PLAYFUL INTERACTIONS:
A CRITICAL INQUIRY INTO INTERACTIVE ART AND PLAY

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Thesis submitted in partial fulfilment of the requirements of the University of the West of England, Bristol for the degree of DOCTOR OF PHILOSOPHY

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Acknowledgements

I would like to start by writing my heartfelt THANKS to all those who have supported me. Thanks to Professor Jon Dovey, supreme Director of Studies and Dr. Tracey Warr, brilliant second Supervisor, who both guided me wisely - and put up with my stubbornness about making artworks. Thanks also to the Digital Culture Research Centre and the Pervasive Media Studio for supporting my research projects. Gold-dusted thanks to all the great people who supported the making of the artworks: funders, galleries, curators and in particular Dr. Tom Mitchell and Tarim - the best programmers and technologists there are! Penny Laslett deserves a special, from my heart, thanks for always giving me support. Last but not least, family and friends who put up with my 'I am working, I am sorry I just need to…' excuses. I am especially grateful to my Dad, who taught me to take one step at a time and not to panic, and to my Mum, for telling me she is proud of me and to 'Get on with it!'. If any mistakes are found in this thesis, they are due to the cat Cumulus' disrespect for keyboards. However Cumulus the cat must also be duly thanked, since she is the only one, who, throughout the write up, encouraged me to stay at home - happily keeping me company by my computer. We had lots of deep conversations, some about play, but mostly about food.

ABSTRACT

My practice-based doctoral research explores how I, as an artist, can create conditions and possibilities for playful interaction in and around interactive artworks. Using practice-based research methods four artworks were created, presented and examined in relation to my research questions concerning play. The three key research questions were:
1] How do the properties and affordances of materials and technologies foster play and interactions?
2] How can artists conceptualise physical participation and play in interactive artworks?
3] What kind of play takes place in and around interactive artwork?
My inquiry focused on the development of a model for making playful and interactive artworks and the creation of a vocabulary of play, which demonstrates the different kinds of play initiated through my practice and research. The model provides alternative ways to think about the role of play within interactive art and consists of a series of tangible making gambits for eliciting playful interactions from the audience. The model will be useful for future interactive artists, as well as other fields concerned with the creation of playful experiences. Underpinning my process of creating playful experiences were methods of observation of the participants' interactions, which were used in order to enable change and improvement of the artworks throughout the research process.

I argue that by employing a sculptural approach to interactive art, using the visual arts tradition of working with the properties of materials and affordances of technology, an invitation to play was created. I propose that to focus on the material's affordance, rather than on interactive systems, provides additional ways to create interactivity. I also suggest that by understanding technology as a sculptural and embodied material we can move the focus from the technology to what the art does and says. In this sculptural playful interactivity audience members are allowed and encouraged to touch and physical and immersive participation is invited. I explored the body as a particular mode of interaction that can bridge the divide between doing and looking in the gallery, developing theories of the playful body and how audiences connect through play. I argue that the combination of sculptural, captivating interfaces, where the artwork reacts reliably, enables the audience to develop play mastery and become fully engaged. These playful interactions invite people to be curious and seek to engage audiences into dialogue, thereby opening up the possibility for play. Play is an essential pre-condition for the emergence of possibilities and, as such, it is the flexible structure by which meaningful interaction can arise. These interactions are not about our relation to technology but rather about new ways of experiencing culture. In this context interactive art is part of a wider change in contemporary art, where artists are creating culture to be experienced rather than consumed.

INTRODUCTION
I PLAY THEREFORE I AM

PLAY is older than culture, for culture, however inadequately defined, always presupposes human society, and animals have not waited for man to teach them their playing (Huizinga, 1950: 1).

Research context

A growing number of artists today are pushing forward the exploration and understanding of audience interaction. As new technologies emerge different ways to creatively interact and collaborate emerge with them. There is a blurring of the boundaries between artists, audiences and participants that promotes new ways of interacting. This shift between doing and looking (in the gallery) is where my research and practice is positioned.

It is clear that there is an emergent field within the visual arts which explores a range of different tactics to generate interactive experiences. This is evident in the number of artists working to create spaces in which audience interactions take place. Artists are working with the 'peculiar pleasures of interactive art, how the relationship between artist and audience is changed' (Graham, 1997b: 161). These artists are exploring a 'critical vocabulary for exactly what (interactions) might relate to who, and in what way' (Graham and Cook, 2010b: 2). It is this interactive vocabulary, or the grammar for interactivity, as Japanese artist and professor Masaki Fujihata (2001) calls it - these gambits of making, combined with play theory, that my research is concerned with.

There are also an increasing number of audiences who both want and expect to interact with the artworks at exhibitions, as demonstrated by the higher attendance numbers at exhibitions such as Digital Arts Weekend at the V&A and at Höller's recent exhibition in New York (2012). These audiences are part of an evolving vocabulary of interaction and gestures between participants and artwork. Our environments are also becoming increasingly interactive and sensors are evoking embodied interaction. Children are

becoming accustomed to this new worldview through toys that, more often than not, react to them:

> The "dead" world of objects before intelligence and interactivity will not exist for them, and, as they grow to adulthood, they will likely demand that the world remain as pliable as they remember from their youngest days (Pesce, 2000: 8)

We are becoming players in the gallery, moving away from *a stand back, look; don't touch* audience to an active participating culture. In this context play is a persuasive and powerful tool. It can change people's behaviour and inspire audiences to interact, rather than simply observe. In fact the 'hallmark of play is that anyone can do it' (Brown 2010: 20). Evidence from artists and researchers is beginning to show that play is an important element in interactive art. In fact, as Andy Polaine's research highlights:

> Creating a seductive invitation to play is critical to those working with interactive media. Without this, audiences do not even begin to engage with the rest of the work, its meanings, its depth (2010: 91).

There are currently only a few models for creating interactive artwork that centre on making playful artwork from a visual art viewpoint. My research builds on Polaine's research, as quoted above and on the PhD thesis of Brigid Costello (Computer Department, University of Technology, Sydney, Australia, 2009) who both contribute considerably to the subject. Costello developed four useful strategies for stimulating play. I partly build on two of her strategies: 'the power of the sensual', in particular, the use of the body and, secondly, her strategy of 'responsiveness', which argues that responsiveness is essential to keeping audiences playing. (I describe this in more detail in the analysis). A significant difference between her research and mine is Costello's methodological focus on the development of an evaluative framework. Her play framework is an evaluation tool developed via dialogue with the participants and the emphasis is on how the audience describe their play experiences. Together with the audience she develops thirteen characteristics, or descriptions[1], of play. In contrast, my research uses observation as part of my making process and does not include what the audience might think or feel. Rather, my observations are used to find out what people do – how people physically interact with the artwork. Costello further suggests that it might be beneficial to train participants in the evaluation processes. She notes that:

> As some of the case study results indicated, play can get in the way of reflective engagement with an artwork. Play can make an audience so focused on "what they

> can do" that they never contemplate the meaning of "what they are doing" (2009: 188).

This last comment is particularly interesting in the context of my research, which in contrast, seeks to generate experiences of play and flow, when we forget what we are doing (Csikszentmihalyi, 2009a).

I also build on Beryl Graham's research into the audiences' concerns and relations with interactive artwork in a conventional gallery and museum setting (1997a, 1999, 2010a). Graham addresses a main issue in interactive artwork, namely defining and understanding audience behaviour and notes that:

> I became aware of problems that occur when people come across interactive artworks in galleries — the queues, the lurking, the apparent confusion over what to do, etc. Despite talk of the revolutionary potential of interactive art to change the audience-artwork relationship, there is very little practical information available about that relationship (Graham, 1999: 327).

My research contributes to Graham's concerns from an artist's point of view, as opposed to the curatorial viewpoint that Graham represents.

Finally, my research is also informed by Mary Flanagan's research. Flanagan provides rich insight into the development of art games and their links to play theory. She provides a range of examples of artists and game designers whose design actions and methods emerge through their use of play. Even though her field of research (games and pervasive media) is positioned outside the scope of my research, many of her observations are relevant. She argues, as I do, that we need to pay attention to the gambits of making and possibilities that are created through the making process itself. Flanagan notes that as play and games become a growing part of culture, there is a need for artists and designers to work with an awareness of 'what those games are designed to be, what one does in them, and how play is constructed within them' (2009: 253).

My PhD contributes to this field by creating a tangible model for making playful interactions and by developing a vocabulary of the play observed in and around interactive artwork. This type of play vocabulary and model of making has not been articulated before in the context of visual arts and will be of use to other practitioners seeking a way to conceptualise play within interactive art. My research is carried out through a practice based methodology, which is understood as an original investigation undertaken to gain new knowledge, partly from, and by means of, creative practice. The

original knowledge and insight arising from my practice provides alternative ways to think about the role of play within interactive art. My practice combines sculptural and electronic elements and is concerned with playability and interactivity. The artworks are intentionally accessible through the use of location and materials and they often hum and react with a playful, animated life that is liable to take people by surprise. Projects are centred on the use of interactive technology and location tracking, everyday materials; for example shoes and capes, bridges and streetlights, balloons and coloured blobs, as well as elements such as water, sound and light are used to develop spaces where playful experiences and immersion take place. I explore the use of the body as the site of playful interaction and, in my research, interaction is habituated in the body and is both physical and visible, involving gestures, jumping, swimming and touching. I use the term interactive art - this is ultimately what my practice is concerned with – the dialogue of interaction that is enacted between artwork and audience. Ultimately, my practice aims to provoke curiosity and connect people with their immediate environment, the artwork and with each other. Using visual art and sculptural making methods I created four playful interactive artworks to investigate the research questions. These artworks form the core of my inquiry into creating playful interactions. *Echidna* (2010) is an interactive sound sculpture that looks like a fussy tumbled creature that has its own (electronic) voice, which squeaks and reacts to human presence. *Catch Me Now* (2010) is an interactive light work that plays with the audience, enticing them into a merry dance of catch. *The Big Swim* (2011) is an immersive light installation, where participants swim in a cloud of light and colour in a swimming pool. This work was part of the Cultural Olympiad. *Tracking You* (2012) is a playful, wearable, sound installation that uses participants' movements to generate interaction, connecting the body, technology and sound to explore audience participation and how to elicit collaborative play. The four artworks were seen to unlock multiple playful behaviours; audiences danced, jumped in light puddles, played tag, did cartwheels, made "play victory" poses and I witnessed lots of laughter, gambolling, joyful play fighting, and impromptu performances. My thesis will argue that interactive art is an important part of wider changes in contemporary art, moving beyond representation to creating experiences. I suggest that the body and the creation of playful experiences as a particular mode of interaction can bridge the divide between looking and doing. My research is therefore focused on physical interaction, exploring the body as the site of interaction[2] and developing theories of the playful body. I further propose that the use of a sculptural approach utilising material properties and

technological affordance[3] can lead to new methods for creating playful interactive artworks.

It is worth noting that I use both the terms affordance and properties intertwining them to describe an object's interactive abilities, materials' play affordances and properties, and features of an environment. The term affordance (coined by Gibson) can be described as the function, or quality, perceived about an object or material. Properties, on the other hand, are often understood as an actual physical attribute and qualities of a material. Often the terms properties and affordance are intertwined. Different disciplines use them differently, for example, designers talk more often about affordance whereas sculptors use the word properties to talk about the materials they work with. In addition some people differentiate between 'actualized affordances', which are considered as tactile and shaped affordances and those that are 'actualized passively', namely perceived affordances (Kyttä, 2004: 181).

Figures clockwise:
Fig. 1 *Echidna* interactive sound sculpture by Tine Bech 2010
Fig. 2 *Catch Me Now* interactive light installation by Tine Bech 2010
Fig. 3 *The Big Swim* light installation by Tine Bech 2011
Fig. 4 *Tracking You* interactive sound installation by Tine Bech 2012

Research aim

My practice-based doctoral research is centred on the making process – discovering the gambits of creating playful interactions that will inform my own practice and future artists making, as well as others interested in playful interaction. A gambit is understood as a method for creating something – in my case playful audience interactions. The gambits of play presented in the analysis are a series of making tactics and elements employed to create playful interaction. The word is also derived from Dan Lockton's research *Design with Intent*[4]. My research also focuses on observations and the development of a play vocabulary, demonstrating the different kinds of play initiated through interactive artwork, in order to create an affective model for audience engagement. The research is concerned with creating playful art experiences and is linked to play theory and interactive art practices. Through my own practice, and with reference to others, I look at how we can create conditions and possibilities for play within interactive artworks. It is important to note that my research questions are not answered conclusively. The nature of practice based research means that within an art context knowledge is not replicated or reproduced; the artworks are instead examples of knowledge (Scrivener, 2000). Play is inherently unpredictable and ambiguous as Sutton-Smith describes (1995). I therefore, in accordance with Costello, reject the notion that it is possible 'to create a formula for developing a playful experience' (2009: 11). Instead, the findings from my practice will provide gambits for making and strategies, which will enhance the field of research into audience interactions and playful experiences. The intention in making a model for creating playful interactions is not to define a good or successful interactive artwork. What is of interest to me is the interactive behaviour elicited by the artwork; what kind of interaction takes place? Did the work unlock playful behaviour? If so what kind? The focus is on the making process, exploring how the inherent properties and affordances of materials or technologies promote play and interactions. I investigate in what ways materials and technologies both can entice the audience in as well as imply how they might interact. Similarly my inquiry also examines how the levels of readability and reliability of the artwork enable, or hinder, interaction - how they shape agency and play.

Research question

Three key research questions were drawn out from the above (subsidiary) questions and sustain the practice based research inquiry throughout:

1. How do the properties and affordances of materials and technologies foster play and interactions?
2. How can artists conceptualise physical participation and play in interactive artworks?
3. What kind of play takes place in and around interactive artworks?

Research area

My research is located within the field of visual arts and the research is underpinned by two key theoretical orientations; play theory and interactive arts practice and contemporary artists who work with, or across, these two categories. My main methodology is practice based research and five artworks were produced and exhibited in conventional cultural spaces; art galleries, museums and art festivals. One project, *The Big Swim,* took place in a non-gallery environment, namely a swimming pool. However, *The Big Swim* was a participatory art installation, which was part of an art festival and the pool, in this context, became a gallery. This also highlighted that my research area is within cultural spaces (galleries) and not art in public spaces (public art)[5].

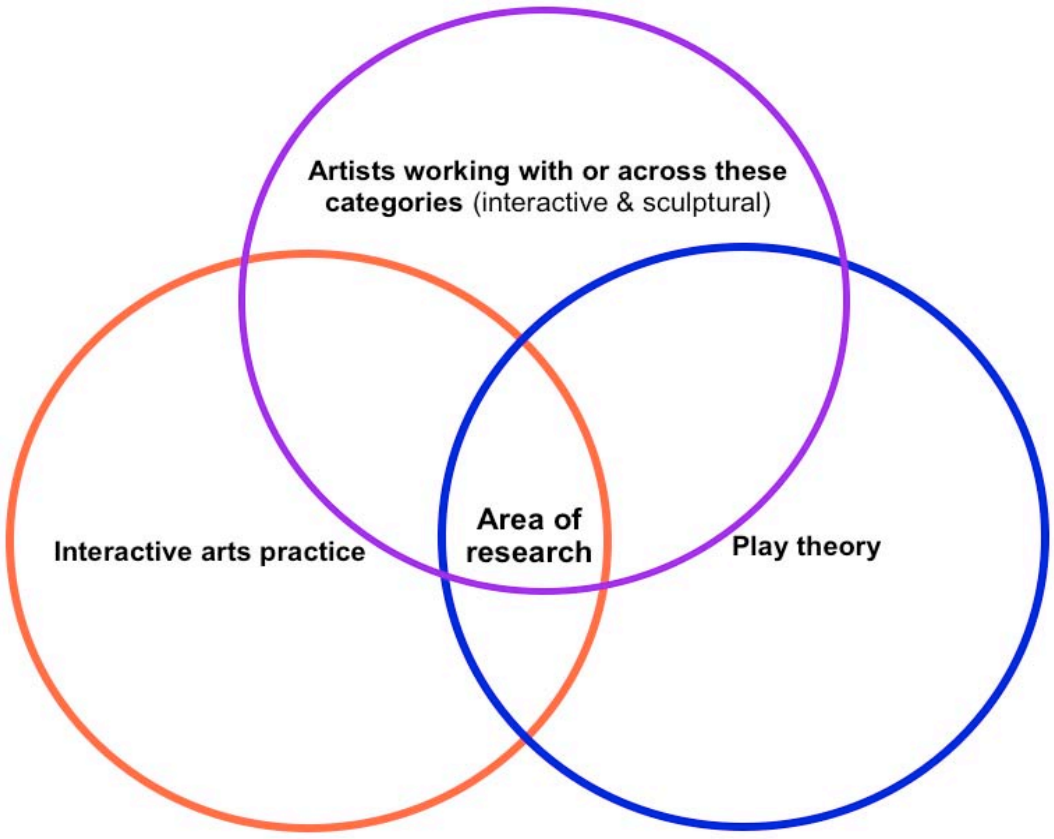

Fig. 5 Venn diagram of my research area

As the background to the research chapter will show, both play theory and interactive arts practices are wide fields that involve several related disciplines. It is therefore important to make clear that interactive art is understood mainly from my background of visual art and that my approach to interactivity arises from a sculptural point of view. Similarly, in the context of play theory, I do not include game theory, as I do not consider it a relevant area to my research field of sculptural interactivity, which aims at more open ended experience than gaming. Closely related areas, such as media art and participatory art, are briefly touched on in order to distinguish my own practice, rather than to make an in-depth analysis of these fields. The research is informed by play theory and, whilst I touch on why we play, my aim is not to explore why humans play. Sociological, ecological, and psychological studies on interactivity and play are also beyond the scope of this thesis. Rather, artworks are analysed from a perspective of play theory and visual arts making methodologies.

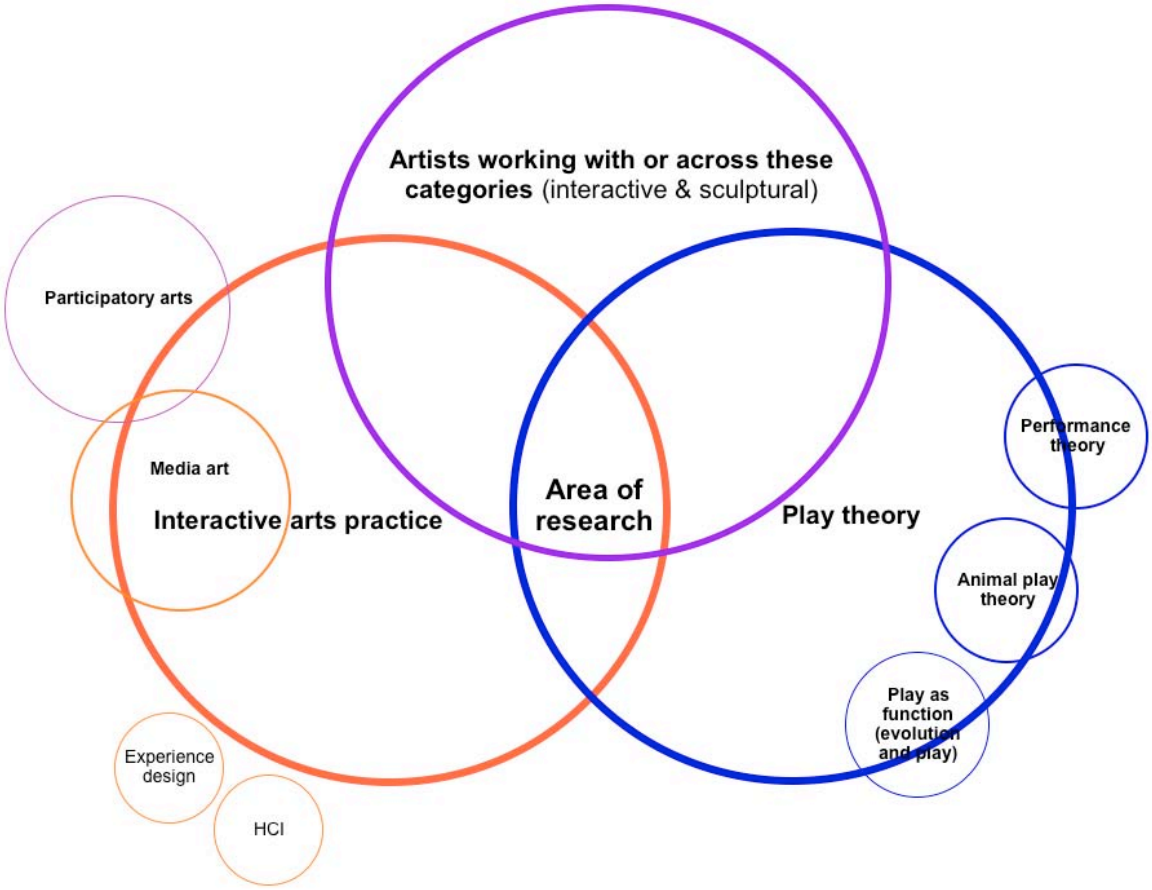

Fig. 6. Venn diagram illustrating the expanded research area and the cross disciplinary nature of both interactive arts and play theory

Two fields sit completely outside my research field, namely Human Computer Interaction (HCI) and Experience Design[6]. I recognise that it is possible to argue that my research is linked to HCI, due to the focus on audience engagement and interfaces, or that it can be connected to Experience Design because of my aim to create playful experiences. However, I do not consider these fields to be central to my research and I will briefly explain why. My intention is not to direct participants to reach a specific goal or a new (game) level as is often the case within an HCI process, instead, my artwork is understood as open artwork where a range of possible play outcomes is desirable. Nor is my purpose to create an exact and reliable outcome that leads the audience to a specific experience that is repeatable, as is the case within an Experience Design user journey. Furthermore, art making is often an open process which allows for ongoing changes and unpredictable outcomes. Another key difference is that Experience Design and HCI are usually focused on a commercial end-goal. This is mainly due to their close links to the consumer market. For better or worse, company strategy in today's attention economy is to sell the experience of their products and services. The advantage of this strategy is that a company's success is dependent on the consumer's memory of the experience, not the quality of the product[7]. Finally, if we look at the model by Javier Cañada who has created a grid that takes into account all the different disciplines, themes and key designers within user experience design, then my research - a visual arts approach to making interactive playful installations - sits outside this grid. My research is concerned with the components of making sculpture and interactive artworks and draws on play theory in order to generate possibilities for play.

Fig. 7 *The User Experiences Comos v 1.1*, by Javier Cañada. See appendix page 266 for the full model.

Outline of the thesis

My thesis follows an art practice based research structure, in which the artworks are placed at the core of the research (see Gray & Malins, 2004: 165-167). I have developed my thesis structure after taking the advice on various research models approved in the UWE Postgraduate Research Handbook 2007-8 (see footnote[8] for full details).

