIT Press, 2004.

Firth, J. "Communicating Through Location: The Understood Meaning of the Foursquare Check-In." *Journal of Computer-Mediated Communication* 19 (2014): 890–905 .

Gaver, W.W., et al. "The drift table: Designing for ludic engagement." *CHI EA '04*. ACM Press, 2004. 885-900.

Gibson, J.J. *The ecological approach to visual perception.* Boston: Houghton Mifflin, 1979.

Gonçalves, Smara, and Carlos, Miranda. "The Ludic Dimension of Public Space: A Strategy for the Creation of Collective Memory." *ERAU '12*. Porto: Faculdade de Arquitectura da Universidade do Porto, 2012. 430-435.

Hammond, Drew, and Anthony Townsend. "Smart Citizens." Manchester: Future Everything Publications, 2013.

Heft, Harry. "Affordances of children's environments: a functional approach to environmental description." *Children's Environments Quarterly* 5 (1988): 29-37.

—. Ecological Psychology in Context: James Gibson, Roger Barker, and the Legacy of William James's Radical Empiricism. . London: Lawrence Erlbaum Associates., 2001.

Heidegger, M. *Being and Time*. Hoboken: Blackwell, 1967.

—. The basic problems of phenomenology (Studies in Phenomenology and Existential Philosophy). Bloomington: Indiana University Press, 1988.

Husserl, Edmund. *The Idea of Phenomenology*. Translated by Lee Hardy. Dordrecht: Kluwer, 1999.

Kelly, Kevin. Out of Control: The New Biology of Machines, Social Systems and the Economic World. New York: Perseus Books Group, 1995.

Kostakos, V., E. O'Neill, and A. Penn. "Designing Urban Pervasive Systems." *Computer* 39, no. 3 (September 2006): 52-59.

Kyttä, M. "Affordances of Children's Environments in the Context of Cties, Small Towns, Suburbs and Rural Villages in Finland and Belarus." *Journal of Environmental Psychology* 22 (2002): 109-123.

Lasén, A. "How to be in two places at the same time? Mobile phone use in public places. ." In *Mobile communication in Everyday Life. Ethnographic Views, Observations and Reflections*, by J. Höflich and Hartman M., 227-252. Berlin: Frank & Timme GmbH, 2006.

Latour, B. Reassembling the Social: An Introduction to Actor-Network-Theory. Oxford: Oxford University Press, 2005.

LAX: Laboratory for Architectural Experiments. *Urbanimals*. 2015. http://lax.com.pl/portfolio_page/urbanimals/ (accessed Juni 07, 2016).

Lefebvre, H. *The production of space*. Malden, MA: Blackwell, 1991.

Luke, R. "The phoneur: Mobile commerce and the digital pedagogies of the wireless web." *Communities of Difference: Culture, language, technology* (Palgrave MacMillan), 2006: 185-204.

LUSTlab. *Urban Echo*. 2011. http://lustlab.net/ (accessed December 28, 2015).

McQuire, Scott. *The Media City Media, Architecture and Urban Space* . London : SAGE Publications Ltd , 2008.

Mensvoort, Koert van, and Hendrik Jan Grievink. *Next Nature: Nature Changes Along with Us*. Barcalona: Actar, 2012.

Merleau-Ponty, M. *Phenomenology of Perceptio* . Translated by C Smith. London: Routledge and Kegan Paul, 1962.

Oosterling, Henk. "Dasein as design or: Must design save the world." *premsela.org*. 01 April 2009. http://bit.ly/1UiO8lw (accessed June 01, 2016).

Raessens, J. "Playful Identities, or the ludification of culture." *Games and Culture* 1, no. 1 (January 2006): 52-57.

Reed, E.S. "The intention to use a specific affordance: a conceptual framework for psychology." In *Development in Context. Acting and Thinking in Specifc Environments*, by R.h. Wozniak and Fischer. K.W. Hillsdale, NJ: Lawrence Erlbaum Associates, 1993.

Reeves, S. *Designing Interfaces in Public Settings*. London: Springer-Verlag, 2011.

Richardson, I, and R Wilken. "Parerga of the Third Screen: Mobile Media, Place, and Presence." In *Mobile technology and Place*, by R Wijken and G Goggin, 181-197. Hoboken: Taylor Francis, 2013.

Rockwellgroup. *Plug-in-Play*. 2010. http://www.rockwellgroup.com/projects/plug_in_play (accessed June 07, 2016).

Ruis, E. "The New Ludic City: From hybrid play towards embedded play within urban spaces ." Midterm paper, University of Utrecht, 2015.

Sheller, M., and J. Urry. *Mobile Technologies of the City*. London: Routledge, 2006.

Studio Roosegaarde. *Marbles*. 2012.
https://www.studioroosegaarde.net/project/marbles/ (accessed April 26, 2016).

The Fun Theory. *The Fun Theory*. 22 09 2009. http://www.thefuntheory.com/piano-staircase (accessed 10 26, 2015).

Turcot, Laurent. "Promenades et flâneries à Paris du XVIIIe au XXIe siècles. La marche comme construction d'une identité urbaine." In *Marcher en ville. Faire corps, prendre corps, donner corps aux ambiances urbaines.*, by Rachel Thomas, 65-84. Paris: Editions des Archive Contemporaines, 2010.

Weiser, M. "The Computer for the 21st Century." Scientific American Special Issue on Communications, Computers, and Networks, 09 1991: 94-104.