My basic generic structure for the written submission consists of:

1. Introduction – I describe the research proposition, my interests and establish my research question
2. The background to the research - examines current theory and knowledge relevant to identified issues and aims, interests and concerns. This takes the form of a contextual review rather than a literary review
3. Methodology - defines my system of methods and principles used within the context of the research and discusses my personal practice as research
4. Catalogue - having established my research questions, the background to my research and my strategies for making, I explain the artworks produced. I reflect on my making process and observations of the audience's interactions
5. Analysis – I analyse the findings accumulated through the practice and present my theoretical and practical positions arising from my research. This discussion also draws on a further contextual review in addition to that set out in the background to the research
6. Conclusion – I summarise the analysis and draw together the wider implications of my research findings
7. Appendix

Finally, I have documented my practice based research in the form of a website, which is also available on a DVD. Five artworks are presented, four of which form the substantial core of the catalogue and analysis.

Footnotes can be found at the end of each chapter.

Outline of the chapters

The thesis begins by establishing the area within play theory and interactive art practices which forms the platform for my discussion into playful interactions. In the play theory section I identify key play theories and my criteria for recognising play behaviour. I also briefly explore the 'function of play'. In my discussion concerning interactive art I

describe my definition and make clear my approach to participation, interactivity and technology. Following on from this I briefly touch on embodied interaction, before raising questions regarding whether playful artworks can become meaningful. Finally, I investigate the audiences' playful behaviour in and around current contemporary interactive artwork.

In the methodology chapter I outline my practice based research approach and the underlying visual art methods of making artworks. Significant to my methodology is my use of observation as a way to record audience interactions with the artwork and as a way to test the artworks. These observations focused on testing the artworks interactivity and playability and took the form of direct observation. During the observations I also documented the work, recording and photographing moments of interaction, which further functioned as evidence of the play behaviour witnessed.

In the catalogue I describe four artworks which use sculptural interactivity in order to activate the viewer into playful interaction. As described earlier these artworks are; *Echidna* (2010), an interactive sound sculpture where I explore how to create playful interaction using a tactile interface. By using an electromagnetic field to create an invisible and, therefore, surprising interface, I also examine the notion of animating technology and sculpture. *Catch Me Now* (2010) is an interactive light work, where I investigate how I can use material and technological affordance to create play and performance. The artwork turns the conventional notion of a spotlight following you on its head by creating a simple interface; an encompassing spotlight that runs away, leads participants on a chase and into play. *The Big Swim* (2011) is an immersive light installation, which was intentionally accessible and investigated how to transform familiar surroundings through a captivating community experience and thereby evoke playful art experiences. *Tracking You* (2012) is an interactive, wearable, sound installation in which I aim to create collaborative play and confirm research findings from the previous artworks around a reliable and consistent interface. I describe the making process of these artworks and the outcome of my audience observations. I also explain why one of the artworks, *Chromatic Play* (2012), an interactive light installation, was not included in my final thesis.

In the analysis I collate the insight and knowledge arising from my practice into a practical model for creating playful interactions. These findings are assembled into a

series of making gambits focusing on what I consider to be the most important requirements when creating interactive artworks, namely; a sculptural approach to interactivity (The agency of materials), a bodily and physical interaction (Don't just stand there, DJST), a reliable, simple interface (Robust, Readable & Reliable) and emergence (Open work), which leads to play mastery and agency (Play mastery and taking ownership) and finally I cover issues around creating collaborative and singular play.
In the conclusion I summarise the model and my contribution to knowledge arising from my PhD. I end with additional comments and research findings originating from my research. In the postscript I contemplate possibilities for future research in the field.

The appendices provide a collection of supporting materials and primary evidence, such as observation notes, and selected documentation and sketches of the making process. The majority of the visual supporting material; photographs, in addition to those presented in the catalogue, are presented online, at a dedicated PhD website at http://www.tinebech.com/Research/ that the reader can explore while reading the catalogue. This website is also designed for the examiners to be able to view the artworks (catalogues) as well as to observe the evidence of audience interactions. These documentations of the artworks produced are echoes and traces of the encounter itself, which, in the context of practice based research, constitute the available evidential proposition of the thesis. The structure of the website is simple; navigate to the research page which has a PhD section where the practice is presented in the PhD catalogue, with photos and videos. Each artwork: *Echidna, Catch Me Now, The Big Swim* and *Tracking You* has a dedicated page following the same structure showing an edited video of the artwork, short unedited videos, and a subpage with observations containing photos with moments of the audiences' playful interactions. The observations of *The Big Swim*, as will be explained in the methodology and in the catalogue, employed additional methods, most of which are in the appendix. The visual evidence on the website for *The Big Swim* shows edited video and observations photos of *The Big Swim*.

In the context of documentation and observation it should also be noted that the videos and photographs are supporting material rather than my main evidence. As will be described in my methodology chapter, my analysis and evaluation mainly employs direct observation, corroborated by my note taking and peer reviews conducted by a third person, often an artist or student researcher. Finally, it should be noted that a fifth catalogue, *Chromatic Play*, is also included in the website's PhD catalogue even though

it is not part of my thesis catalogue. I decided not to include the work as it repeated research findings found in the other artworks. Nevertheless, visuals of the artwork and a few selected audience interactions are accessible in order to highlight moments of significance. I give more details about why I chose not to include this artwork in the catalogue introduction.

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[1] Costello's evaluation framework is developed in collaboration with the audience in order to describe the play they have experienced, and consists of thirteen play characteristics: Sympathy, Subversion, Simulation, Sensation, Fantasy, Exploration, Discovery, Difficulty, Danger, Creation, Competition, Captivation and Camaraderie. Her focus on language means she naturally draws on Piaget's theories of relations between play, thought and language. My research is different in that I use observation as part of my making process and this does not include what the audience thinks, rather, the focus is on their behaviour – how they play. Another notable difference is that her process also focuses on selecting the right participants to provide feedback.

[2] The body as interface does, in the context of my thesis, simply mean to use the body (wave arms, running and so forth) to activate the interface, rather than connotations of embodiment interaction as proposed by Paul Dourish (1999).

[3] The affordance of an object indicates how that object or feature can be used. Affordance of an environment, for example a flat surface, is that it can be used to run on; a bench's affordance is sitting, lying down etc. This, incidentally, is why so many public benches have armrests between the seats, or are slanted, to avoid people sleeping overnight in public spaces. Essentially affordances and properties tell us how things work, as described by Donald Norman:

> Affordances provide strong clues to the operations of things. Plates are for pushing. Knobs are for turning. Slots are for inserting things into. Balls are for throwing or bouncing. When affordances are taken advantage of, the user knows what to do just by looking: no picture, label, or instruction needed (1988: 9)

[4] *Design with Intent* is a toolkit consisting of a collection of design patterns, or 'gambits', for influencing user behaviour through design. Lockton takes the term gambit after Byron Lawson and explain that Lawson 'used the term 'gambit' to describe the 'repertoire of tricks' that experienced designers (and architects) are able to bring to bear on a problem, drawing from chess terminology' (Design with Intent toolkit wiki).

[5] A swimming pool is, regardless of being part of an art festival, also a public space. Whilst this could mean my research is concerned with public art, I do not cover this wider research area. I will briefly list my reasons: Public art is often (but not always) a permanent work of art concerned with

an area's identity, or it is a memorial; projects often have elements of community involvement, or have a political agenda, for example, concerns around the commercialisation of public spaces. Cartiere and Willis illustrate this wide social aim of public art and write that public art 'contributes to social changes, shocks, excites, challenges social convention, has meaning, educates, inspires, celebrates, and remembers, draws us together, envisions new paradigms and crosses disciplines, and is a catalyst for changes' (2008: 2). I do not consider a debate about public art relevant to my thesis because, although some of my artworks have taken place in public spaces, the majority have been presented in gallery, museum and other art contexts. Finally, it is worth noting that the gallery and museum field naturally has its own debates about audience interaction covering a wide field, such as no touch policies versus preservation, as well as how to exhibit artworks. All of these are areas I do not deem it necessary to cover in this study. Costello included some of this debate, in her efforts to define an exhibit parameter and explored how this potentially influences audience interaction.

6 Experience Design is the design of products, processes, services, events and environments where the focus is placed on the quality of the user experience. Human Computer Interaction (HCI) often involves the study and the design of the interaction between people or users and computers. For further definitions within these fields see Nathan Shedroff's extensive glossary at: http://www.nathan.com/ed/glossary/index.html

7 An example that illustrates the success of using experiences to create memories is Don Norman's description of Disneyland in which he highlights how people remember all the fantastic rides after visiting and not the horrible queueing (Norman: 2011).

8 UWE PhD Research Model number three (UWE handbook 2007-8 pp. 20-21):

I. Research Aims – identification of research aims
II. Introduction – the structure and nature of the PhD submission
III. Background to the research – A detailed interrogation of your practice to date in the context of other practitioners or specific artworks which have been significant for you.
IV. Methods and Strategies: The role of your practice as a research tool – experimentation/exploration you intend to undertake and how will it be evaluated? Research into existing work in the field should lead to a series of questions in which you are able to question the 'how' and 'why' of your own experimentation in the context of other work that has gone on before or that is happening at the same time.
V. Cataloguing: Chronological presentation, description and discussion of works undertaken for the PhD. This section should be illustrated, acting as a catalogue discussing the nature and significance of each artwork being presented as a part of the practical submission. This catalogue may also make reference to earlier works which are not in the PhD exposition.
VI. Summary of the findings of the practical research. New insights and ideas gained. A discussion of the dialogues developed during the period in which the work has been

undertaken. Discussion of the domain/context in which the work performs and its potential significance for other artists/designers/curators etc. Evaluation of the exploration/experimentation and the identification of key areas of findings in practice, intention, process, application etc.

VII. Conclusion

VIII. Bibliography.

BACKGROUND TO THE RESEARCH
PLAY THEORY AND INTERACTIVE ARTS PRACTICE

Play surprises and delights us, moves us and transforms us. There is, after all, something playful about play. It is this exacting ambiguity that makes play so rich, and potentially so valuable (Salen and Zimmerman, 2005: 85).

The real issue implied in 'art and technology' is not to make another scientific toy, but how to humanize the technology and the electronic medium
(Nam June Paik, cited in Youngblood, 1970: 308).

The research described in this chapter forms the background to my practice based PhD. As outlined in the introduction, my research area is located within the visual arts and is underpinned by two key theoretical orientations; interactive arts practice and play theory. The chapter consists of three sections: play theory, interactive art and play in and around interactive art. In the first part I give an overview of the play theory that informs my practice and analysis and I establish my own play definitions and criteria. In the second part I consider the many definitions of interactive arts practice (including my own). I then examine issues related to my interactive art definition, such as the notion of the body and participation within interactive art, before briefly touching on interactive arts in relation to contemporary art and technology, in order to establish my own practice. Following on from this, I consider meaningful interactions and play within visual art. In the third section I conclude with a review of a selection of contemporary interactive artists who create play behaviour and experiences; the field in which my PhD practice is located.

PLAY THEORY

In order to understand in what ways artworks can elicit playful interactions, and how artists can activate the viewer into playful participation, it is necessary to develop an understanding of play and its many theoretical orientations. I, therefore, in this necessarily short account of play, focus on the play theories relevant to interactive art and my practice. I draw on Caillois, Huizinga, Brown, Eberle, Sutton-Smith, Smith, Panksepp, Winnicott, Csikszentmihalyi, Schechner, Bateson, Pellegrini, Zimmerman and Salen, as well as animal researchers Fagen and Burghardt. Play theory covers many disciplines and approaches, such as: play in the context of anthropology and culture, play and performance, play in the context of child development (education) and psychology, as well as a large field exploring animal play. The approach taken here is that play is understood from an interactive art and visual arts methodology, however, I also draw on play from a cultural and ethological view point, employing the theory of 'play as function' – the notion that play serves as some form of adaptation (a function of evolution). This field often focuses on the advantages of play (and why we play), and lately on why we have historically idealised play (see Sutton-Smith, 1995 and Smith, 2010). The notion of play as progress was particularly dominant in earlier studies of children's play where the ethos was "play is a child's work" and children's play was understood as the acquisition of skills to be used later in life whereas adults play is seen as leisure. In this view children's play 'is not recreation. The adult steps sidewards into another reality; the playing child advances forward to new stages of mastery' (Erikson, 1950: 194-195). Today it is generally agreed that play does have a function but not all that was previously claimed. More recent research, coming from neuroscientific empirical evidence, supports aspects of the benefits of play, such as the generation of positive emotions (Panksepp and Biven, 2012), and also suggests that 'play's positive pleasure typically transfers to our feelings about the rest of our everyday existence', it is a 'viability variable' for adaptation (Sutton-Smith, 2008: 97) - play is how we are made – we are built for play (Brown, 2010).

I will now cover the key play theories pertinent to interactive art and my research. I also return to play theory on multiple occasions throughout the other chapters of the thesis, thereby building and forming theories of play within interactive art as the research developed.

Play theory for interactive art

Defining play is difficult, as anthropologist Brian Sutton-Smith notes in *The Ambiguity of Play*: 'we all play occasionally and we all know what playing feels like, but when it comes to making theoretical statements about what play is, we fall into silliness' (1997: 1). We are able to recognise an invitation to play[1] almost instinctively, but we do not know how to define it (Pesce, 2000). We hesitate to define play because, in its most basic sense, it is preverbal. It 'proceeds without a complex intellectual framework' (Brown, 2010: 15). As demonstrated in the artworks catalogued 'play is a thing of beauty best appreciated by experiencing it' (Brown, 2010: 15-16). Play means something different to each person – what is work to one person is play to another. Play is a broad field, which is illustrated in the many varieties of play forms, play experiences, play spaces, type of players, and play equipment. Ultimately, play is 'hard to pin down or define. It is a mood, an activity, a spontaneous eruption' (Schechner, 2006: 89).

Entering into Play

A key theorist for the interactive arts field is historian Johan Huizinga who refers to play as separate from ordinary life; that it is 'a stepping out of "real" life into a temporary sphere of activity with a disposition all of its own' (1950: 8). Huizinga argues that play takes place in 'the magic circle' (a tennis court, the card table, the temple or the hopscotch field) distinct from the everyday environment - 'inside this space the play proceeds, inside it the rules obtain' (1950: 8). Huizinga argues that there is no distinction between a spaced marked out for play or sacred rites and it therefore shows that play is rooted in our fundamental being and culture (1950: 20). Significantly it is Huizinga's aim to place play at the centre of the creation of culture – sacred rites, art, poetry and science 'all are rooted in the primeval soil of play' rather than only as a way to understand culture (1950: 5):

> We have to conclude, therefore, that civilization in its earliest phases, played. It does not come from play like a baby detaching itself from the womb; it arises in and as play, and never leaves it (1950: 173).

Play, according to Huizinga, is a voluntary and enjoyable activity that we can engage in fully, without it being threatening. Play 'is never a task. It is done at leisure' (1950: 8). Sociologist Roger Caillois claims, like Huizinga, that play is a 'separate occupation, carefully isolated' (1961: 6). He draws on Huizinga's work and similarly states that 'play is no different from what is expressed in culture' (Caillois, 1961: 64). He then departs from

Huizinga's work by critiquing the usefulness of his writing because of the lack of a classification of play and goes on to say that Huizinga's approach is 'broad and narrow at the same time' (1961: 4). Caillois developed an extensive classification of play which is useful in the context of observing play in and around interactive art. Nevertheless, it is possible to argue that Caillois' theory, when considered in the context of contemporary play, perhaps ends up in the same place as his critique of Huizinga, in that his framework could include almost any activity.

Whether play is separate (magic circle) from everyday life has become a hotly contested debate, fuelled by the increase in pervasive media and games research. Following Salen and Zimmerman's (2003a) definition of the magic circle[2] many papers and criticisms have been written in response. Zimmerman (2012) wrote in an online paper that the aim of the magic circle, as defined in 2003, was intended as a helpful concept, aimed at game designers for understanding how meaning arises. For example, once a game, or a play situation takes place, the context shifts and relationships changes. Things that did not matter before suddenly do. Zimmerman explains 'For me this idea - that games are a context from which meaning can emerge - is so simple as to be almost banal. Hardly a cause for debate!' (2012: 3). Furthermore, he calls for a stop to the endless papers for or against the magic circle, 'to stop the energy being wasted by chasing the ghost of the magic circle jerk - a ghost that simply doesn't exist' (2012: 1-2)[3]. Whilst it is true that play often occurs in a separate space (such as playgrounds, or in my case, the gallery – the installation space), I reject the notion of a divide between ordinary life and play. People treat play as separate when it is, in reality, embedded in complex ways into various contexts: politics, rituals, religion and arts culture (Sutton-Smith, 1995: 282-283). Play is, as Huizinga makes us aware, universal and precedes culture. In relation to this thesis my art installations serve to evoke play in which meaning can arise. The magic circle is also the invitation to play – it is what allows audiences to step over the threshold into participation and bridge the gap between looking and doing in the gallery. In this context it makes sense to briefly draw on the concept of ritual, as described by Performance Studies Professor, Richard Schechner. He argues that 'ritual and play lead people into a "second reality", separate from ordinary life' (Schechner, 2006: 52). Key to his argument is Schechner's understanding of performance to include play, games, sports, performance in everyday life and rituals. Rituals can take place in a sacred or secular space and require special behaviour. However, a sacred space can be both the religious temple and the 'ordinary secular spaces (which) can be made temporarily

special by means of ritual action' (2006: 71-72). The very act of going into this space will have an impact on the participant – it is to step "into play". While Schechner does not discuss installation, it is possible to include this and argue that the act of interacting with the artwork (or performing, as Schechner would say) becomes a ritual performative process.

Play definitions pertinent to interactive art

I now return to Caillois, whose classifications of play are useful for identifying and observing play in and around artworks and are referred to throughout my text. Above all, I draw on Caillois' play frame because of its useful distinction between 'paidia', instinctive and exuberant play and 'ludus', complex and controlled play. Paidia and ludus are 'ways of playing' (1961: 53). Paidia represents a primary power of improvisation and a 'spontaneous manifestation of the play instinct' (1961: 58). Ludus is complimentary to paidia and reflects discipline and striving for excellence. Within these two poles are four categories of play; 'agôn', signifies competition, sports and games – the desire to win; 'alea', represents chance games such as dice – a passive surrender to destiny; 'mimicry', fantasy, disguise and illusion - playing a part and pretending; and finally, 'ilinx', the pursuit of vertigo, spinning, running, whirling - the surrender to sensations and disorder (Caillois, 1961: 13-23). These four categories exist within the dichotomy of paidia and ludus, for example, the game of chess is agôn (game and competition) at the ludus (controlled, organised) end of the scale. The difference between ludus and agôn is that agôn is competition related, whereas in ludus the skill of the player is connected to a sense of mastery, the satisfaction of doing something skilfully. Significantly, Caillois does not consider any of the poles as more important than any other, the play forms are not fixed and play activities often draw on more than one category. However, he does also state that there is little relationship between paidia's tumult and alea's passive participation of chance as well as between the calculation (self control) of ludus and ilinx's state of vertigo (Caillois, 1961: 31). Scott Eberle notes that adults seldom surrender themselves voluntarily to vertigo, something I return to later in the text when describing the artworks of Höller (2013: 1). Schechner has suggested that paidia, because of its tumult and spontaneity (and vertigo), is less researched than ludus (2006: 107). This is possibly due to the ever-expanding field of video games, which naturally fall in the category of ludus. The fact remains that within play theory, physical play, such as rough and tumble play, has been neglected both for children, which most play theory is concerned with, but also in the context of adults interacting and playing (Smith, 2010;

Pellegrini et al, 2007)[4]. My research makes a contribution to this field in its emphasis on the playful body, as described in the conclusion.

Fig. 8 Table of Caillois' classification of play (1961: 36). (See appendix for A4 size image)

It is worth noting that I also draw on other classifications of play. Caillois does not, for example, cover play fighting (rough and tumble), or other standard definitions of play today. Psychologist, Peter K. Smith, describes six types of play: 1] Social contingency play (peek-a-boo) 2] Sensorimotor play (physical play, up to 2 years old, such as sucking objects) 3] object play 4] language play 5] physical activity play, which includes rough and tumble, gross bodily movements and exercise play 6] fantasy and pretend play (Smith 2010: 8-10). These categories naturally overlap, for example, playing with an object pretending it is a spaceship. Rough and tumble is linked to social play and Smith describes it as a 'vigorous social form of physical play' such as chasing, tagging, tumbling, wrestling and other behaviours which would be considered aggressive in a non play situation (2010: 9 and 104). Brown includes rough and tumble in social play, as well as friendship and belonging and celebratory and ritual play (2010: 88). In other words social play includes many play forms. Smith, Pellegrini and Sutton-Smith all devote attention to rough and tumble as an important aspect of play, pointing out that it is often under researched. I return to physical play and rough and tumble play several times in my catalogue and will further define it by describing some of the play observed in and around my interactive artworks. An additional and useful definition of play is that of Sutton-Smith, who includes the fact that play can take place anywhere, last for any

length of time and engage any number of players, and suggests that 'play is like language: a system of communication and expression, not in itself either good or bad' (Sutton-Smith, 1997: 219-18). Similarly to Huizinga, psychiatrist Dr. Stuart Brown defines play as being spontaneously engaged with for its own sake, it is inherently attractive and leaves the player wanting to do it again (2010: 17). He extends this to things that 'appear purposeless, produce pleasure and joy (and) leads one to the next stage of mastery' (Brown, 2009a: 03.50 min). Brown states that play is a behaviour 'pervasive throughout human culture and across the evolutionary spectrum' and is linked to survival (2010: 31). In the context of my research the use of the body as the site of playful interaction, Brown's focus on physical play is particularly relevant. He stresses that 'if you don't understand and appreciate human movement, you won't really understand yourself or play' (Brown 2010: 84). I return to the aspect of physical playful participation in the context of interactive art several times in my thesis and often draw on Brown's theories, as well as Panksepp's approach to physical play.

Brown's definitions of play also include an assertion that play which becomes "dark" (for example bullying) is no longer play. In this situation what is play to one person is no longer play to the other. Crucial to his argument is that play is defined by a continued desire to keep playing. This is most evident in the ways in which players handicap themselves, in order to keep the playing field level, so that they can keep on playing (Brown, 2010: page 178). Caillois similarly states that if someone is forced to play then a game 'ceases being play' (Caillois, 1961: 6). On the other hand, both Sutton-Smith and Smith argue that play has a darker side - in particular within fantasy and, at times, in rough and tumble play when it is used to establish dominance. Schechner (2006) also argues that play can be deceitful and not what it seems. These different views on "dark play" represent what Flanagan (2009) calls "two camps", one having a more idealised view on play, for example Brown, Caillois, and Huizinga, whereas the opposite side, represented by Sutton-Smith and Smith include dark play as play. They also maintain that previous claims made for the many benefits of play are an idealisation. Sutton-Smith defines this idealisation as the rhetoric of 'play as progress'. He argues that 'the rhetoric and the play are never identical' but that different scholars and disciplines, all seek to promote their own "play agenda" and their underlying belief systems are being sustained through the use of rhetoric (2001: 8).

Lastly, before describing my own play definition and criteria, I want to highlight play theorist and historian Scott G. Eberle's 'wheel of play' in relation to interactive art. Eberle describes play as a process with elements or stages. His wheel of play is useful in the way it breaks down the play experience into cycles that the players go through. These are:

- Anticipation: interest, readiness, expectation, curiosity, anxiety, uncertainty, wonder, – which leads to the next stage of
- Surprise: discovery, astonishment, shifting perspective, 'a-ha moments' – it then becomes
- Pleasure: gratification, joy, delight, it feels good – from which follows
- Understanding: new knowledge, application of ideas, mastery – that creates
- Strength: empowerment, confidence, new skills, creativity - which in turn leads to
- Poise: grace, composure, spontaneity, fulfilment, and sense of balance (Eberle, 2009: 5.25 – 14.30 min, also cited in Brown, 2010: 19).

Once people reach the end of the stages they are ready to do it anew. Sometimes they will go on for several rounds but, more importantly, not everybody goes through all the stages, or in the same order. I suggest that it is possible to reposition Eberle's wheel of play in the context of interactive art. His play stages remind me of some of my own experiences of interactive artworks. Furthermore, the stages are a useful guide to my making process, allowing me to anticipate the audience's interactions with my artwork.

Fig. 9 Eberle's stages of play (2009: 5.21 min)

In the context of Eberle's wheel, it is possible to draw on psychologist Csikszentmihalyi's 'theory of flow'. Csikszentmihalyi coined the term 'flow' (now part of everyday language) and 'go with the flow' and they are linked to his theory of enjoyable experiences (2009b). When people are in flow they focus on the immediate demands of the activity they are engaged in and become lost to the world. Flow tells us something about the experience of play, both in the sense of identifying types of play for the research and also in understanding that we enter into a physical state of play. Eberle's stages of play also echo Sutton-Smith's (2001) view of play as performance. Play in this connection is not only performance for others but includes the audience's own self-experiences and aesthetic satisfaction.

Finally, I want to untangle the fact that games and play are connected, as it is important to differentiate between the two in the context of the research field of interactive art that my thesis focuses on. To address this I turn to Schechner, who differentiates play from games. Games are usually clearly structured; they rely on fixed boundaries and generally take place in specific places such as sports arenas or game consoles (Schechner, 2006: 92 and 96). Salen and Zimmerman define games as a subset of play and write: 'what distinguishes games is that they have a goal and a quantifiable outcome' (2005: 307). Playing catch, for example, as happened in my works *Catch Me Now* and *Tracking You,* is outside their definition of games (2005: 302). Games also tend to have winners or losers. My thesis, on the other hand, is not concerned with game theory and I place an emphasis on open ended free play and non-narrative play. Play observed in my interactive art takes place in short bursts, or longer explorations leading to play and to flow, where the audience invents play scenes and games. Where there are moments of "win" these stems from play mastery, rather than having to proceed through levels (as in traditional games) or winning over others. However, I acknowledge that play consists of both rule bound and spontaneous acts – in particular, rules that can be figured out and interfaces that can be mastered and played with.

My play definition and criteria

I have, in the text above, outlined key play theorists and my approach to play, touching on some of the attributes of play used in my research. Play, in this thesis, is defined as an activity that is voluntary, done for its own sake and improvised or made up, by the players themselves. Significantly, play is understood as a physical activity as opposed to

playing passively, such as playing video games or watching TV. Play is further categorised as innately attractive, in other words, it is fun and people want to do it again and again, what Brown describes as a 'continued desire' (2010: 17). Play is also identified by often bringing about an experience of loss of time and self, as illustrated aptly in *Tracking You*, when a participant commented 'I had so much fun I forgot to be embarrassed'. In addition, the play is often improvised and open-ended and has few, or no, pre-set rules or "game penalties".

Play is also, in the context of interactive art, doing - 'playing is doing' as Winnicott states (1971: 41). At the core of Winnicott's understanding of play is his focus on 'not so much the object used as the use of the object' (1971: 5). This playing area is not *'inside'* (as inner psychic reality), nor is it *'outside'* (as in the separate to us world – the 'not-me'), in other words 'doing' is outside the individual but it is not in the external world – to interact with 'what is outside one has to *do* things, not simply to think or wish' - this is why play holds the potential to bridge the gap between doing and looking in the gallery (1971: 41). It is Winnicott's notion of the move between inner (formless) and outer (agency, purpose) that is reconstructed through interactive art (1971: 55).

My thesis explores playful interactive art and I use the term 'playful' intentionally, drawing on Sutton-Smith's distinction, whilst bearing in mind that play typically includes the playful:

> Play is sometimes defined in terms of the content of the forms it takes, such as children's play, games, sports, festivals, and so on, most of which are well-organized entities within human culture and are pursued with great earnestness, while *playful* refers more to a mood of frolicsomeness, lightheartedness, and wit (2001: 147).

Finally, my play criteria apply both to children and adults, acknowledging that the boundaries of play are blurred. The play definitions summarised above are used to identify play in and around interactive artworks together with play signals, which I will now outline.

Play signals

How do I know when someone is playing? Whilst we instinctively know and recognise play signals they are often implicit. However, and crucial to my thesis, play signals are a strong indication that the behaviour is play. Play signals are crucial to interpreting actions

correctly (Bateson, 2006). For example, Schechner states that we show we are playing by underplaying or overplaying, or by using culturally specific signals, such as a wink (2006: 102). Play behaviour is more exaggerated (Pellegrini et al, 2007). Another key signal is the play face; the mouth is open, the eyes are smiling, the eyebrows are often arched and frequently audible smiling and laughing can be seen (Smith, 2010; Eberle, 2006). Sutton-Smith also makes the point that play is 'always characterized by its own distinct performances and stylizations' (2001: 220). If I, as an observer, conclude that these play signals are evident and if the play criteria outlined in my play definitions earlier are supported - then the behaviour is play. Another possible (and playful) approach is to simply accept Burghardt's statement about understanding play: 'It exists. Accept it and move on' (2005: xi).

Play signals function as messages (verbal and non verbal). According to anthropologist and social scientist, Gregory Bateson, play exists within a play frame where players send metacommunications (meta message). In his play frame we suspend our disbelief and treat our experiences as true (and serious), nonetheless, we do know that it is only play. The play paradox is that the experience is both real, and not real, at the same time. Bateson's metacommunication is our play signal, where each action carries the message "this is play". In order to play, a message has to be sent because:

> play, could only occur if the participant organisms were capable of some degree of metacommunication, i.e. of exchanging signals which would carry the message "This is play" (Bateson, 2006: 316).

Simplified, a meta message tells us, for example, that when a monkey bites another monkey, it knows it is not a 'bite' and that 'these actions in which we now engage do not denote what those actions for which they stand would denote' (2006: 317). In other words the 'bite' means, "I like you", not, "I hate you". Bateson's concept of play signals function to communicate (contextual information) about the behaviour to follow. Play signals are both an invitation to play and a continued affirmation that "this is play". Schechner extends this to performance theory and adds that a bite is also not *not* a bite. He draws on Stanislavski's performance theory 'as if' and writes that a performance can also be the 'enactment of a double negative, the not …not' (2006: 103, sic). Sutton-Smith adds to Bateson's concept of play as (meta) communications, stating that play is also a 'distinctive behavior', writing that he 'believes more expansively that play is both a kind of communication (a mode) and also a kind of action' (Sutton-Smith, 2001: 23).

Play signals are crucial in animal play[5] and most play scholars (Sutton-Smith, Brown, Smith, Schechner) who do not primarily study animal play, acknowledge animal play studies as a valid theoretical framework for understanding play and social interactions. As Peter K. Smith writes:

> One inference from animal play to human play would be that play has benefits. This could especially be made for locomotor play, object play and play fighting, which show homologies to play in human children. By contrast, pretend or fantasy play appears more specifically human (2010: 77).

Similarly, most animal researchers speculate about human play, for example, animal play researcher Gordon Burghardt writes 'to get at the root of playfulness (…) one must take other species seriously' (2005: xii). Panksepp and Biven concur that the physical play animals enjoy is somewhat similar to ours (we are, after all, also animals) (2012). Brown also writes that to understand what play does for us we need to know play in other species and to 'place the behavior (play) in a biological and evolutionary context' (Brown, 2010: 26). My method of observation, as described later in the methodology chapter, is largely one of direct observation – watching how people interact and play. This type of study of behaviour does not disturb the environment, and is similar to the methods of observation used in animal research, where it is not possible to ask what animals are thinking. The fact is that we can glean a lot from simply watching play. Smith describes this method of human play observation as a structural approach[6] where we 'look at the actual behaviours and the way they are performed' (Smith, 2010: 4).

Fig. 10 *Tracking You* by Tine Bech 2012. Participants headbutting and doing rough and tumble play

The physical play and the play fighting frequently observed in *Tracking You*, in *Catch Me Now* and, at times, during *The Big Swim,* highlighted how we share characteristics of play with animals. For example, in *Tracking You,* when the audience initiated play, they demonstrated the same staggered gait or looped approach (curvilinear movements) as animals do in play fighting. Some of the most fascinating play signals (the play bow in dogs being the most well-known) and play behaviour have been witnessed in animal play, for example, in Norbert Rosing's striking photographs of a polar bear and husky sled dog playing in Canada's Hudson Bay, the Japanese macaque monkeys having snowball fights and the ravens who slide down snow on rooftops for no determinable reason. Does the European Hooded Crow need to practice "snowboarding"? We don't know, but it seems to like the sensation of whooshing through the snow, just as we do.

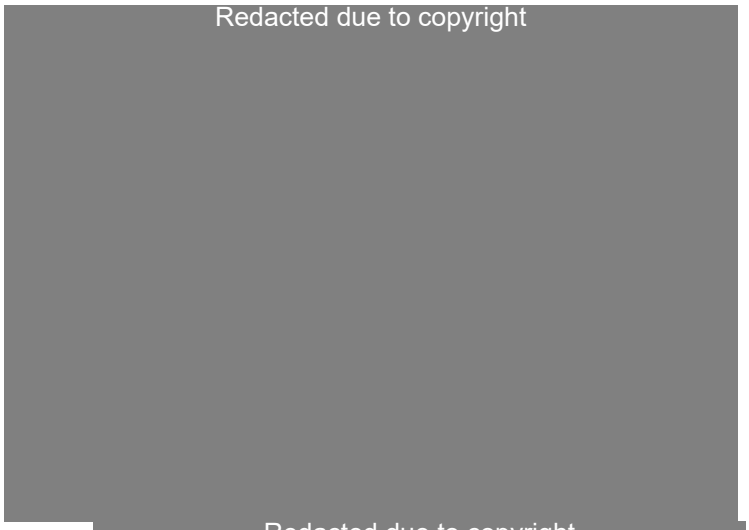

Fig. 11 Play signals across species. The end seemed near for this tethered husky dog (dogs do get eaten by polar bears) but instead the husky wagged his tail and did a classic play bow. The bear accepted the invitation and returned every day for a week to play, while he waited for the ice to freeze in November and go hunting (Brown, 2010; 2008a)

Fig. 12 Japanese macaque monkey in Jigokudani Monkey Park, in Nagano

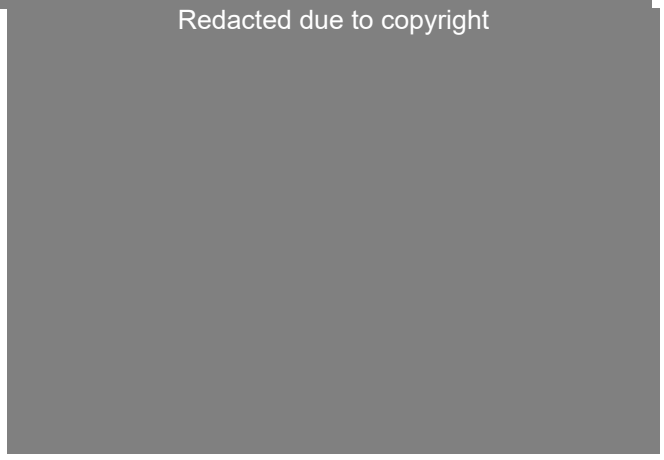

Fig. 13 The classic time out signal across the animal world

Fig. 14 Screensnaps of a raven "snowboarding" on a rooftop in Russia, using a plastic lid from a jar. http://www.youtube.com/watch?v=_2rJoIhgWmw

Play as function

Why did the polar bear choose to play rather than attack and eat the dog, particularly as he had just come out of hibernation? If we look at the theory of 'play as function' [7] where behaviour is seen as adaptive (and animals are in the game of passing on genes) - then it suggests that play fighting and social functions are linked. Play, it seems, is a smart and cost effective way of adapting and surviving. Research suggests that play fighting enables the players (animals) to become experts in reading others, promoting behavioural flexibility, reducing the stress of close body contact, teaching bravery, as well as the valuable experiences of dominant/subdominant roles (play fighting is characterised by role changing) (Smith, 2010: 63-76). The exact nature of the benefits of play's function in animals and humans does, however, remain a matter of speculation and there is little empirical evidence to support the many claims made for the importance of play (Burghardt, 2006, Fagen 1995). Jaak Panksepp, an affective neuroscientist, also points out that there is 'no large and substantial scientific database for any of these ideas' (play as function) (Panksepp and Biven, 2012: 374)[8]. However, Panksepp contends that play's 'social effects, on the other hand, have been easier to document' and that play is instrumental in honing a range of social skills (2012: 374). Animal researcher Robert Fagen also believes that animals that spend more time playing become better at making decisions, for example, who should be trusted (Fagen, 1995: 448). Fagen considers that the role of play in the development of the skills essential for survival and reproduction are particularly important for animals whose ecology is varied or unstable (also see Burghardt, 2006; Brown, 2010). Smith describes this:

> One theme occurring in play literature (both animal and human) is that, when faced with a relatively unfamiliar, but safe, environment, play affords opportunity for behavioural and cognitive innovation and the subsequent practice of newly developed behaviour and strategies (2010: 75).

Research by Spinka, Newberry and Bekoff (2001) also suggests that play is training for the unexpected, both physically and emotionally. Brown further affirms this and suggests that play makes animals smarter and, for higher animals, it creates complex social bonds and promotes empathy (2010: 5). In other words, play is a form of emotional intelligence which, among other things, assists the ability to self-regulate (control impulses or violent behaviour[9]). Play it seems, for both humans and animals, creates opportunities for adaptive responses to new environments, which, in turn, affects the evolutionary process, as suggested by Pellegrini, Dupuis and Smith:

> The importance of play in impacting evolution relates to it being a relatively low cost way in which to develop alternative responses to new and challenging environments (2007: 272).

Research now proposes play as the human principle of 'adaptive potentiation' which enables us to experiment and flourish (Sutton-Smith, 2001). Sutton-Smith links this to Stephen Jay Gould's basic principals of biological evolution which favour, not precise adaptation, but flexibility to changing environments and an 'evolutionary potential for creative responses' such as 'sloppiness, broad potential, quirkiness, unpredictability' (2001: 221). Brown also states that play appears to be the outcome of what he calls 'superfluous neurons' (2010: 41). If the player has the choice and the opportunity in the environment, (and is safe and fed) then play will emerge spontaneously – play is innate. Fagen also suggests 'that play relates to fundamental levels of individual adaptation' (1995: 37). For humans, play also lies at the core of many social bonds, as well as fuelling creativity and innovation. Brown, using Panksepp's research, proposes that play deficiency in adults is similar to sleep deficiency in that once we get to play we immediately rebound (Brown, 2010: 43)[10]. These rebounds imply that play is both functional and important (Smith, 2010; Panksepp and Biven, 2012; Brown, 2010). This evidence indicates that we are built for play and have a drive to play, exemplified by the play taking place in the artworks presented in the catalogue. Brown (2010) posits the idea that humans are designed by biology to play throughout life, but for most animals play disappears, or appears less and less, after sexual maturity[11]. Significant to my

research is that human play does not diminish; as Eberle states, we do not lose the need for novelty and pleasure as we grow up (2009). Play behaviour may change, but the drive is still there. The key is whether we act on it. We are, after all, the biggest player in the animal kingdom (Brown, 2010: 5).

This inherent drive to play, the metacommunication and play signals, are key elements in my research, exploring how artists can create artworks that evoke our ability to play. This is combined with a set of play definitions which allows me to confirm when audiences are playing, thereby developing a play-vocabulary of the play-behaviour that takes place in and around interactive artworks, which in turn informs my inquiry into making. These play definitions are summarised as: play is 1] voluntary 2] a pleasurable experience in itself and is not dependent on external rewards or goals 3] an activity - a physical engagement 4] distinct from most behaviour by being exaggerated, or engaging in make-believe 5] recognisable by its use of metacommunication and play signals. I now turn my attention to interactive art, the field in which my PhD practice is located, together with my own sculptural art practice.

INTERACTIVE ART

I start my section on interactive art by outlining definitions of interactive art; this is followed by a close examination of some of the contextual issues concerning my definition, namely the body, participation, levels of interaction and the discourse about technology, in order to distinguish my own practice within these fields. I end, before going on to a review of artists working in the field, by examining what constitutes meaningful interaction and play in and around artworks.

Interactive art definitions

It is useful to begin my discussion of the field of interactive art by clarifying the different definitions. The terms used to describe interactive art are numerous and reflect the emergent nature of the field. It has been variously described as media art, new media, digital art, digital multimedia, computer art, electronic art, and art that you "plug in", until about 2006 when the expression 'art formerly known as new media' emerged[12]. The most common term now is perhaps 'new media art'. Today Graham, Cook, Quaranta, Dietz, and Shanken use the phrase 'art after media' to describe media art. Regardless of what name is used, the effort, I agree, has been to find a shared language and to move the coverage of media art beyond the question 'can computers be art?' (Graham, 2005: 3).

The exhibition *Decode* (V&A, 2010) offered insight into the ongoing debate concerning definitions by curating the exhibition in three sections: 1] Code 2] Network and 3] Interactivity. A similar three phase, but more rigorous, definition is offered by Graham and Cook (2010a). They classify three criteria which are seen from both an art history and a media art perspective (2010a: 9). Crucial to my research is that their definitions are linked to the behaviour of the artwork. This approach leads to an understanding in which interactive is seen as a mode, or behaviour, rather than a medium.

Fig. 15 Graham and Cook's model for terminology (Graham and Cook, 2010a: 9)

Graham and Cook's diagram is mapped onto Steve Dietz's (2000) characteristics of media art: computability, connectivity and interactivity. Computability is often a visualisation of data, or forms of generative art. Connectivity is exemplified by net art or installations that connect with external sites. Interactivity is where the audience engages with the artwork in active participation. Using Dietz's three categories my practice falls within his term 'interactivity'. From all the many ways of defining interactivity I emphasise where the audience actively engage and often use the body as a site of interactions. In other words, interactive artwork (my preferred term) is defined as an artwork where audiences physically and visibly interact with the work. This 'conversation is usually non-verbal and usually involves a dance of physical movements' (Polaine, 2005a: 4). The artwork is defined by incorporating a person as part of the artwork and the focus is moved to the interactions between the audience and the artwork. Whilst my definition can perhaps be seen as a broad interpretation of interactivity, I nevertheless wish to avoid any psychological interpretation of interactivity, such as reading a book, or that described by Itsuo Sakane. He proposes that interactive art could simply be art that involves the participation of the audience and states that we can 'consider viewing and interpreting a work of art as a kind of participation (Sakane, 1989: 3). I agree that in the context of interactive art, imaginary interaction 'in terms of art history, this cognitive interaction precedes the physical interactions encountered in interactive art' (Simanowski, 2011a: 126). Key to my thesis is, therefore, the focus on physical participation, where the body is the site of interactions and the audience visibly interacts with the work through movement and gesture.

Interactive art and embodied connections

This bodily interaction with the artwork is a form of embodied interaction[13], we know that the borderline between the body and the world is not sharply defined but that they are instead entwined in a constant dialogue (Schilder, 1935). Schilder recognised the complexity of the body as both a major part of the materialisation of consciousness, an active agent within the materialised world and, at the same time, the sensory and imaging equipment of consciousness in contact with the material world[14]. In relation to the body in interaction it is useful to very briefly mention Merleau-Ponty (1962), who, in his phenomenological attempt to find a model for the individual's access to the surrounding world, inserts precisely the body as the 'tissue' (the membrane) through which we necessarily must relate to the world. He rejects the classical division between subject and object, inasmuch as he regards this distinction as being fatally wrong and, at the very core, impossible, because the subject already exists as a body in the world before it even begins to reflect upon it.

This embodied interaction is, I believe, a natural part of establishing the body as the site for interaction. After all, the body is our first technology and our 'most natural instrument' (Mauss, 1934: 461). More important is that play in this context is, as Brown suggests, the 'primal activity. It is preconscious and preverbal – it arises out of ancient biological structures that existed before consciousness' (2010: 15). Maxine Sheets-Johnstone similarly suggests that movement is woven deeply into the human experience. She argues that humans have always danced. Dance is, like play, a prehistoric metacommunication in which the body is more than a motor habit. In a performance, if 'the dancer is not present in any lived, dynamic sense, then the dance can hardly be', the dancer moves through a form and the form move through him (2005: 2). The moving body is one of the ways we learn about the world. This knowledge is embedded in our 'kinetic/tactile-kinesthetic experience' (Sheets-Johnstone, 2003: 415). The dancing, playing body is not just:

> Pleasure or fun in running, chasing, laughing, jumping, beating, and so on, it is quite literally pleasure or fun in the flesh. It is not an accessory to a main event, but the main event itself (Sheets-Johnstone, 2003: 415).

While embodied interaction can be linked to theories of embodiment, I instead propose the body as a site for play - a site for meaningful interactions. Embodiment in my thesis is understood as a physical interface, in which the artwork activates the viewer into playing and connecting. Embodiment in this context is not a way of understanding, as the

philosophy of phenomenology proposes, as suggested by Merleau-Ponty. Rather, the body is seen as the site for jumping into light, wearing capes and running – a kinesthetic experience of the interactive artwork.

The dialogue between the body and art is particularly evident within performance art, installation art, participatory art, and interactive art. There is a long tradition within contemporary art of the body which this thesis does not cover, for example, artists who use their own body as both subject and artwork itself, where the body is both 'canvas, brush, frame and platform' as Tracey Warr writes (2000: 11). Another example are artworks by Ernesto Neto, such as *Anthropodino*, which provide a playground for the senses that often demand a physical, childlike, engagement from his audience. Artworks that use the body and which are more directly relevant to this thesis, are artworks such as those by interactive artists Krueger and Rokeby who pioneered using the body to interact with the artwork and Carsten Höller whose work highlights that visual art 'is always more than visual, involving a variety of somatic senses' (Shusterman, 2012: 3). Höller's artwork invites the audience to participate through the body - to go screaming down his series of sculptural slides (I return to these artists later in the thesis).

Interactive art and participation

Interactivity can also be understood in the context of participatory art. The wish to enable viewers to participate is not new and the consideration of productive recipients has held particular interest for artists and theorists since the 1960's. For example Roy Ascott's concern with creating artworks which are responsive to the viewer, rather than fixed and static, predates media arts (Shanken, 2002). Graham point out that the origin of interactive art is not the technological developments of Silicon Valley but rather that it is linked to the history of community art and video art (1997b: 162). Karl Popper identifies several roots of interactive art, notably he also connects media art to land art and installation art through their historical connection to Duchamp and readymades (Popper, 2007: 12). Interactive art has, perhaps in its broader sense, been around for even longer with the Kinetic Sculptures of the 20th century, such as those by Yaacov Agam and luminous work by Laszlo Moholy-Nagy.

Like participatory art, most interactive artworks are enhanced by, and dependent on, audience participation. However, participatory art represents more than simply audience participation, it is socially engaged art, with an 'artistic interest in collectivity,

collaboration, and direct engagement with specific social constituencies' (Bishop, 2006: 178). Seen in the context of participatory art theory, my practice is not defined as participatory art; I do not see my artworks as activist, social politics or co-creation, as in the type of participation in which the audience produces the actual work. Rather, my research focuses on how to activate the audience into playing and interacting. Like me, Christian Kravagna, distinguishes between participatory practice and interactive art. Participatory art, he asserts, is interested in the 'differentiation between producers and recipients and is focused on the participants by handing over the creation (the idea) of the artwork, or the making process, to them. In contrast interactive art:

> goes beyond a mere perceptional offer to the extent that it allows for one or more reactions, which influence the work - usually in a momentary, reversible and repeatable manner - in the way it is manifested, but without fundamentally changing or co-determining its structure (Kravagna, 1999: 1).

Kravagna also states that interactive artworks are often directed at individual interactions, whilst participatory art is often achieved in group situations. Here, I believe, Kravagna reflects a key issue in interactive art which I explore later in my analysis, namely, how interactive artists need to explore how to create possibilities for both group, as well as individual interaction.

Both participatory art and interactive art echo questions of authorship and co-creation (I return to the aspect of co-creation and control as well as Umberto Eco's discussion of 'open works' in the analysis). In this view the audience is part of the work and the meaning of the artwork is not always intrinsic to the artwork, or the artist's own self, but rather, it is created in the dialogue between artwork and viewer. Marcel Duchamp described this kind of participation in 1957:

> A creative act is not performed by the artist alone; the spectator brings the work in contact with the external world by deciphering and interpreting its inner qualifications and thus adds his contribution to the creative act (1957: 819).

The 1960's marked the end of the kinetic art period and the beginning of socially engaged art (participatory art), as well as the emergence of art dominated by new technology (Popper, 2007). While Kaprow's participatory 'happenings' and Krueger's interactive 'responsive environments' took place almost at the same time in history (1960s), they nevertheless have different aims. Contemporary interactive art is more similar to Krueger's thinking in that interactive art today often senses the world and asks that the audience play with the system, rather than reacting to a performer or participating through social dimensions. Krueger wanted the audience to react to the

'responsive environments' (Krueger, 1991). What participatory art and interactive art have in common is the aim to explore and push the boundaries of the audience-artist relationship. This is epitomised here by artist Carsten Höller (who I, for the sake of argument, class as participatory) stating 'You could say that the real material I'm working with is people's experience' (2006), and (interactive) artist Golan Levin's reply, when asked what digital technologies allow him to do 'I can create 'behaviour' (Victoria and Albert Museum, 2009: np)

The difference between creating behaviour and experience is perhaps theoretical and, in my view, behaviour and experiences are entwined. For example, my aim is to create playful experience and the evidence is the behaviour observed. In this context Cornock and Edmonds (1973) devised a useful taxonomy as a means of understanding the range of interaction levels within interactive artworks. They suggest that it is necessary to think of an 'art system' (rather than 'artworks'), which encompasses all participating elements, the audience, the environment and the role of the artist. The artist's role is seen as one that specifies and modifies the rules governing the interaction, which is useful for my aim of creating playful behaviour. Their taxonomy consists of four levels; 1] Static: there are no interactions with the artwork, it does not respond. Although there might be emotional enjoyment, there is no touching 2] Dynamic-Passive: this is when the artwork changes in response to the physical environment, such as light/time, but is not influenced by the audience - these changes are predictable 3] Dynamic-Interactive: the artwork responds directly to input from audiences - the audience can activate the artwork and it will respond 4] Dynamic-Interactive (Varying): this last level was added to the classification in 2004 and incorporates level 3, but also stipulates that the artwork changes over time, through automated learning via user input, or input from the artist (Edmonds, Turner and Candy 2004: 114). Using Cornock and Edmond's definitions my artworks mainly exist within level 3 (apart from *The Big Swim*, which belongs to category 2). Graham and Cook (2010a) and Popper (2007) also call this level of interaction 'reactive' artwork.

Fig. 16 Rokeby, *Very nervous system* (1983). The term Dynamic-Interactive (Varying) is illustrated in *Very nervous system* where the audience influence the system itself, changing the original specification of the artwork.

Interactive art and technology

Whilst I agree that digital technology has, as Golan states, allowed artists to create behaviour, it is key to my thesis that my definition of interactive art is neither defined, nor dependent on, the use of technology as the interface. As will be demonstrated in the catalogue it is not always the case that a machine interface is used in my artistic practice. The scope of my practice research is a physical and sculptural approach to interactivity, for example, jumping into a coloured cloud in a swimming pool to play, or chasing a spotlight that moves around. I believe it is, as Erkki Huhtamo states, 'quite possible to conceive complex user-activated interactive artworks that don't require computers at all' (2007: 4). My practice of interactive art is not about our relation to technology and, while it uses technology to create new ways of experiencing art and develop playful interaction, it does not seek to explore the medium of technology itself. Much of interactive art's discourse relates to the specificity of technology, which in turn is often linked to the theoretical positions surrounding media art. These issues are only briefly touched on here, ultimately, this thesis is not located in the field of media or culture studies, nor is it intended as a critique of media art. Briefly summarised, the discourse is concerned with the following issues: 1] Whether media art is a new genre (born from technology and science). This is illustrated, for example, in how Krueger is viewed by some, due to his work being pioneered by the department of science; 2] If media art represents a critique of the contemporary art scene (and therefore is a movement in opposition) for example as often suggested in the CRUMB discussion blog; 3] And finally, that media art is defined as art that uses and explores the medium of technology and, therefore, represents a comment on society and our relation to technology.

The specificity of technology also relates to new media art's history of being shown in the context of the computer world such as, for example, SIGGRAPH[15]. Finally, the issue of technology is connected to the question of whether new media will be accepted in the contemporary art world. Quaranta, for example, suggests that contemporary art does not appreciate art as research into technological (science/computer) perspectives but sees art as 'a powerful statement on the world we are living in' (2010: 2). Media art is often seen to be in deliberate opposition to the contemporary art world, questioning already established notions of art and cultivating the notion of interactive art being different to that produced in the contemporary art world by developing its own methods of making and distribution. Today media art is 'usually classified as New Media Art when it is

produced, exhibited and discussed in a specific "art world", the world of 'New Media Art' (Quaranta, 2010: 1)[16]. Shanken, for example, divides the worlds into New Media Art (NMA) and Contemporary Modern Art (CMA). Manovich famously referred to this opposition between media art and contemporary art as the divide between 'Turing-land' and 'Duchamp-land' (1996). Claire Bishop also separates media art, asking why mainstream art is not exploring 'ephemera of the virtual age and its impact on our consumption of relationships, images and communication'. She negates media art as a 'specialised field of its own: It rarely overlaps with the mainstream art world (commercial galleries, the Turner Prize, national pavilions at Venice)' (2012: 1)[17]. I believe it is time, as voiced by Steve Dietz, to 'reintegrate the competing claims of these two camps (Turing and Duchamp-lands) so that we can focus on what really matters: the art' (Dietz, 2010: xiii)[18].

I argue that artists today are fairly uninhibited in their choice of media and will mix technology with traditional art materials. For example, artist Olaf Breuning's anthropomorphic sculptures are a playful use of everyday materials and technology. Breuning's work, *Boomcyclone,* shown at *Let's Entertain: Life's Guilty Pleasures,* Walker Art Center (2000) was constructed using parts from a toy, an iMac computer and a coloured vacuum cleaner playing music and showing lights. Another example is the *Chi-TEK* project in which a group of female artists were asked to 'hack' a teapot to make it interactive using a range of materials to create interactions. Some of the invited artists made interactive teapots using gestures (not technology) whilst others used sensors, or arduino. The project illustrated that the contemporary artists approach to interactivity is not defined by the use of technology[19]. Artists are connected to, and changed by, a world that is increasingly using technologies. The same point is made by Inke Arns who suggests that interactive art is not defined by its media, but rather, by its 'content-related examination of our present' (2007: np). This approach, of using everyday materials now includes everyday technology[20], which is becoming cheaper and more accessible. Another form of accessing cheap technology is toy hacking, for example, using electronic parts from toys or from the Wii or the Kinect technology for art projects. In this context Mathias Fuch's definition of 'ludic interfaces' is useful (2010: 54). Fuchs describes ludic interfaces as unconventional and different from the customary engineered systems (the keyboard, mouse) and the HCI ideology. Ludic interfaces are often custom built. They are distinct in their 'playfulness as the main design objective'

and are 'rich in connotative power and surprise' (2010: 54, 55). In other words, what is critical is, that for artists today there is no either/or anymore, new digital materials are part of everyday life and are used together with the old aesthetics of visual art. In other words, interactive art is more than art after media; the media experience is part of life and part of the artist's palette. Critically, this approach enables us to focus on the more important issues that art can highlight, rather than concerns around medium, or the newness of the technology. As Huhtamo writes:

> Today interactive media is everywhere; its forms have become commonplace. It might be wise to turn attention from the modes and technologies of interaction to the themes and topics they can serve, highlight and criticize (2007: 7).

Fig. 17 Tine Bech *LightPOT* (2011), Chi-TEK at the V&A Digital Weekend. Interactive modified teapot using a texting interface.

Fig. 18 Mouna Andraos and Melissa Mongiat *On The Difficulty of Serving Tea* (2011), Chi-TEK at the V&A Digital Weekend. The artwork illustrates interactivity through physical interactions, rather than technology. Here the audience was asked to use strings and work together as a group to lift the teapot to pour a cup of tea.

PLAY AND INTERACTIVE ART

I now turn my attention to the third section of the background to the research - the topic that my doctoral practice explores - playful interaction. I start by examining meaningful interaction in the context of play before exploring selected artworks, which engage the audience in playful interaction. The criteria for the artworks described are that the interface allows, or encourages, playful, physical audience interactions. It goes without saying that artworks that are intentionally created to be "played" with, such as *Videogrid,* by Ross Phillips (included in my text) represent a different experience to other substantial (and also physically) interactive artworks, such as Daniel Rozin's *Mirrors* (not included). Where possible I use examples of playful interactive artwork that I have experienced myself, because after all, this direct, first hand, physical interaction is key to fully appreciating the playfulness and the interface of the artwork. It also reflects the fact that my theories of play also come from application, not only theoretical contemplation, because to create play, we must become legitimate players.

Meaningful interaction and play

Both interactive art and play share a critique of not being "serious". Within interactive art Shanken and Stiles (2011), for example, note that as more sophisticated technology emerged, interactive artists started to concentrate on the technology rather than the quality of the interactions. This understanding potentially arose from an inherent double edged danger that lies in the interactive interface, as Regina Cornwell proposes:

> The very elements which are supposed to enrich a diverse public's involvement - the touch, wave, feel, shout, press interactivity - are precisely what feed into its low and often already simplistic expectation of what interactivity is (Cornwell, 1996: 3).

This seduction of technology, combined with a blurring between art and entertainment in contemporary culture, has led to interactive art being perceived by some as merely entertainment and not serious in the way that art generally represents itself. Interactive art in this view turns into "fluffy fun", an art without substance that does not ask questions of the audience. Huhtamo also notes that interactive artists are influenced by cultural forms, such as fairgrounds and amusement arcades, and this has:

> …provided favourite references for conservative critics writing about interactive art – the gallery has been "turned into a playground", etc.). The invitation to touch has

> connoted disrespect and reckless pranksterism, but also a critique of culturally and institutionally sanctioned 'high art' (Huhtamo, 2007: 2 *sic*).

Play research similarly has also been viewed with 'hostility' by the academic communities, as Fagen writes, 'play taunts us with its inaccessibility. We feel that there is something behind it all, but do not know what, or have forgotten how to see it' (Fagen, 1981: 492-493). In the context of interactive art, Flanagan notes that 'games and artworks concerning play continued to be marginalized as irrational, whimsical parts of culture unworthy of the advanced scholarship of the day' (2009: 18). Sutton-Smith similarly confirms the cultural assumption that 'play is frivolous and art is revered' which probably stems from our 'dualism redolent of typical work ethic attitudes' (2001: 135). In other words, we conceive play as not being serious because it is in opposition to seriousness and work. Brown similarly notes that the opposite of play is not work but depression (2010). Andy Polaine suggest that High Art does not invite play and interactivity because it does not fit with 'Big Fine Arts' traditional readings of objects and meaning as 'preferably sublime and soulful' (2005: 4). Polaine's assertion that it is unlikely that playful art will be admitted into the hallowed halls of Fine Art is disproved by the examples of play and interaction which take place in the gallery, as described later in this chapter. Nonetheless, I agree that there is a gap between doing and looking and that Polaine's world of High Art still exists - one where 'making noise, moving around manically and laughing, for example, are usually frowned upon' (2005a: 7). However, I think, it is more to the point to ask: does play automatically operate in opposition to seriousness? As Schechner wryly writes, is play really 'a rotten category tainted by unreality, inauthenticity, duplicity, make-believe, looseness, fooling around, and inconsequentiality' (1988: 3).

Regina Cornwell suggests that Duchamp provides a 'counter-model for artists in the field of interactivity' that brings depth to the art by way of time, insisting that art takes time to understand (Cornwell, 1996: 5). This is perhaps an easy argument to make, but, if we add Duchamp's tactic of using readymades, the use of everyday objects, which, in my view, is a method for challenging our assumptions about art and which forces the audience to ask questions, then there is no doubt that Duchamp mastered the balancing act between serious art and being a player. He was, in the words of Cornwell:

> a funambulist - a tightrope walker - balancing language and imagery full of puns and irony, a player and a worker. Artists in the interactive field must learn to master the tightrope which computer technology dares them to do in a fun-filled and contentious world in order to keep seriousness alive (Cornwell, 1996: 5).

Another counter argument to the idea that playful interactions do not constitute serious art is visual arts' long tradition of being a signifier. If art is a looking glass that reflects the world then it is to be expected that art should also examine playfulness. This is particularly the case now, as play is increasingly becoming part of everyday life and culture. As Jon Dovey writes:

> …there has been a marked shift towards play and playfulness in work and public life. Indeed play, through its functions under the sign of consumerism, has itself become a form of work (2006: 135).

We see interactive artists, as well as artists such as Maurizio Cattelan and Takashi Murakami who are playing with the language of entertainment, reflecting a culture dominated by the entertainment industry (as also noted previously by Huhtamo).

Playful interactions within art are not new, nor are they merely entertainment. Flanagan writes 'historians who see representational practices as mirrors of culture can also look to play for cultural clues, paying special attention to the intersection of play and art' (2009: 21). The historical connection to play in the arts is represented by the Dada and Fluxus artists who often used play, absurdities, audacities and trickery as a means to engage the audience and transform the experience of art. Fluxus questioned art as the authenticated object because, as Flanagan notes 'it undermined the seriousness of high art, and pointed irreverently instead to intentionally creating everyday action and experiences' (2009: 101). Fluxus artists sought a new practice that included player agency and frequently merged art with the theatrical, deliberately using entertainment and amusement venues. They understood that play exists between the serious and the absurd and, more often than not, employed play to create serious art. Meaningful play was a perfect medium for Fluxus.

Lastly, the exhibition *'Let's Entertain: Life's Guilty Pleasures'* (2000), at the Walker Arts Centre, also provided further insight into play in the gallery and art, by investigating the relationship between pleasure and contemporary art - exploring how to provide an experience in a museum setting that is not 'a gimmicky, controlled experience, but open-ended, challenging, thoroughly engaging and pleasurable for our audience' (Vergne, 2000: 23). Richard Shusterman points out that contemporary art often sees pleasure as lightweight, ignoring its deeper philosophical significance. We often overlook arts' 'social dimension' and the pleasure of sharing art experiences, an aspect I return to in the catalogue and conclusion. Shusterman suggests that it is a typically puritan approach to

reject the pleasure in art and instead confirm arts' 'meaning and cognitive import' (2000: 34 and 35). Fine Art identifies pleasure with the frivolous which, as a result, is seen as less meaningful - buying into the (essentially wrong) dogma that 'the opposition to pleasure is meaning and truth' (Shusterman, 2000: 46). Costello (2009) also found, by means of interviews with participants, that pleasure is clearly linked to people's interaction in the gallery. In other words, in the context of interactive art, it is a marker that people have a playful experience. I argue that pleasure can be deeply meaningful and purposeful, as Shusterman points out 'pleasure's importance is often intellectually forgotten, since it is unreflectively taken for granted' (2000: 41). Pleasure is perhaps most evident in the pure satisfaction people have when playing and Caillois, Brown, Panksepp, Sutton-Smith and Csikszentmihalyi all link play and pleasure. In the gallery playfulness can be an antidote to what Höller described as a world where 'a utilitarian way of thinking is so dominant that other forms of seeing and acting have become almost impossible' (Höller, 1999: 102-103). Play provides an alternative way of thinking and encourages 'unproductivity, (…) exaggeration, tranquillity, and intrepidity' (Höller, 1999: 102-103). I further propose that Höller's comments can be seen as a link to Sutton-Smith's account of Gould's basic principles of evolution, supporting sloppiness and quirkiness. Play is, in fact, a serious contender in the art world because, as Sutton Smith writes 'civilization may be gradually transforming itself to the point that it can indeed admit that play is as fundamental to life as are survival and religion' (2001: 67).

Playful art experiences

Carsten Höller's artworks invite the audience to playful exploration through active participation. Höller's work *Test Site* (2006-07) in the Turbine Hall at the Tate Modern saw visitors screaming while sliding down his large, sculptural silver slides. The audience was invited to participate and play – surrendering to the experience of exhilaration. His series of slide artworks began in 1998[21] and famously includes a chute that leads from Miuccia Prada's personal office in Milan to her car. Exiting one's office via a slide can only be described as playful! Höller's work is relevant to this research in the way his work relates to play behaviour. Many of his works, such as *Mirror Carousel* and *Flying Machine* and his slides reflect forms of play. Höller experiments with the exhilaration, thrill and vertigo of the playground. If we use Caillois' definition of 'ilinx', Höller's work can be understood as an 'attempt (to) momentarily destroy the stability of perception' (Caillois, 1961: 23). Höller himself states that:

> When people are on their way down a slide, they often shout for pure joy … I'm interested in the aspect of letting go. Once you let go, you travel without motivation to some specific place. It's a very special state of mind. Maybe "happiness" (or "pleasure") isn't the right word, but it has to do with relief or even freedom (1999: 102).

Hantelmann also noted, in the Tate Catalogue, that 'sliding makes most people happy' (2006: 19). Adrian Searle, on the other hand, reflected on *Test Site* at the Tate Modern and wrote in the Guardian, 'It was fun, though there were those who wondered whether it was really art'. Höller commented himself on the criticism of art as a spectacle and stated that he 'doesn't believe that the hunger for spectacle signals the death of art: it's just a logical consequence of what came before' (Searle, 2010: 6).

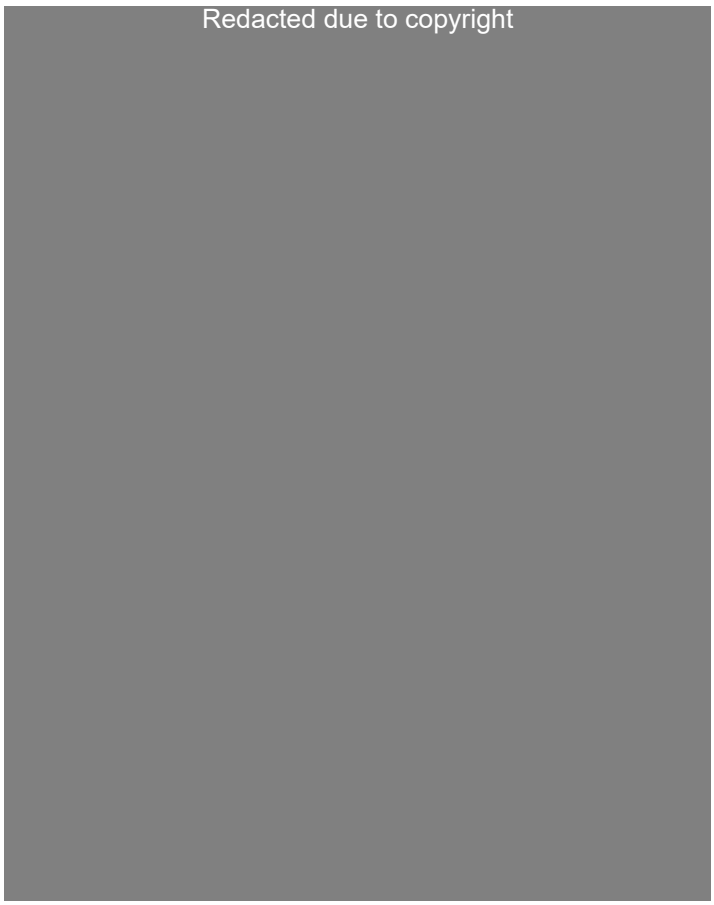

Fig. 19 Carsten Höller *Test Site* (2006), Tate Modern

Höller promotes his slides as a mode of transport that provides 'a regular dose of exhilaration, joy and lack of control' (Morgan, 2006: 14). Höller is interested in 'non-utilitarian, seemingly useless, senseless and unproductive ways of thinking, feeling and being' (Hantelmann, 2006: 19). I posit that the slides are not an activity of doubt as Höller refers to them, but rather, an exploration of the world through the body and play. Höller is concerned with doubt instead of certainty – to experiment rather than answer. I suggest that doubt is what can become play - play is experimental, it remains open ended instead of reaching a conclusion. If doubt is uncertainty – doubt about how we relate to the world, as in Höller's meaning of the word, then doubt needs to be explored. Höller's sculptural forms encourage this type of "who am I?" play exploration. As Hantelmann writes, his slides produce 'an experience of the here and now (that) connect the visitor to a physical self' (2006: 21). Höller's work, in the context of this thesis, represents the body in play. Shusterman also describes Holler's work as a 'full bodied,

participatory aesthetic experience' in which Höller deliberately distorts the conventional 'oppositions between life and art, the aesthetic and the ethical, knowledge and amusement' (Shusterman, 2012: 3).

Höller's joy-producing slides and other artworks that employ the methodology of playful participation can be seen as experience creations. This signals:

> a fundamental shift in the way in which the meaning of an artwork is understood; from a level of intention, expression or content to a dimension of effect and experience; from what an artwork 'says' to what it 'does' (Hantelmann, 2006: 29).

In other words, there is a shift taking place in which artworks are moving away from the traditional representation of statements towards artworks that produce experiences and behaviours. If we agree that the last century dealt with the art of representation by means of seeing, then in this century art is an exploration into experiences. As Fifield explains 'through interactivity, contemporary artists mirror, distort, and confuse the audience's experience not of representation but of reality itself' (2008: np). These explorations into creating playful experiences are part of a reflection of our surroundings that are becoming increasingly interactive**.** This is also perhaps reflected in the range of fields and companies, from experience design, game design, online interactive design and hyperlinks, to theme-park design and malleable architecture, which all seek to create "experiences" for a variety of reasons.

Fig. 20 A historical playful installation is Palle Nielsen's work, *A Model for a Qualitative Society* (1968), in which he literally turned Moderna Museet in Stockholm into a playground, with the artwork using costumes from the local theatre, paint and swings. During its three-week exhibition period the installation received over 33,000 visitors, 20,000 of whom were children 'To this day, the noise level of the pedagogical art project is surely unparalleled in art history' (Larsen, 1999: 2). Nielsen's work has since inspired a series of related playground artworks. [22]

Playing everywhere

This shift in methodology, creating experiences and play behaviour, is also linked to artists and groups who elicit play in the public realm, as well as playing inside the museum and gallery where it is not encouraged. Examples of such public artworks are Blast Theory's, *Hide and Seek,* which uses GPS seams in a playful way to create a game of online and physical catch on the street, or Rafael Lozano-Hemmer's work, *Body Movies* (2001)*,* which is a massive screen flooded with light where the audience can, with their bodies, reveal portraits. Hemmer himself comments that the most playful effective aspect of this work was the very simple idea of giant shadow play. In other words, audiences seemed to ignore the fact that they had to align their shadow in order to reveal the portrait of someone, instead they simply played with the shadows and each other. Another street play artist is Lotte Child, whose street training programme *Playing in the Street,* uses play to engage communities such as estate inhabitants and police officers. Festivals and events which blend play and public art are: *Urban Games,* in Amsterdam, by curator Scott Burnham, *Dislocate,* in Japan, Berlin's *Invisible Playground*, New York's *Come Out and Play* and *igFest* in Bristol. More sculptural playful artworks are: the *Red Ball Project, a* playful, giant, inflated red ball on the loose in cities, by Kurt Perschke, or the brilliant *Carousel Slide Swing* series, by Polish artist Kamilia Szejnoch, who hangs swings from propaganda monuments. These examples invite the audience to play in public spaces. They represent an emergent vocabulary of interaction and gestures which are becoming part of the public environment. Interactivity and art today are found frequently in pervasive media, in lobbies in buildings, projected onto buildings outside, in the in-between places and public squares. We are playing everywhere. As Mary Flanagan writes:

> Shifts in play have historically mirrored shifts in technologies and these shifts in technologies signal shifts in social norms. With groups tired of isolation and longing for community (…) The continuing popularity of Come Out to Play events in major global cities demonstrates that the public wants to play and play outside (2009: 262).

Fig. 21 Rafael Lozano-Hemmer *Body Movies, Relational Architecture 6* (2001) Ars Electronica Festival, Linz, Austria, 2002. The audience's silhouettes can measure between two and twenty-five metres depending on how close or far away they are from the light sources

Fig. 22 Kamilia Szejnoch's, *Swing*, Warsaw (2008). Memorial to the Berling Army Soldiers. The installation brings new meaning to the propaganda monument. The work plays with collective memory, playing with the history machine

Play is a powerful human drive and there are many examples of audiences playing where they are not meant to - we are in a flux between doing and looking, playing with physical interactivity at galleries (even to the point of playing "tag" with custodians guarding precious artworks). Play behaviour around interactive artworks does not always follow the intentions of the artist, or indeed, the interactive system (as also seen in Lozano-Hemmer's work above). Play actions in the gallery are, at times, unpredictable, as described by this reviewer when seeing artist Julius Popp's work, *Bit.code,* at *Decode,* V&A (2010).

> What I was actually thinking, however, was that there was a large red button clearly visible on its side which looked *really tempting*. Later, I asked co-curator Shane Walter of onedotzero what would happen if somebody were, hypothetically, to press it. He confirmed that it would turn the exhibit off, and that this specific interaction wasn't really encouraged (Griffiths, 2009: 1).

Bit.code consisted of long white and black belts with big squares referencing giant pixels spelling words out from zeroes and ones sourced from the internet and was not intended to be interacted with by the audience. This type of play is what Sutton-Smith describes as 'the trickster', it is the person who wants to 'play with the frames of the rules' (2001: 150).

An example of an artwork which generated play, but not to the artist's intention, was Olafur Eliasson's work, *The Weather Project* (fig 3), at the Tate Modern, London, (2003-04). The artwork was seen by a large number of people and became widely popular and developed into a meeting place. People went to the see the "Sun" (as it was named by the public) to play, or simply hangout, lying on the floor looking up at themselves in a sky made of mirrors and a sun made of LEDs, with clouds of smoke floating around. People wrote rude words using their bodies and in general showed a remarkable range of play behaviour. Eliasson's work clearly evoked play and participation. However, Tate Curator Jessica Morgan noted that this was not completely in accordance with the artist's intention of 'establishing the type of phenomenological awareness of scale and space that enables a questioning of the surrounding institutional environment and provokes critical thought' (2006: 12). The fact that an overwhelming number of people reacted in play rather than phenomenological awareness is interesting in the context of exploring how to evoke playful interactions but also in the context of play theory and play as function, exploring environments.

Interactive playful behaviour

I end my review of artworks which engage the audience in play and interaction by focusing on the "playful", as defined by Sutton-Smith:

> Playful would be that which plays with the frames of play. Play, by contrast, would be that which plays with the frames of the mundane and sticks to its purpose (2001: 148).

The playful is a key aspect of my own approach to creating artworks, because, as Zimmerman and Salen write 'there is, after all, something playful about play' (2006: 85). The intention to play, surprise, tease and trick is plentifully represented within art and, particularly, in art that involves human interaction of some kind. A good example is Michael Naimark's description of an artwork (1980)[23] which consisted of a wooden plank, a hammer and cheap, old-fashioned, sharpened pencils, the kind with an eraser at the end, to create a playful audience interaction. He writes that most people would try to hammer the pencils into the plank and found it difficult 'mainly due to those damn erasers' (1997: 4). Naimark's example generated playful audience behaviour. It also made the case for 'a much broader conceptual space for interactive art' (Naimark, 1997: 5). The playful behaviour of the artwork also highlighted that it is possible to use any material and its affordances to create interactive art. An example of play behaviour that used the

affordance of technology is Ross Phillip's, *Videogrid*. The work consisted of multiple screens arranged in a grid (into one big screen) showing short video sequences recorded by the audience. The video clips played continually in a loop until another audience recorded over it. *Videogrid* was essentially an interactive, massive, group portrait. When I experienced the work at *Decode,* at the V&A, audiences of all ages were interacting. People were clearly playing; making faces and inventing clever body movements and patterns for the video grids in response to the work. The work also encouraged dialogue between the members of the audience (including those who did not know each other). In fact, it was noticeable that at *Decode,* as audiences entered into the interactive section, people became more playful and the noise level rose. This demonstrated that noise, in the context of play, is a signal of play.

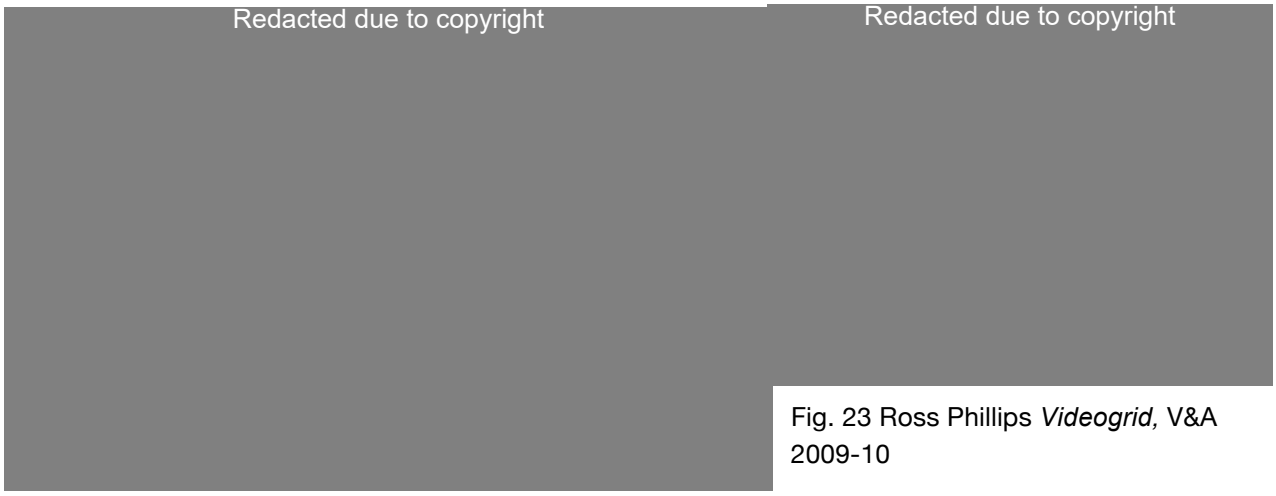

Fig. 23 Ross Phillips *Videogrid,* V&A 2009-10

Another example that demonstrated the range of play and interactive behaviour was Maurizio Cattelan's work, *Charlie. Charlie* was a human sized doll, a small boy on a tricycle, which moved around the gallery. The work behaved like an interactive work, using sensors, camera or programming, but it actually played a double game – the work was, in fact, controlled by a man with a remote control hiding round a corner, who secretly played with the audience. Cattelan's work used subversion and played with the distinction between art and audience interactions. I experienced *Charlie* myself and I took delight in being tricked because it showed me my own preoccupation with the technologies. I spent most of the time trying to work out how the piece was operated technically, only to walk round a corner and find the person with the remote who was controlling the work. I realised there was not a smart system reacting to my presence and movement. Others might very well have felt displeasure at being tricked, but to me

the work illustrated all the different ways play is mobilised. It demonstrated that play is something different for different people, which is, of course, why it is so hard to define.

Fig. 24 Maurizio Cattelan *Charlie,* Biennale, Venice 2003

Another artwork that played with remote control is Peter Forde's *Real Virtuality*, shown at the *Unleashed Devices* exhibition, (2010). Here the controller was not hidden but was central to the work. The work was a performance by the artist who was obviously playing with the concept of video games and how people control virtual people using the game console controller. The artist was connected to the game controller via a Bluetooth headset and, by using the remote control, the audience could take turns to make the artist walk forward, backwards, or sideways, or they could operate the four action buttons to make him bow, wave, give a high-five, or a thumbs-up gesture. The artist has commented on the audience behaviour and play:

> people stop just short of being cruel when they are controlling him - but he has been put into some awkward situations when made to walk up to policemen or people who are much larger than he is. "I can generally tell, when I see their smiles, that they are enjoying controlling me," he said (BBC, 2010).

Whilst Cattelan used subversion and a remote control hidden around the corner - playing participants, Peter Forde gave people the remote and asked them to play him literally. Both artworks evoked the playful - playing 'with the frames of play' as Sutton-Smith defines - one in a "subversive trickster" play mode, the other in "you are the trickster" (you are in control) play mode.

'Playing is essentially satisfying', as Winnicott tells us (1971: 52). This pleasure is deeply meaningful and purposeful, as Shusterman points out, but play is more than this; it is a genetically determined social process, the drive, in both humans and animals, by which we explore (and adapt) to the world (Panksepp and Biven, 2012: 356). This short review

of artworks mobilizing play has illustrated the adaptive and expressive functions of play and how playfulness has been present in art practice throughout the 20th Century – but, more crucially, that it is becoming more and more commonplace under the influences of interactive art, participation and the new awareness of experience creations.

Summary

In the background to the research chapter I have established my key definitions as well as the research field my thesis is positioned within. I started by ascertaining my definition of play. I described play signals and how I identify play behaviour, as well as touching on play as function. I also defined interactive art and, in doing so, outlined the contextual background of: the body in play as a way of interaction, participatory art's links to, and differences from, interactive art. I have covered a small area of what is a rich and complex field of interactive art practice, focusing on physical interactivity and play rather than media, highlighting how the artist's aesthetic today mixes technology and traditional arts material to create interactive art. My thesis draws on both play theory and interactive arts and contributes to the interactive art aesthetics, which is not a new field, but rather a growing field, and, as Naimark suggests 'odds are the territory is much bigger than we currently imagine' (1997: 5). The human innate ability to play can, and is, being used to create engaging interactive artwork that is part of a new and growing field of practice, where artists use materials, technologies and play to create engaging meaningful art experiences. The catalogue will explore these qualities through my arts practice. First, however, I turn my attention to my visual arts practice-based research methodology. Just as the background to the research was not an A to Z literary review, my methodology is not an off the shelf methodological solution, rather it is defined by the iterative, creative dynamic and responsive nature of visual art 'the practitioner (is) at the very heart of research' (Gray and Malins, 2004: 32).

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[1] The 'Invitation to play' is wording used naturally by many, including myself. However, I owe credit to Polaine for drawing my attention to Pesce and his use of the phrase in the context of objects – in this case a swing on a hill, inviting you to play (Polaine, 2010; Pesce, 1996).

[2] Salen and Zimmerman define the magic circle as 'In a very basic sense, the magic circle of a game is where the game takes place. To play a game means entering into a magic circle, or perhaps creating one as a game begins' (2003: 95).

[3] Salen and Zimmerman were responsible for the renewed interest in the magic circle when they used, or perhaps invented, the concept in their 2003 book. Zimmerman explains:

> The magic circle is not something that comes wholly from Huizinga. To be perfectly honest, Katie and I more or less invented the concept, inheriting its use from my work with Frank, cobbling together ideas from Huizinga and Caillois, clarifying key elements that were important for our book (2012a: 2).

[4] Smith, for example, argues that there is an emphasis on 'object, pretend play, and sociodramatic play', rather than rough and tumble and this is likely to be due to the fact that these types of play are seen as beneficial to learning (progress of play rhetoric) more quiet and good behaviour (2010: 99).

[5] Burghardt's definition of animal play consists of five criteria, which are also worth including. However, it is also important to acknowledge that some play definitions will not work for all species. Huizunga's definition of play, for example, will not work with animals, as Burghardt notes (2005: 69). Burghardt's definitions are: (1) the adaptive functions are not fully evident at the time play occurs – that the behaviour does not contribute to survival (2) play is a spontaneous activity, done for its own sake, because it is fun (pleasurable) (3) play is not a serious performance of ethotypic behaviour but is an exaggerated and incomplete form of activity (4) that the play exhibits many repetitive activities, done with abundant variations, unlike serious behaviours that are not as flexible and (5) animals must be well fed, comfortable and healthy for play to occur, as all stressors reduce play. Crucial to his definition is, in his opinion, that all five criteria should be met for the behaviour to constitute play (2005: 70-82).

[6] Smith refers to Fagen who developed two methods for looking at play. The first is a structural approach where we 'look at the actual behaviours and the way they are performed'. The second is the 'functional approach' which looks at the purpose of the behaviour. Smith suggests a third approach to examining which criteria are actually used when deciding if something is play and when it is not, for example, if an observer concludes that these play criteria are met, then the behaviour is play (Smith, 2010: 4).

[7] A resurgence of the idea of play as adaptation, a function of evolution, can be dated from the 1970's /1980's. The theory of evolution, as we know, starts with Darwin 1859, 1871, 1877 and Huxley 1942, then in socio-biology with Wilson 1978, Bjorklund and Pellegrini 2002 and Bateson 2005 (See Smith, 2010 and Pellegrini, Dupuis, Smith, 2007).

[8] While the question of why we play and neuroscientific, or rather, affective neuroscientific research is outside my research field (hence the footnote), it provides a deeper reason for why we play - why artists need to explore how to create artworks that bring out play in the audience. Reading Panksepp's research it is clear that the view is that play is partly functional (or adaptive) and has a socialising benefit -in particular that physical play (rough and tumble play, or what he calls the PLAY system) is also linked to joy – it is the 'ancestral Sources of Social Joy and Laughter' as Panksepp has subtitled his chapter on play (2012: 351 – 387). I return to the notion of joy and play in the conclusion.

[9] Brown started his lifelong research into play when he was on a panel in the 1960's looking into what motivated the Texas sniper killer Whitman (often called the University of Texas tower sniper) to kill his wife, his mother, 15 people and wounding 31 others. The cross disciplinary panel found, amongst other reasons, that Whitman's father strongly disapproved of play and always told his son to do something useful. Later in life Whitman was unable to deal with his aggressive impulses in stressed and humiliating situations and he became preoccupied with violence.

[10] Brown has, in addition to his clinical research, collected what he calls 'play histories' in which there are stories of people who have rekindled play in their adult life. Brown has collected over 6,000 stories of how people have played throughout their lives, including accounts from Nobel laureates and hardened criminals. Smith also states that play deprivation in children 'appears to have serious consequences for later adult behaviour' Smith (2010: 52). Animal research shows similar evidence. Rhesus monkeys show the rebound effect in play after deprivation (Smith, 2010: 57). Similarly, in rats the desire to play increases the longer they are deprived of it (Panksepp, 2012: 356).

[11] It is well established that both human and animal play follows the inverted-U shape of development i.e. we play more during our juvenile period when there is an abundance of resources and protection (Pellegrini et al, 2006; Smith, 2010; Sutton-Smith, 2001). Significantly, humans have the longest period of immaturity, allowing them a long period of play, facilitating the development of crucial skills. The extended period of immaturity is usually when play is observed in most species and 'this correspondence between play and an extended period of immaturity is not trivial' (Pellegrini et al, 2007: 263).

[12] *Art formerly known as New Media* was an exhibition at the Banff Centre, by Curators Sarah Cook and Steve Dietz.
http://www.banffcentre.ca/wpg/exhibitions/2005/formerly/

[13] Embodied interaction is not understood here in the context of Paul Dourish (1999) who uses the same term. Drawing on phenomenology, Dourish defines embodied interaction as an engaged participation between two equal bodies (computer and person) that are always set against the backdrop of relationships, or actions, and different understanding, all of which are also embodied.

'The setting within which the activity unfolds is not merely background, but a fundamental and constitutive component of the activity that takes place' (1999: 6). The embodied turn that Dourish presents is significant within computering (moving HCI away from system/planning to focus on the experience of the user and his physical presence in the world) but I find it is less relevant from a sculptural viewpoint, or in the context of fine art with its strong tradition of including the body.

14 This text references Schilder's (1935) full work, 'The borderline between world and body (is) not sharply defined. The body will be projected into the world, and the world will be interjected into the Body. Body and world are continually interchanged'. I am indebted to Tracey Warr's unpublished lecture, 'The Artist's Body', for pointing out Schilder's work.

15 Media art became established in the late 1980's and early 1990's (Quaranta, 2010: 1). During this time ISEA and SIGGRAPH grew to become key exhibition conferences showing digital art. Other key media art exhibitions are Transmediale, as well as newer festivals such as the Victoria and Albert Museum's V&A Digital Festival. Other Media Art organisations include Ars Electronica and ZKM, The Computer Society (London), Furtherfield (London), Node (London), TEKS (Norway) Interacess (Canada) Beta_space (Australia), EYEBEAM Art and Technology Centre (NY).

16 This argument is perhaps also reflected in the fact that media art is often absent from contemporary arts collections and that it still seems to be represented mostly at festivals such as those mentioned.

17 Bishop makes several interesting points, for example, she highlights the mainstream's reluctance to accept media art, but points out that it embraced photography, film and video in the 1960s and 1970s. She suggests that because photo and video are image based and, therefore, self evidently relevant to visual art, but that code and programming is alien and 'meaningless to the average viewer', could be the reason why there is 'a sense of fear underlying visual art's disavowal of new media' (2012: 5). Popper also sees the field of video as autonomous since the 1990s, separate from digital art. Bishop's paper stimulated many retorts from the world of media art and Quaranta picked up on her use of 'niche', arguing that beside the niche of the media art world, the mainstream art world (which, in fact, is also a niche and small, like media art), there is the real art world, there are 'legions of artists responding to the digital age'. (2012: http://medianewmediapostmedia.wordpress.com/2012/09/03/claire-bishop/).

18 It is worth noting that, for some artists and scholars, the first premise of the debate about a divide between media art and contemporary art is whether it is desirable to move beyond the divide. Their argument, or worry, is, if media art is merging with the contemporary art world, is there a future for the media art's concerns and issues - especially if media art is understood and seen as a comment on the relationship between technology and the human interface.

The discourse of the divide is of course much wider, far less binary and far more complex than covered here. There are several writers and artists writing about 'Art after Media'. See, for example, Graham and Cook, (2010), Domenico Quaranta, (2011), Shanken (2011, 2010) Arns, (2007), Christiane Paul, (2008), Frank Popper, (2007), Huhtamo, (2007), Dietz, (2005), CRUMB & Rhizome discussion lists, Manovich, (1996).

[19] At the Chi-TEX exhibition 15 women who work with technology as part of their art practice were invited to hack a teapot. In the context of definitions (names) of interactive art it was interesting to notice that all the artists involved defined themselves differently, yet made interactive artwork (see list below). I believe this poignantly illustrated that artists do not worry about definitions, or which category their artwork falls into, instead when making their concerns are often far more practical, such as how does a material behave, or more philosophically - what the artwork is about, what do we want it to do, say, show, mean.

Participating Chi-TEK artists 2011, V&A Digtal Weekend;
Mouna Androas & Melissa Mongiat (Montreal, Canada): **interaction designers**
Sarah Angliss (Brighton, UK): **sound artist and engineer**
Rain Ashford (London, UK): **interactive electronic art and wearables artist**
Katrin Baumgarten (London, UK): **designer and artist**
Tine Bech (London, UK): **visual artist**
Shu Lea Cheang (Paris, France): **new media artist**
Anna Dumitriu (Brighton, UK): **conceptual artist**
Alexandra Deschamps-Sonsino (London, UK): **industrial designer, co-founder of Tinker**
Julie Freeman (London): **performance and installation artist**
Syuzi Pakhchyan (Los Angeles, USA): **wearable technology design**
Artemis Papageorgiou (Athens, Greece): **installation artist and architect**
Mika Satomi (Goteborg, Sweden): **wearable technology designer**
Eunjoo Shin (Korea/London, UK): **interaction designer**
Clare Bowman (Lancaster, UK): **artist**

[20] By everyday technology I mean everyday media such as GPS, cameras, mobiles and laptops but also the less everyday for the regular consumer, but nevertheless influential, off the shelf electronics which are accessible and cheap to use, such as arduino, movement sensors, hacked toys and games as well as Max MSP and Open Frameworks.

[21] Höller's Slides series consist of: *Valerio I,* (1998), *Valerio II,* (1998), *Female Valerio,* (1999), *Slide No 5,* (1999/2000), *Slide No 6,* (2003), *Test Site,* (2006).

[22] *A Model for a Qualitative Society* by Palle Nielsen has since inspired several other art playground projects:

- *Kinder Planet* **(**1971) created by a group of students from the Hochschule für Gestaltung, in Offenbach, around Professor Thomas Bayrle, Wolfgang Schmidt, Linette Schönegge, Regina Henze and Karin Günther-Thoma.
- *The Great Game to Com*e, (2008), a playground at Frankfurter Kunstverein, experimenting with public space and its use. Adolescents and adults were invited to participate actively in the process of developing and experimenting.
- A small project by artist Corin Sworn in Canada, (2003), at the Or Gallery, also referenced *A Model for a Qualitative Society*.

23 Naimark does not credit the work, which was shown at the 1980 New York Avant Garde Festival, on the roof of the Cunard Terminal.

METHODOLOGY
PLAYFUL INTERACTIONS STRATEGIES AND METHODS

What researchers in Art and Design now have are the beginnings of a dynamic and evolving procedure for inquiry, which places practice and the practitioner at the very heart of research (Gray and Malins, 2004: 32).

My research employs a hybrid practice based methodology derived from the nature of my sculptural interactive arts practice. These methods and strategies can be divided into two main approaches, the making of artefacts (artworks) and the methods of evaluation and analysis. In this chapter I start by introducing my key underlying methodology, practice based research, before going on to explain my iterative system for creating artworks, which includes reflective practice and documentation. The chapter then goes on to describe my approach relating to the evaluation and analysis of the artworks, such as play criteria and observations. A key method in my evaluation of the artworks, which is also part of the making process, are my observations, which are used to record and test how the audience interacts with the artworks.

Practice based research

My key methodology is practice-based research in which interactive artworks are created as a means of interrogating the research questions[1]. This is defined as:

> Research which is initiated in practice, where questions, problems, challenges are identified and formed by the needs of practice and practitioners; and secondly, that the research strategy is carried out through practice, using predominantly methodologies and specific methods familiar to us as practitioners in the visual arts (Gray, 1996: 3).

My approach employs a fusion of methods, which are customised to the requirements of the research and my practice. An art-based methodology is 'essentially qualitative, naturalistic and reflective' (Gray and Malins, 2004: 72). Practice-based research is

characterised by multiple realities in which the artist is a reflexive critic of her own artwork and is inextricably intertwined into these processes (Robson, 2011: 132). Significantly, art-based methodology 'operates not only on the basis of explicit and exact knowledge, but also on that of tacit knowledge' (Barrett, 2007: 4)[2]. In other words practice based research is defined by being 'cyclical, emergent and discovery oriented' and this chapter acts as a foundation for the practice presented in the catalogue (Sullivan, 2010: 192).

My position is that practice-based research generates original knowledge by means of the creative practice. The artwork created 'embodies ideas that are given form in the process of making', which, in turn, is seen as 'evidence in the creation of new knowledge' (Sullivan, 2006: 1). Steven Scrivener suggests that practice based research (what he refers to as creative-productions) and the making of artworks contributes to 'human experience' and aims to generate cultural understandings, which are (critically) not just novel to the creator (Scrivener, 2002: 1). This cultural experience and knowledge goes beyond that of the creator, in other words, it is more than the artist simply researching new making techniques. Graeme Sullivan also proposes that artworks carry meaning and enable experiences, whether these experiences are enduring or ephemeral (2006: 1). If this is the case then it can be argued that the artworks are 'objects of experience' and, as such, are more important than the knowledge embodied within them, thereby also becoming objects in their own right and are not only a means to generate new knowledge (Scrivener, 2000: 2-4)[3].

Practice based research differs from research carried out by artists outside academia for several reasons. It adds intentionally to a shared knowledge of making and understanding, as opposed to the artist (the creator of an artwork) doing research for their own sake. In other words, the research is not only examined in relation to the artwork produced, but also to the issues established, the research questions and the system of methods developed for the practice. These findings are shared with both the academic and the artistic community. Key to practice based research is that artworks are not replicated; they are instead reflected, communicated and made accessible to other researchers and artists through both visual and written means. In my case this is represented by the exhibitions of artworks, the body of documentation (visual recordings, photos and video) and the observation notes and sketches (see also Robson, 2011: 154-

156). Within an artistic methodology, 'knowledge' is not replicated or reproduced – there is no point in an artist reproducing another artist's work (except, of course, in the case of artists whose practice is concerned with restaging or reproducing previous artworks) (Gray and Malins, 2004: 130, 135). The artworks are examples of knowledge, which in turn must be seen as 'original, i.e., not derivative or imitative of others' (Scrivener, 2002: 2)[4].

Underpinning the practice based research process of creating playful interactions and experiences for audiences are methods of observation devised to record and examine how the audience interacts with the artwork. This combination of art practice techniques, augmented with social science methods of observation and interview, is becoming more common within practice-based research (Gray and Malins, 2004: 30). This is particularly evident in art projects that include the relationship between the artwork and the audience. A key methodological difference between interactive arts and other fine art forms is that interactive artwork requires some elements of human testing, often in the context of an audience. Krueger articulated this important interactive art characteristic: 'Whereas in the past artists did studies for their own consumption, in an interactive art form it is necessary to exhibit studies as well as finished pieces in order to observe how people react to them' (1991: 45). However, these are not social science observations; my own artists' observations are not about finding out about people, rather they serve to test (and allow me to record) participants' interactions. Nor is it what HCI calls 'user testing'. It is important to differentiate between HCI's and my aim. HCI intends to design predictable user journeys, whereas my aim is to create play that is an open invitation – a call to action, extended to the audience. In other words, the play is not a controlled or instrumental process to achieve specific goals (as perhaps HCI would have it), such as to gain access to information on a website, or feedback using software). Using the word testing within an interactive art context is perhaps not entirely accurate, it is more than testing; it is a combination of testing and observation - watching what the audience actually do, in order to test and then adjust my artistic intention and reveal my assumptions about anticipated interactions. Often I know immediately if something 'works' or not. It is a tacit and intuitive knowledge based on my previous experience. Interactive artworks are partly created by the audience's interactions and the audience thereby becomes part of this iterative making process. I will now describe this process

within my methodology for creating artworks, including the underlying methods of reflective practice and documentation.

An iterative methodology

My research adopts the methodological strategy 'Inquiry by Design' and is adapted from John Zeisel's (1981) and Gray and Malins (2004) model to fit a visual arts interactive practice, in which the audience play and interact in some way with the artwork. Zeisel's model is an iterative design process in which the designer (or, in the case of Zeisel himself, the architect) uses 'inquiry by design' to enable change and improvement throughout the making process. Conceptual shifts and the development of the process happen as the result of repeated, iterative movement through three elementary design activities: 'imaging, presenting, and testing/evaluation' (1983: 6). Zeisel uses the word 'imaging' for forming a picture in the mind – or an idea, notion, or vision. Such 'imaging' is often visual and provides the artist with a larger framework for the development of the artwork, however, these images also represent the artist's 'subjective knowledge' (1981: 7). Zeisel defines 'physical design' (in my case artwork) as something which 'inventively mixes together ideas, drawing, information and a good many ingredients to create something where nothing was before' (1983: 5). Zeisel suggests that design (in my case art making) and research are more similar than presumed and that 'there is a close kinship between design images and research concepts, design presentations and research hypotheses, and tests in both disciplines' (Zeisel, 1983: 17). Gray and Malins' research also suggests that 'artistic models of inquiry' have shared characteristics with the research process in that both develop research questions and propositions, building an argument, presenting, testing and evaluating, in order to modify or advance the thesis (2004: 76).

The artistic methodology developed for this research is an iterative model of making derived from my research aim to create artworks that enable playful interactions. This approach is a continuous iterative cycle of making artworks, where the insights gained from one cycle of making, which includes observation, informs the development of the next artwork. My art projects are created in order to understand how artists can generate conditions for play in and around interactive artworks. Observations are carried out in order to understand and test the artworks' possibilities for play. From the behaviour

observed a vocabulary of play emerges, demonstrating the different kinds of play initiated through interactive artwork. This play vocabulary in turn informs a model for making playful interactive artworks.

Fig. 25 model illustrating the cyclical nature of the research and creation of playful behaviour

The making process (a series of making cycles)

The making process of creating interactive artworks, conducting observation and including the audience's interactions as part of a making process is inevitably a cyclical and iterative process. It should be noted that this process, which I will now describe, does not always take place in a neat sequence. Rather, the research takes place in the context of 'real world messiness' (Crang and Cook, 2007: 14). The process is full of problems and challenges – struggling with technology, hacking it, and making it work for creative purposes. Similarly, working with programmers can cause misunderstandings but this is also, at times, why the process becomes structured and forces me to voice more clearly my tentative ideas. In reality, the making process is a series of creative leaps, in which the artwork is modified by the problems and solutions equally. It is, as Zeisel's model below illustrates, a multidirectional process (Zeisel, 1983: 6 and 14).

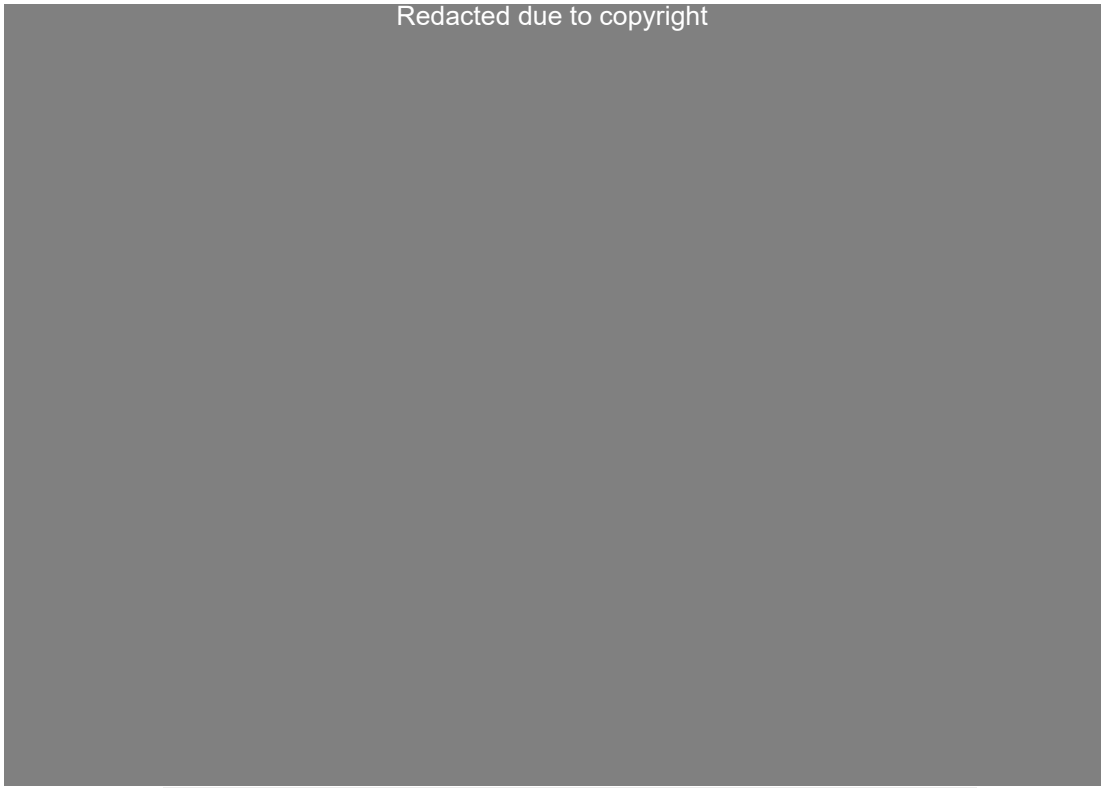

Fig. 26 Zeisel's spiral illustrates the process of iterative making as a multidirectional process in which the artist makes predictions and thinks 'forward and backwards at the same time' (Zeisel, 1981: 9)

My initial making process starts with the idea for an artwork and is linked to the research questions. This first stage is described by Zeisel as 'seeing something where nothing seems to have been'. My next stage is where the tentative idea is then explored through a process of contextual research to determine if it is feasible. Zeisel splits this contextual research phase into two types of information which feeds into the making process; firstly, heuristic information as a catalyst for imaging and, secondly, knowledge for testing (1983: 6). My process is similar and I gather information from several areas in order to:

- avoid repeating another artist's work, by researching other artists working with similar concepts and materials
- establish empirical knowledge in relation to technology and material properties
- receive feedback and critique from researchers and artists
- examine the theoretical underpinning of the idea/artwork and its link to current debate

Crucially, this process also acknowledges that artists are:

> not only embodied in the making of images and objects, but these artefacts also exist within a set of creative and critical contexts and informing discourse that is

> partly directed by the scope of the research project, and partly by the field at large (Sullivan, 2006: 3).

The contextual research process mainly takes place at the beginning but also continues, in short or long loops, throughout the entire making process. It is important to note that contextual research can be both informing and limiting. Sullivan suggests that the tradition of contextualising arts practice – often from a perspective that reflects on what came before (historically, culturally and philosophically) can be restrictive. It is, therefore, necessary also to look forward into the unknown. This perhaps offers better possibilities for practice-based research to reveal new knowledge (Sullivan, 2006: 2).

Following the first cycle of contextual research the idea for the artwork is formalised and the making process begins. During this period I also collaborate with technologists and programmers to ensure I can implement the artworks' potential electronic interfaces. I return to the method of collaboration later in the chapter, as well as in the catalogue introduction. The making process is often intuitive and draws on tacit knowledge. This process employs methods of working responsively with materials, which includes the audience. As an artist I mainly use materials that are part of everyday life. These can include anything from streetlights, sounds, balloons, LEDs, interactive electronics and location tracking technology through to environmental elements, such as urban spaces, gravity and water. My art practice deliberately uses tactics of play and digitally influenced methodologies, as well as exploring and transforming everyday materials and places; experimenting, for example, by mixing manufactured circuits and commercially available, off-the-shelf, components. These material methods are playful (and incorporate chance) and exist between the polarities of the weighty and the inconsequential. My material thinking is concerned with the properties and affordances of materials – how objects and materials behave and how we perceive them. Bolt describes this as a form of material intelligence within arts practice:

> Material thinking offers us a way of considering the relations that take place within the very process or tissue of making. In this conception the materials are not just passive objects to be used instrumentally by the artist, but rather the materials and processes of production have their own intelligence that come into play in interaction with the artist's creative intelligence (Bolt, 2007: 29-30).

This form of material thinking is firmly embedded in my art practice, but it is not a material led process in which the ideas for the artworks originate from the materials themselves.

Rather, it is the cooperation between materials and technology, with the idea leading the process.

During this period the artwork is also interacted with, played with and tested[5]. I examine the artworks' interactive abilities, its play affordances and the material invitation. Using observations I evaluate how participants interact and play with the artwork. These artist observation tests sometimes take place at the studio with colleagues and are also carried out at exhibitions – playing and testing the artwork with the audience. The artwork is, as a result, presented as a final artwork, even though the process of remaking is undertaken between exhibitions. I accept that the moment when the artwork is finished is fluid and that the artwork may be continually adjusted over years of exhibiting. The artwork 'develops cumulatively' and, in reality, most artists and designers constantly modify their final work in response to new information and insight (Zeisel 1983: 6 and 16). Interactive artist David Rokeby describes this process of observing-testing-evaluating and concludes that 'exhibitions serve as a public research laboratory where my ideas about interaction and experience are tested, affirmed, or shot down' (1998: 1)[6]. This notion, of an exhibition as a public research laboratory, reflects my own making process. After observing audiences interacting I will revisit and adjust the artwork in the context of my artistic intentions and the research questions. This process of making-testing-observing-remaking-evaluating is, to use Zeisel's term, 'a feed-back and feed-forward process' where audience interactions become part of the making process. It is significant to the nature of iterative research that new knowledge is formed through the practice, which then feeds into the next cycle of making (Zeisel, 1981: 9). Robson also describes observation used in the exploration phase as typically unstructured, conducted in order to find out what is going on and as a precursor to subsequently testing out the insight obtained (Robson, 2011: 317). I describe my methods of observation in more detail later in the chapter. The last cycle is the analysis of the artwork. At this stage in the research the interactive artwork is evaluated and analysed employing methods described in detail in the last section of this chapter.

Reflective practice and documentation

Underpinning the research process of creating playful interactive artwork is the methodology of a reflective practitioner and documentation of the practice (Schön, 1991). Research which employs methods of artwork creation require transparency in order to

reveal and share the artistic decision making process. Consequently, documentation becomes essential to the rigour of the research. Documentation functions as evidence and provides examples for future artist-researchers. The documentation articulates the practice-based research process as well as the outcome (the artwork), making explicit the thought processes involved. It seeks to communicate tacit knowledge and to illustrate the visual language used to explore concepts which are not contained in verbal language. Furthermore, and critically, documentation acts as evocation during the evaluation and analysis. Documentation captures research moments and takes a range of forms that can be both physical and electronic. In my research, sketchbooks functioned as a method for recording ideas, tests and reflections. Video and photo documentation of the artwork, as well as notes, provide access to the artwork produced and evidence for the behaviour observed in and around the interactive artwork[7].

Methods of documentation are linked to the approach of a 'Reflective Practitioner'. Donald Schön (1983) refers to 'reflective practice' as a method which encourages the artist to step outside the process in order to see the bigger picture. This is more than just a reflective process, as John Biggs points out:

> A reflection in a mirror is an exact replica of what is in front of it. Reflection in professional practice, however, gives back not what it is, but what *might* be, an improvement on the original (Biggs, 1999: 6).

Schön (1983) defines the ability of professionals to 'think while doing' (think on your feet) as 'knowing-in-action'. This ability is a key skill in an established practice and enables the practitioner to apply previous experience to new situations. 'Reflection-in-action' is what happens whilst a problem is being dealt with, in what Schön calls the 'action-present'. It is a response to a challenge where the expected solution is outside of our 'knowing-in-action'. Reflection-in-action is about confronting our hypotheses because, to an extent, knowing-in-action forms the basis of assumption. It is about re-thinking, in a new way, the project or problems encountered. 'Reflection-on-action' is defined as reflection after the project, consciously planned and critically undertaken, as well as documented. In other words, my approach in this research:

> Attempts to unite research and practice, thought and action into a framework for inquiry which involves practice and which acknowledges the particulars and special knowledge of the practitioner. (Gray and Malins, 2004: 22)

The chapter now explains the methods used for the evaluation and analysis, namely: play criteria, observations, and peer user reviews.

Evaluation and Analysis

I understand evaluate to mean judging the value of something, in my case, testing artworks – evaluating their interactive and playable values. Analysis is understood as a detailed examination of something in order to ascertain and construct meaning, in my case, the analysis is of the original research findings derived through the practice, as well as of the play behaviour observed. I acknowledge that evaluation and analysis take place at different times throughout the research process and that it is a balance between an informal process of putting things together and a systematic process (Crang and Cook, 2007: 132). My methodology is iterative and cyclical and the evaluation is therefore pervasive throughout the research project. Furthermore, my research is not a traditional three-staged 'read-*then*-do-*then*-write model' (Crang and Cook, 2007: 2). Rather, the findings and theories are emergent and my approach reacts to the dynamic of the creative practice (Gray and Malins 2004: 22). As Katy Macleod writes, 'often the logic comes after the event. After the rendezvous, as Duchamp would have it, the co-efficient of the gesture (object?) and its interpretation' (cited in Rust, Mottram and Till, 2007: 45 sic.).

Criteria

Play theory is essential in identifying and understanding the different kinds of play elicited through interactive artwork and my observations and evaluations were conducted using a set of play signals criteria and definitions, as outlined in the background to the research play section (and repeated briefly here) that play is 1] voluntary 2] pleasurable in itself and is not dependent on external rewards or goals 3] an activity - a physical engagement 4] distinct from most behaviour by being exaggerated, or engaging in make-believe 5] recognisable by its use of metacommunication and play signals. In fact, play is easy to recognise; we all know the feeling of playing. Play is therefore also understood by remembering the feeling of play because 'if we leave the emotion of play out of the science, it's like throwing a dinner party and serving pictures of food' (Brown, 2010: 21). Play theory tells us that 'the urge to play is not learned. It is innate. The evidence indicates that PLAY is one of the primary-process, genetically determined social urges'

(Panksepp and Biven 2012: 356). The analytic process also takes into account that there is no right or wrong way to play. Instead, the artwork is understood as an 'open work' where a range of possible play outcomes are desirable (Eco, 1962: 21). The artwork is designed to engage and create possibilities for play and interaction. The aim is not to create an exact and reliable play outcome that can be repeated and validated. My methodology instead acknowledges that within a creative inquiry 'multiple issues and goals may be appropriate (and) ...that these may change, grow, and be given different emphasis as the work proceeds' (Scrivener, 2000: 9).

Visualisations

Visualisation is also part of my analytical approach. Robson writes 'images are useful as a mode of interpretation and/or representation' (2011: 370). It is also significant to my research that people often recognise and understand play better through images than text (Brown 2010: 20). Visual thinking makes ideas and research findings visible, enabling issues to be explored and communicated (Gray and Malins, 2004: 107).

Observation

As argued earlier, interactive work needs to be tested by real audiences, it is a method for 'getting at real life in the real world' (Robson, 2011: 316). These artist observations are part of the making process within my interactive arts practice. Observations are used to find out what people do – how people physically interact with the artwork. Crucially, the observations are not about finding out about people, or to learn in an ethnographic sense, how people experience play. Rather, the observations serve to record people's physical interactions and to allow evaluation of the artworks according to my artistic intention and research questions. The strength of this type of observation lies in it being situated in the real world, enabling observation of play behaviour in and around interactive artworks in the natural environment. This is similar to my description of observing animal play in the background to the research; it is an ecological approach, of observing play in the natural environment, comparable to observing human's play interactions. The weakness of observation is the potential difficulty of maintaining objectivity. However, the counterargument is also acknowledged that researchers cannot claim to be isolated from culture and society, we are "in" the world, the world is not "out" there. That it is in fact only by recognising this 'situated subjectivity' that it can instead serve as a resource for deeper understanding. After all, practice-based research is 'an embodied activity that

draws in our whole physical person, along with all its inescapable identities' (Crang and Cook, 2007: 13 and 9).

My observations took place predominantly in galleries during exhibitions of the artworks. My primary observation notes were recorded using two methods: note taking using the iPhone application *Notes*; and photos and video, which were used to corroborate the notes (selected play moments) as well as to document the artwork. The decision to use *Notes* on the iPhone was selected after testing various tools as the most effective method for unobtrusive observation. The application, *Notes,* synchronises automatically with a computer and is dated, thereby storing the raw data. Writing down notes on a laptop whilst making my observations was tested, but this resulted in the participants who were playing with the artwork asking me if I was controlling the interactivity. In other words, they jumped to the conclusion that it was the artist interacting with them rather than the artwork. The method of note taking using traditional pen and paper was then tested. However, I was concerned that this would result in people feeling as if they were under surveillance, for example, one audience member immediately assumed I was a gallery worker counting numbers. Using the iPhone was easy, always in reach, and tapped naturally into the culture most people engage in. The observations and note taking were inconspicuous, done on the spot and, crucially, were carried out without affecting the installation environment and thereby influencing people's natural interactions.

My observation technique mainly consisted of sitting and standing (hovering around) near the artwork, in order to get a clear sense (and at times hear sounds such as laughter) of people playing. My observations were largely 'non-participatory' and 'unstructured', what Robson defines as 'unobtrusive observation' (1993: 316). This type of observation sits between two more traditional modes of observation; non-participatory and structured (which is often quantitative and data driven) and participatory and unstructured (which is often qualitative and the researcher is actively involved) (Robson, 2011: 329). The difference between the two is 'the pure observer typically uses an observation instrument of some kind, the participant observer is the instrument' (Robson, 2011: 319). My observations were non-participatory and unstructured. However, there were times when I also engaged in participant observation, when I would test the artwork and engage in play with the audience. On one occasion the observation was structured (carried out at particular times) in order to collect samples of an adult audience interacting with *Catch*

Me Now. This was done at the Science Museum, at a late night, adults only, opening. The concept of saturation was also applied, for example, during the observations when a playful behaviour was observed often enough, such as someone *posing* in *Catch Me Now's* spotlight, the theoretical saturation point was reached and I concluded that it was a credible finding (Crang and Cook, 2007: 15; Robson, 2011: 148).

Ethics

The observation was often 'covert' (also called direct or unobtrusive), carried out in the gallery space without announcement. This carried with it ethical considerations. It was deemed that the intrusion into people's privacy was minimal, people were observed doing what they would normally do with the artwork – play, or not play. People were not encouraged to do anything harmful to themselves or others. It was anonymous and it was safe. The benefits of covert observation are that the act of being observed did not change peoples' behaviour. Further, play in public spaces is particularly susceptible to shyness. As a covert observer I became a natural part of the environment of audience members and custodians mingling in the space. However, I wore a nametag (which indicated that I was the creator of the work) and I would engage with, and reveal my actions and reason for being there, to anyone who approached me. All of my research projects adhered to a set of ethical rules which are listed in the footnotes[8]. During *The Big Swim* all methods were disclosed and participants and swimmers signed consent forms.

Interviews

During *The Big Swim*, which was an interactive art event that took place over a weekend, short structured interviews were carried out as an additional method of obtaining data. This was due to the relatively short window of opportunity to observe people interacting. The interviews with participants (swimmers) and lifeguards also counteracted low visibility - not being able to observe people well, as the artwork consisted of people swimming in a fog.

Collaboration

Interactive arts projects can require specific technical skills such as programming and in these situations I collaborated and paid for technical support to help implement technical solutions. In all projects I was the creator of the artwork and directed the technical collaboration, controlling the agency. As an artist coming from a visual arts background

and sculpture, but with a good knowledge of technology, the working collaboration was a problem-solving process in order to implement desired interactions in the best possible technical way[9].

Peer and user reviews

Peer review was used to balance my perspective and to unlock new insight because in 'seeking the views of others, which will inevitably be subjective, we can develop inter-subjective views, which are less likely to be one-sided' (Gray and Malins, 2004: 23). I used peer review from fellow artists, students and researchers who wrote a short review based on their impression of the play and interactions which took place in and around the artworks. I specifically draw on the reviews conducted at *The Big Swim* due to this artwork's event based nature, which limited the period of time available to carry out observations. However, it is important to note that overall I do not significantly rely on the peer reviewer/expert users. In particular, in one case the reviewer was heavily influenced by the conversation and observation I had with him (I was present myself, carrying out my own observations). These texts and accounts are included in full in the appendix. I also employ audience reviews where possible, in the form of taking notes of comments overheard during observations, tweet conversations and blogs by audience members describing my artwork together with their own evaluations.

Summary

My practice-based artistic methodology was adapted from *Inquiry by Design* and was tailored to suit interactive arts practice. It involved a process of cyclical artwork creation. This iterative process tested each artwork's proposition of play and built cumulative and robust knowledge about how to create playful interactive artwork. It allowed insight into unpredictable play interactions, and revealed my assumptions about audience behaviour and material play affordances. Underpinning the research process of creating playful interactions was documentation used as a way to reflect on my practice. The key methods used to evaluate and analyse the artworks were unobtrusive or covert observation, using a set of play criteria, peer and user reviews, and, on occasion, interviews. These methods are situated within 'real world research' and aim to suggest theories rather than develop verified results.

A defining methodological decision was to make substantial artworks as part of my research process. Consequently, five large-scale art projects, focused on physical play and interaction, were created to allow the realisation of ambitious artworks in order to address the research questions. These new interactive artworks are catalogued in detail in the following chapter.

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[1] Candy also describes practice based research: 'if a creative artefact is the basis of the contribution to knowledge, the research is practice-based' (2006: 1). A similar term within this understanding is Practice as Research, which was derived from the PARIP research project (Nelson, 2009). These should not be confused with the term Practice-Led research, where the main focus is to advance knowledge about practice. The AHRC describe Practice-Led research as concerned with the research processes, rather than outputs (Rust, Mottram and Till, 2007: 66). In other words, Practice-Led Research looked at the nature of practice and led to new knowledge about operational aspects of the practice, not to new outcomes, such as artworks or theoretical play frameworks, for the interactive arts field.

[2] Barrett's full quote is significant in that it highlights the dichotomy which exists between theory and practice – or, in other words, it illuminates the complexity when one form of language (e.g. visual, making and thinking process) is translated into another form or language (e.g. textual, logical process) and vice versa.

> Since creative arts research is often motivated by emotional, personal and subjective concerns, it operates not only on the basis of explicit and exact knowledge, but also on that of tacit knowledge. (…) Pierre Bourdieu argues that tacit knowledge and the alternative logic of practice underpins all discovery; and yet the operation of this logic is often overlooked because it is subsumed into the rational logic of discursive accounts of artistic production (Barrett, 2003: 4).

[3] Scrivener provides a set of norms which a creative-production can be tested against:

- Described the issues, concerns and interests stimulating the work, i.e., something that will contribute to human experience?
- Shown that the response to these stimulants is likely to be original?
- Shown that the issues, concerns and interests reflect cultural preoccupations?
- Shown the relationship between the artefact and those issues, concerns, and interests?
- Presented original, high-quality and engaging artefacts that contribute to human experience?
- Communicated knowledge, learning or insight resulting from the programme of work?
- Shown themselves to be a self-conscious, systematic and reflective creative artist or designer? (2000: 4-5).

[4] The issue of reproducing knowledge can also be connected to theories of reliability and trustworthiness within qualitative research. In order to establish trustworthiness for the research findings they present, researchers traditionally rely on three central concepts. *Validity* relates to the notion that the findings really are what they appear to be. *Generalisation* is the concern with whether the findings are applicable beyond the particular issues under scrutiny. The third concept, *reliability,* is generally connected to quantitative research and focuses on how the findings can be repeated to reproduce the same result. The use of the third concept within artistic methodologies is not directly applicable. I argue that artworks are examples of knowledge, but are not appropriate to the concept of reliability and replication (Robson, 2011: 77 and 155).

[5] It is possible to use Schon's table of 'on-the-spot-experimentation (1983: 153) here. For example, if an idea/concept/material is confirmed then the artist simply moves on and there is no need for further contextual research. See also Scrivener *The Importance of Reflection in Creative Production* (2000).

[6] Rokeby's account of making artwork which interacts physically with the audience is interesting in the context of my argument that interactive artists need to test and play with a real audience. I have included his full quote here, to highlight this issue:

> In 1983 I was invited at the last minute to exhibit my interactive sound installation in an exhibition called *Digicon 83* in Vancouver. This was to be my first public show, and I was very excited, but there was a tremendous amount of work to be done. I worked between 18 and 20 hours a day refining an interactive interface from a barely implemented concept to an actual experiential installation. I spent no time with friends and didn't get out at all. I got the piece done and was extremely pleased with the results. After setting up my installation in Vancouver, I was astonished by the fact that it did not seem to respond properly to other people, and sometimes didn't notice people at all. I didn't really understand the problem until I saw videotape of myself moving in the installation. I was moving in a completely unusual and unnatural way, full of jerky tense motions which I found both humorous and distressing. In my isolation, rather than developing an interface that understood movement, I'd evolved with the interface, developing a way of moving that the interface understood as I developed the interface itself. I'd experienced a physiological version of the very convergence that Turing described (1998: 3).

[7] This form of documentation is not only important within artistic methodologies, but within most 'qualitative research traditions there is an expectation that you provide an account of your journey, documenting various changes made along the way' (Robson, 2011: 73). Documentation does provide a form of evidence, but it is also used as a method to ensure objectivity and militate against any sense of self-indulgence and over-subjectivity within a practice based methodology.

[8] The **six** key principles from the Framework for Research Ethics by The Economic and Social Research Council (ESRC):

1. Research should be designed, reviewed and undertaken to ensure integrity, quality and transparency.
2. Research staff and participants must normally be informed fully about the purpose, methods and intended possible uses of the research, what their participation in the research entails and what risks, if any, are involved. Some variation is allowed in very specific research contexts for which detailed guidance is provided in Section 2.
3. The confidentiality of information supplied by research participants and the anonymity of respondents must be respected.
4. Research participants must take part voluntarily free from any coercion.
5. Harm to research participants must be avoided in all instances.
6. The independence of research must be clear, and any conflicts of interest or partiality must be explicit.

The ESRC's Research Ethics Framework was published in 2005 and updated in 2010

Ethics applications were submitted to the ethics board at The University of the West of England for *The Big Swim* and *Catch Me Now*, for all other projects the media consents were obtained under the galleries' policies. For example, the Victoria and Albert Digital Design Week advertised the fact that cameras may be used when people participated in the weekend exhibitions and activities.

[9] Different views about collaboration are represented within the interactive art field and within universities' different departments, concerning whether artists should be able to master technology and code, in order to work with it. For example Edmonds and Candy argue that artists who have intimate technical knowledge are in a position to make more informed decisions and that they have more control (2004: 116). Their argument can also be linked to aspects of the media art discussion, and the view that media art cannot be critically challenged without a deep knowledge of the medium and as a result continue to require 'a specialized critical approach' (Quaranta 2011: 3). Popper provides another view when asked if interactive art can become too involved with the technology.

> I have always thought that technical knowledge or experience was indispensable for a deeper comprehension of art works and have been in favor of putting the stress equally on the processes of creation and on the open-ended art work. The danger of becoming too much involved - and even swallowed up - by technical considerations seems to me a sign of immaturity in an artist. I have always tried to decipher what the aesthetic intention in a work of art was and how it related to the artist-conceiver's technological preoccupations (Popper, 2003: 67)

Finally it is worth highlighting Michael Petry's argument that artists have employed technologist, or specialist manufacturing since Bernini's use of studio assistants. He points out that today many artworks cannot be made without specialist manufacturing, for example Carsten Höller's *Test Site* was made by a German company that Höller has worked with for over 10 years. Petry suggests

that our preoccupation with the notion of the "artist's touch" is what confuses the issue and that 'in film, for instance, there is no doubt where the authorship of the movie lies' (2012: 6).

CATALOGUE
INTRODUCTION

Play is grounded in the concept of possibility
(Csíkszentmihályi and Bennett, 1971: 45).

Five artworks which focused on play and interaction were created to allow the realisation of ambitious art projects and to address my research questions: 1] How do the properties and affordances of materials and technologies foster play and interactions? 2] How can artists conceptualise physical participation and play in interactive artworks? 3] What kind of play takes place in and around interactive artwork?

In this chapter details of four selected artworks are outlined: ***Echidna*** (2010), an interactive sound sculpture, ***Catch Me Now*** (2010), an interactive light installation, ***The Big Swim*** (2011), an immersive light installation and ***Tracking You*** (2012), an interactive, wearable, sound installation. Also included is a brief description of ***Chromatic Play*** (2012), an interactive light installation and I give the reasons why I chose not to include this artwork. The artworks were presented in a range of exhibitions including: SIGGRAPH Art Gallery (USA), the Kinetica Art Fair Gallery, Victoria and Albert Museum (V&A), Bath Illuminate Light Festival, as part of the Cultural Olympiad and at the China Design & Technology Museum, in Beijing. Many of the projects were also presented at conferences and in journals such as: *Leonardo,* The Journal of the international Society for the Arts, Science and Technology; the German Interactive Design Journal, *Weave;* Leonardo Electronic Almanac (LEA); on the radio programme Resonance, *Furtherfield.* For a full list of exhibitions and publications please see the appendix. Observations were conducted during the exhibitions and my observation notes, including a list of dates and places, can also be found in the appendix.

Funding and collaboration

All the artworks presented in the catalogue received public funding in some form; one was a commission and the rest were gallery projects. All public funding, whether for

gallery projects or commissions, inherently carry a set of parameters. However, and crucial to the research, all projects were informed and initiated by my practice-based methodology - as a means to answer my research questions, rather than following funding criteria. In the same way, several of the interactive arts projects created for this research required specific skills that an artist would not necessarily have, in my case, advance coding and circuit board design. In these situations I worked with the following technical experts: *Echidna* - Tom Frame, *Catch Me Now* - Tarim, *Chromatic Play* - Louis Christodoulou, *Tracking You* - Tom Mitchell. In all projects the research directed the technical collaboration.

Outline of the catalogue

The four artworks are outlined chronologically in four separate catalogues. They are presented in the order they were created, to highlight the iterative nature of the research as well as to indicate how the learning and research findings from each project informed the next artwork. Each catalogue follows the same writing structure: I firstly address the artwork's research aim and questions and, where relevant, I explain the methodological developments. I then describe the making process of the artwork before carrying out a review of my observations of the audience's interactions. This is followed by an evaluation of the artwork. Writing about the making process is a challenge to many practice based researchers. It is often the case that the research, both the questions and the findings, are presented before the artwork is experienced, or, as in my case, that the artwork is only represented by an accompanying website and DVD (Macleod, 2007: 1)[1]. My challenge was to describe an interactive physical experience, the material's playfulness – the look and feel, as well as to accurately represent the research's art making process, with all its intuitive and irrational methods. Similarly, the challenge was how to convey the tacit knowledge that arose from the practice. The fact remains (as described in the methodology) that artworks and play are often best experienced, and that, as Candy writes, 'whilst the significance and context of the claims are described in words, a full understanding can only be obtained with direct reference to those outcomes' (2006: 3). This latter point I have tried to counteract by providing a website that the reader can explore while reading the catalogue. In the context of practice based research, the website (together with the documentation) is what forms the evidential part of the thesis.

In writing the catalogue it became clear that some of the research findings were repeated across the artworks. I have, therefore, focused on each individual artwork's features and the key research findings that arose in each case. I also decided to exclude the artwork *Chromatic Play,* commissioned for the Great Tower, a public heritage castle in Guildford[2]. I concluded that the work repeated issues found in previous works, in particular around readability and reliability, as described later in the *Catch Me Now* catalogues, as well as findings around play as exploration, explained in the *Echidna* catalogue. In addition, my decision was affected by my concern that *Chromatic Play* was influenced by the commission brief, to create an artwork for a public heritage space. Whilst I have an interest in audience behaviour that arises in passer-by spaces, as seen in *Catch Me Now*, and in a space's playability, as described in *The Big Swim* - a public space in a castle brings with it a different set of research parameters to those in my thesis. My work is not concerned with issues around public artwork (as also briefly covered in the introduction chapter's footnotes). *Chromatic Play* consisted of three light sculptures that shifted and changed in colour as an audience moved around them. These sculptures, or creatures, as audiences called them, communicated wirelessly with each other and each sculpture controlled either a red, green or blue (RGB) colour scheme. In other words, when one sculpture was approached it changed all three sculptures to red colours; similarly, the other sculptures when approached would respectively turn all sculptures green or blue. Although *Chromatic Play* elicited play behaviour from audiences I also observed that some people were baffled that a heritage castle had light creatures exhibited in it and a few audience members complained that the castle was not "pure" and presented in its natural state. The most noteworthy play vocabulary observed was how the audience played with the colours by moving (in the case of children running) around the sculptures. At times groups would enter into colour battles or develop "I like" games, yelling "like" when their favourite colour emerged. I have included a short video on the PhD website which shows a family playing "a colour battle" – where each person stands by a sculpture to activate it, trying to override family members standing by the two other sculptures in order to win. I will now describe each of the four artworks created in response to the research questions in detail.

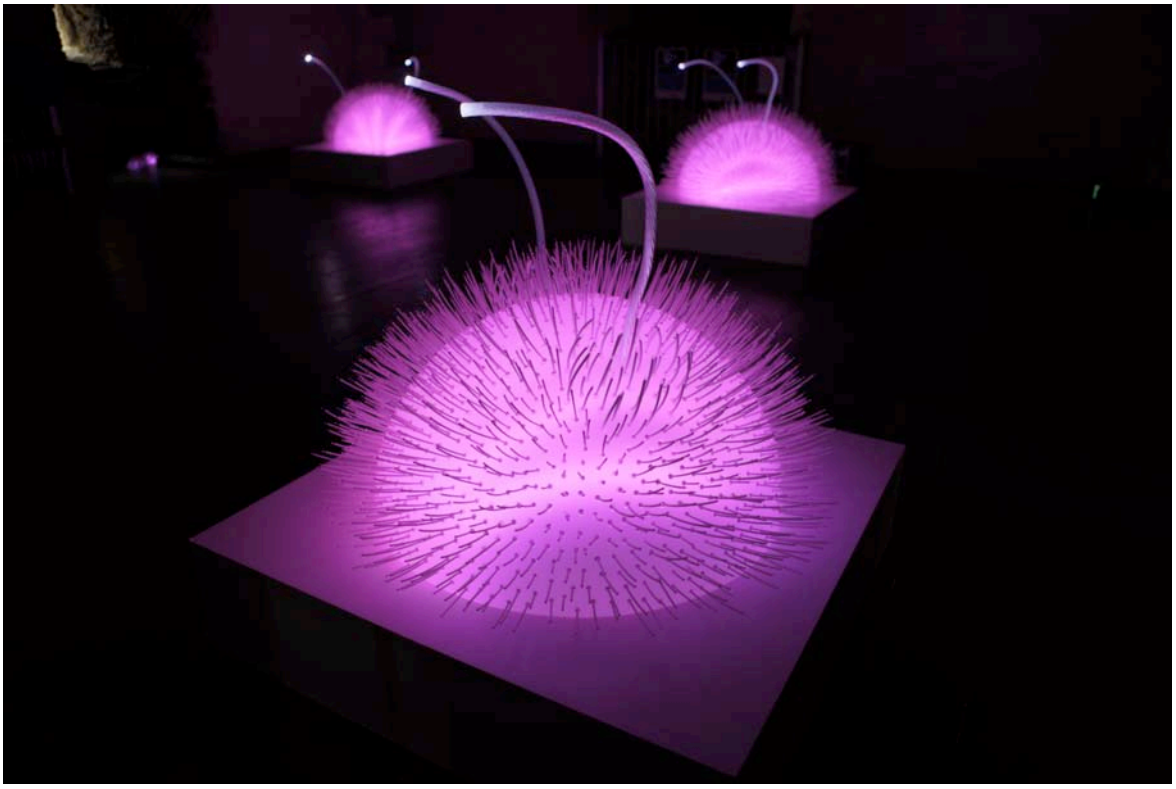

Fig. 26 Tine Bech *Chromatic Play* at Guildford Castle, 2012

[1] Candlin also argues that this duality of practice and theory can be linked to our current institutional environment, where it is standard for practice-based research that artworks are developed in response to research questions, but that it 'is deemed inaccessible to judgement unless accompanied by written contextual material' (2000: 2).

[2] *Chromatic Play* was commissioned by the Surrey Light Project and was funded by EPSRC bridging the Gaps (Engineering and Physical Sciences Research Council). The Light Project is a series of research programmes run by a team of scholars, all of whom work at the University of Surrey: Konstanze Hild (Photonics), David A. Bradley (Medical Physics), Ignazio Cavarretta (Civil Engineering), Victoria D. Alexander (Sociology) and Stuart Andrews (Theatre Studies). The artwork was programmed by Louis Christodoulou.

ECHIDNA

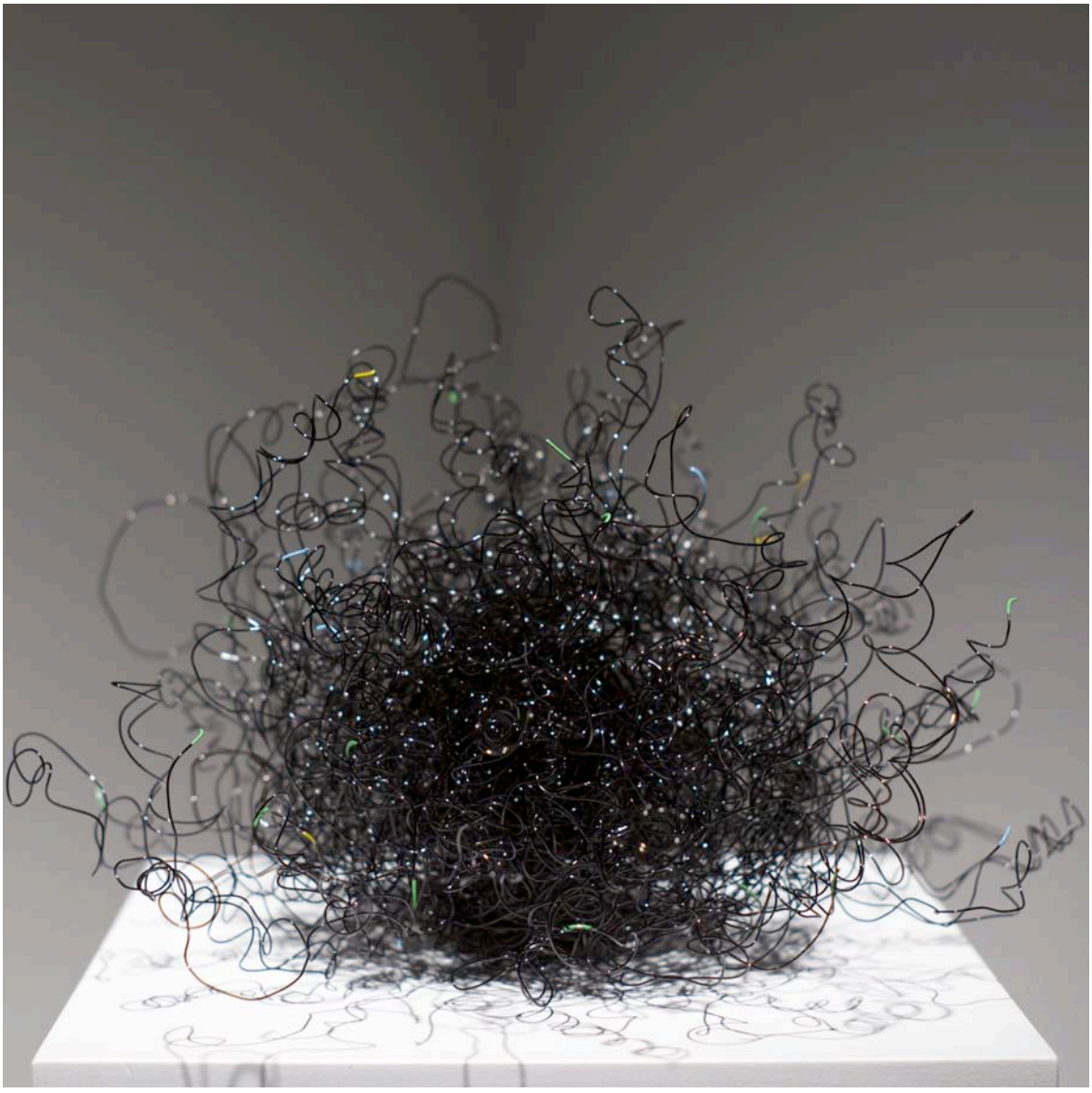

Fig. 27 Tine Bech *Echidna* (2010) SIGGRAPH Art Gallery, LA, USA

CATALOGUE
ECHIDNA

Echidna was an interactive sound sculpture. When approached or touched it would squeak and react to the audience's presence. The sculpture was like a fussy tumbled creature that had its own (electronic) voice. It was made of coloured, tangled wire and resembled a messy line drawing made three dimensionally and infused with life. The sculpture sat on a plinth which contained the electronics connected to the work. When a person touched, or a hand hovered in close proximity to the work, it disturbed the electromagnetic field around the artwork and a sound emerged from it. *Echidna* (A-kid-na) is the name of an Australian hedgehog that some scientists believe has the ability to perceive electromagnetic fields[1]. The sculpture also had this ability.

Echidna (2010) was displayed at SIGGRAPH Art Gallery and in a research talk at SIGGRAPH conference studio, as well as in the *Leonardo* Journal of the international Society for the Arts, Science and Technology, 2010, LA, USA; at The Kinetica Art Fair Gallery, London, 2011; at Banbury Museum in 2011; and, finally, at the China Design and Technology Museum in Beijing, 2012.

Research aims and questions

Echidna explored the properties of materials and the affordance of technology, merging the two into a playful animated sculpture. The work investigated how to create playful interactive artwork using a tactile interface in the gallery environment of "do not touch" and posed the question; what kinds of play take place in and around an interactive sound sculpture? It also explored the issue of how I could involve the body in physical participation to create playful interactions. Additionally, I sought to make an artwork that had an element of surprise by producing an invisible interactive field, which created a sense of amazement when the audience approached, or touched, the artwork.

Methodological developments

Echidna was the first artwork created in response to the research questions. At this stage some of my methods for making observations were still evolving. My first observations were conducted at SIGGRAPH Art Gallery and, at this point, I was still exploring the best way to take notes, often I simply observed and made a mental note of participants' interactions with the sculpture. Later, I wrote some of my thoughts in a sketchbook. The SIGGRAPH conference provided the opportunity to observe a considerable number of people, as well as the chance to study a diverse audience made up of many nationalities. SIGGRAPH is a well-known and respected computer society and therefore offered valuable cross-disciplinary feedback and, as such, the audience functioned as "expert users", providing feedback, as described in my methodology. *Echidna* was shown in a conventional gallery setting and observation notes from later exhibitions do exist, as well as uncut videos of moments of interactions from SIGGRAPH, Kinetica Art Fair and The China Design & Technology Museum, in Beijing, on the website. This, together with an expert user's impression and observation notes, email feedback from the audience and curators, can be found in the appendix.

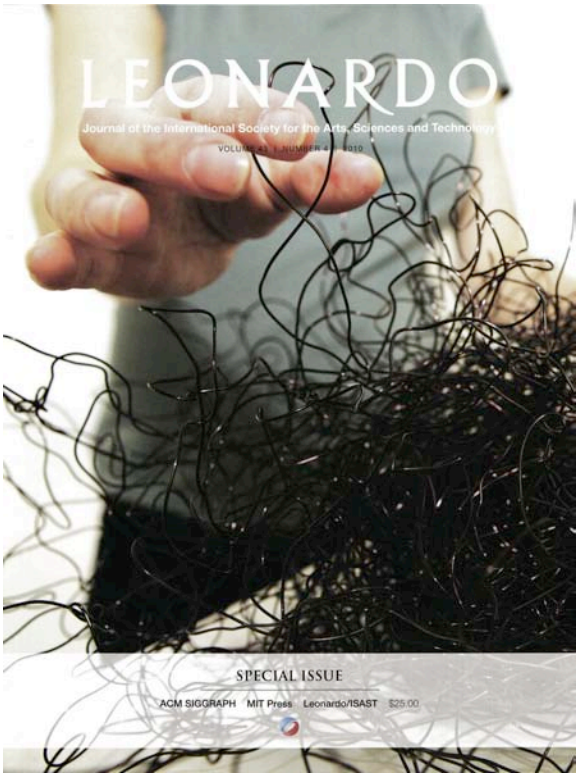

Fig. 28 Tine Bech *Echidna* (2010) Cover from *Leonardo* Journal 2010

Development and making of the artwork

Echidna was created from enamelled copper wire and a custom made circuit which directly measured electrostatic changes in the environment (input). This was combined with a custom designed, phase locked loop system, which was used to drive an audio speaker (output). The artwork's physical interface was an electromagnetic field, which worked as a proximity sensor; it is perhaps best described as a Theremin-like sculpture

that responds to proximity by emitting an electronic static sound[2]. *Echidna* was redeveloped from a previous version of the work made in 2002. The very first version of *Echidna* was originally made especially for children, allowing them to play and touch during an exhibition at the Centre for Contemporary Art in Aarhus, Denmark, 2002, which did not usually allow physical touch. The exhibition theme was the loop between body and world and presented a range of my work, including the artwork *Tumbleweed* (2001), a large pink, round, tumbled sculpture made from 16km of wire. *Echidna* visually referenced *Tumbleweed* with its aesthetics of using wire to create sculptures. After the 2002 exhibition I redeveloped *Echidna* to become a work in its own right, to be interacted with by all ages.

Fig. 29 Tine Bech "old" *Echidna* (2002) at the Centre for Contemporary Art, Aarhus Denmark

Fig. 30 Tine Bech *Tumbleweed* (2002) at the Centre for Contemporary Art

The older version of *Echidna* looked different; the sculpture was smaller, the shape was more loosely wound and the wire was always black. *Echidna,* or "*old Echidna's*", circuit board was also different and the sculpture would constantly hum because the electromagnetic field was too sensitive and picked up changes in the atmosphere. The sculpture did react when approached or touched; nevertheless, I decided that the sculpture was not consistent and that the difference between interacting and not interacting was not great enough to create a readable response. More importantly, it became a nuisance in the gallery to have a sculpture constantly 'on'. The first stage was, therefore, to redevelop the artwork, in particular the circuit board which generated the magnetic field that sensed changes, thereby creating a proximity sensor. I met with Tom Frame, an engineer and, at that time, a PhD student at the Surrey Space Centre. Using the diagram of the previous circuit board of *old Echidna* I gave him the following brief: to redesign the circuit board so that the sculpture would be silent when not touched and to achieve this by adding more control over the sculpture's sensitivity and, thereby, the sound output. The aim was to develop *Echidna* to make it more readable and reliable (clear) in its interaction. This point, the consistency in the interaction, was an important principle that was to become a central element of my findings.

Fig. 31 Tine Bech *Echidna* (2004) previous version of *Echidna,* developed after the 2002 exhibition

Echidna employed the scientific principles of the magnetic field to create a tactile, interactive artwork. A magnetic field is created when an electric current flows. This field is most powerful when close to the source and will rapidly diminish when further away from the source. In the case of *Echidna* this meant that the body of the sculpture (the wire) needed to be close to the circuit board (the source) and the electronics were, therefore, embedded inside the plinth. The main scientific principals that influenced *Echidna* are:

- The number of turns of wire; a magnetic field is shaped and made stronger by a greater number of twists and turns (the coil)
- The ratio of the wire length to the wire width
- The amount of current flowing through the coil.

The design of *Echidna* depended on the affordance of the wire and the (scientific) necessity to curl and twist the wire to create an interactive field. However, a single short, straight piece of wire is also interactive when directly touched, but the field around it is very much smaller. An electro-magnetic field is only produced when the device is switched on and the current flows, the higher the current, the greater the strength of the magnetic field. This latter aspect was clearly demonstrated when the work was exhibited at SIGGRAPH Art Gallery in Los Angles, USA, where a different voltage is used. Echidna became very sensitive and would, at times, start making noises when not touched. This was prevented by simply adjusting the circuit, which would settle the work (the electromagnetic field). People invigilating helped me tend to *Echidna* and a language of *Echidna* husbandry [3] developed. *Echidna's* animated features clearly developed playful behaviour in audiences as well as invigilators, an aspect I therefore return to in my analysis.

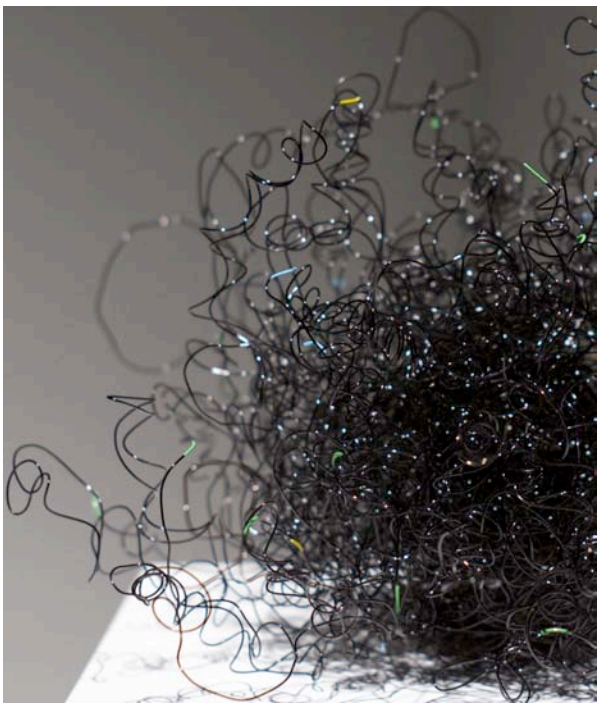

Fig. 32 *Echidna's* wire twisted and curled, making spirals in order to create a magnetic field

A key element of an electromagnetic field is that it reacts to water and, as we know, a human body is made up of around 60% water, thereby making people the ideal interface in a tactile and physical interaction. Often the audience, when exploring and playing with

the artwork, would try to touch it with a piece of paper, discovering that nothing would happen. However, working with an electromagnetic field is inevitably unpredictable. Electromagnetic fields are, in fact, present everywhere in the natural world but are invisible to the human eye. There is an incredible sea of electric fields all around us and *Echidna* would, at times, pick up the 60Hz hum of the atmosphere and start a sound without being touched, as demonstrated at SIGGRAPH (where the field was stronger due to the current changes). In other words, what made *Echidna* work was also, at times, what made it inconsistent in its interactions.

The making process was a parallel development of experimenting with the aesthetics of sculpture, the electronics and scientific principles of an electromagnetic field. The science of the electromagnetic field became entwined in the making process, influencing my aesthetic sculptural decisions. For example, the ratio between length and thickness of the wire affected the electromagnetic field. A thicker wire also helped the sculpture keep its fragile shape when touched (at times roughly) by hundreds of people during an exhibition. I experimented with the colour of the wire, as well as the shape and size of the sculpture, testing both the effect on the interactive field and considering the aesthetic. *Echidna* is now exhibited in different colour versions. The material used to create *Echidna* was enamelled copper wire of a science grading. I discovered, while experimenting with colours, that the electromagnetic field is dramatically reduced when using enamelled copper craft wire. Craft wire is created for purely aesthetic purposes and can have small faults – essentially there are small holes in the copper, causing the electromagnetic field to be reduced and therefore become less interactive. *Echidna* also employed a digital aesthetic, for example, the painted ends of the wire were both a personal artist's visual language, developed over the years, and a visual reference to the electronic components.

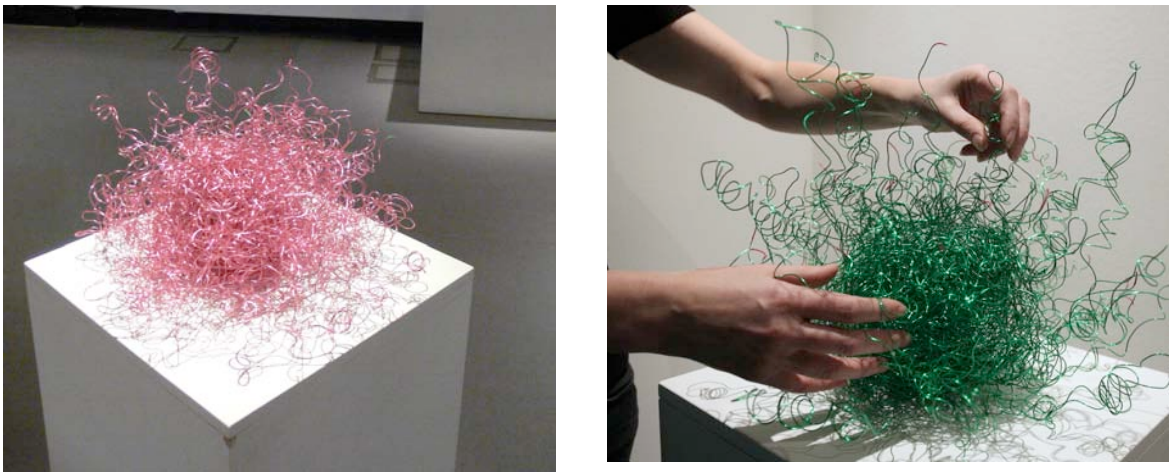

Fig. 33 *Pink Echidna* Banbury Museum, 2011 and *Green Echidna* Kinetica Art Fair, 2011

The overriding methodology of *Echidna* was to see what happens – to make, test, and remake. Working together with an engineer highlighted an interesting clash of methodologies between the scientist's principal of testing using a simulator and that of the art world's trial and error methods - methods which include deliberately breaking rules in order to see what happens. After Tom's first redesign of the circuit board we met at the engineering laboratory and connected the sculpture and the speaker to the new circuit board. The result was disappointing. The sculpture was noisy when not touched and was not reactive; essentially there was no interaction. While designing the new circuit board Tom had measured the electromagnetic field in a simulator, touching the wire and then reading the simulator instead of hearing the "interaction" via the looped phased speaker. The circuit clearly did not work for an interactive art sculpture and Tom and I had to backtrack, playing with different capacitors to see and hear what would happen with the sound and sense of interactivity. Tom also rerouted a connection. To me this was a fun "let's see what happens" process, but I think to Tom it was perhaps slightly embarrassing (we were teased a lot by friendly engineering staff[4]). It confirmed my methodology of an iterative making process and highlighted how this is particularly important with interactive artwork. During the testing I also realised the obvious – a speaker functions within a certain frequency range and this affected the tactile sound interface. *Echidna's* magnetic field is in the range of 60hz - it emits a low hum and is best accommodated by using a paper cone woofer. A paper woofer is made to produce low frequency sounds, typically from around 40 hertz and up.

Observations: what play took place

The play that *Echidna* evoked was physical interaction, a tentative and tactile exploration - what will happen if I touch? Often I observed audience members learning to play through imitation. A learned behaviour often developed where people, by watching others interacting, understood that they were meant to physically interact and that the work is not only aesthetic. While observing people during the SIGGRAPH exhibition it was noticeable that they did not always know that they could touch, despite the name of the exhibition *'TouchPoint: Haptic Exchange Between Digits'* (2010). The learned behaviour that developed was similar to a wave of play behaviour, where, if the chain of seeing other people interacting - and then imitating, creating their own interaction and experience - was interrupted, then the touch would need to be demonstrated by me, a curious audience member or the invigilating staff. *Echidna* is clearly placed in the gap

between doing and looking in the gallery. The observation of audiences interacting with *Echidna* confirmed my interest in how 'we are becoming players in the gallery moving away from a *stand back, look; don't touch* audience' and how my gambits of making can bridge the gap between looking and doing.

Fig. 34 Audience playing with *Echidna* and imitating each other at SIGGRAPH Art Gallery, 2010

People related tactile interaction to *Echidna* and from this play emerged. As Brown writes 'the hand and the brain need each other – the hand provides the means for interacting with the world and the brain provides the method' (Brown, 2010: 185). Play is the medium that links them (Brown, 2008b: np)[5]. Once the audience had worked out *Echidna's* interface they started to "play the sculpture", experimenting with distance and approaches. Often the audience would interact tentatively, moving a hand towards the sculpture gradually. I observed participants play *Echidna* like an instrument, playing with proximity all the way from far away, to poking a finger into the centre of the sculpture. The audience when exploring would test a range of possible ways to interact by touching the sculpture using paper, or other objects, their hands, or other parts of the body. A man at the Kinetica exhibition, after bending forward to hear the sound better, tested what would happen if he touched the work with his nose. Other audience members, after realising there was a proximity related sound reaction from the work, would test whether

Echidna reacted, by clapping above and around the sculpture. *Echidna's* tactile interface also invited a diverse group of participants into playful interactions, as noted by the curator at Banbury Museum:

> *Echidna* has been a very popular exhibit, many fascinated and appreciative visitors, including people with visual impairments and people with special learning needs (Johnston, 2011).

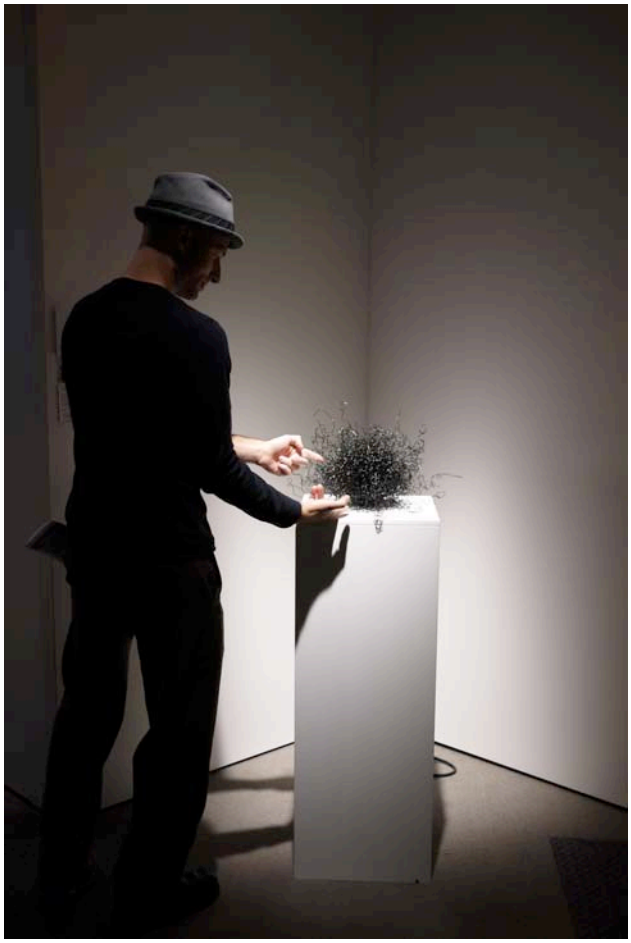

Fig. 35 Playing *Echidna* like an instrument at SIGGRAPH Art Gallery, 2010
Fig. 36 Man exploring
Fig. 37 Man poking *Echidna*

Some audiences were less tentative and would interact confidently, using quick and sure movements. This behaviour would at times become slightly violent, for example, shaking *Echidna,* or even hitting it. This in turn initiated other audience members to "protect" the artwork, remonstrating with "the hitter". People also tickled *Echidna,* or gave it a hug. Audiences often described *Echidna* as a creature, as illustrated here by the curator at Banbury Museum, who emailed the following:

> We have just had a dad and son coming in asking for "the hedgehog". Seems it was a word of mouth recommendation from friends saying they should go and see your work (Johnston, 2011).

I also observed a boy commenting, while interacting with *Echidna* at Kinetica Art Fair, 'It's like a cartoon'. This animated aspect of *Echidna* evidently played into the audience's ways of interacting and touching the work, such as telling others off for not being kind.

The work initiates both solo and group play. Group play involved taking turns, deliberately imitating others, playing with proximity and testing the number of hands interacting at the same time. Groups would also pose for others in photographs, or film the artwork while interacting. *Echidna* was the most photographed and videoed work presented in the catalogue. However, all the artworks in the catalogue involved people taking photos as part of their interactive behaviour. I return to this aspect of playful interaction in the analysis, on page 156 and 158. *Echidna* also initiated (as did all the other artworks) people leaving after playing on their own and then coming back bringing friends, engaging them in group play, or simply showing their friends what they had "found out".

Fig. 38 *Echidna* being filmed and photographed by the audience

Fig. 39 Women playing together, taking turns

One audience member (a woman) entered into a fantasy game, or perhaps what could be described as playing tricks, or a gag. The woman, after playing at length with the work, stayed with the sculpture and at the moment another audience member approached (especially children) she would touch the sculpture and pretend it hurt her, screaming "ouch" and "ohhh" and then laugh loudly. She clearly had fun playing not only with the sculpture, but also with people! She evidently played on the ambiguous static sound of the sculpture and its possible association to an electronic current and thereby pain. Other audience members developed similar play routines – simply screaming for fun when touching the artwork and then giggling. These audience members illustrated Sutton-Smith's description of 'the playful, witty, trickster person (who) plays with the frames and the rules and defies conventional expectations' (2001: 150).

Evaluation

Play theory tells us that it is through exploration that play emerges (Pellegrini et al, 2007: 265). The audience's interaction with *Echidna* was a clear demonstration of how exploration can lead to play. In this context I found that the readable and consistent interface of *Echidna* I sought to create enabled play exploration. I learned that the

audience was drawn in by the sculpture's unexpected interface, becoming intrigued and so exploring the interface more. In turn, the reliable and robust interface ensured consistency, which meant that people continued to play and explore. The boundary between exploration and play is naturally blurred. However, identifying when someone is playing can be differentiated by play signals (for example the play face as described on page 24) and by the audience's repeated and changing (episodic) interaction with *Echidna*[6]. I found that the curious invitation and the consistent interface can lead to a wide variety of play behaviours, exemplified by the woman playing the prankster who screamed when touching *Echidna*. She was clearly playing with the invisible public rules of engagement in a gallery; demonstrating play in all its unexpected facets such as the trickster and playing with "expected behaviour". It was clear from all my observations that someone playing will entice others to play. This positive, learned behaviour and imitation amongst audiences became a second clue – a making gambit, which I explored further in both *Catch Me Now* and *Tracking You.* In the same framework *Echidna* also demonstrated how interactive art can create social connections, as illustrated by a participant at Kinetica Art Fair who commented that 'I never talked to so many strangers in any other gallery. It makes you social' (Appendix observations). *Echidna* demonstrated the audience's willingness to interact and play in the gallery and I learned how physical interactions which entice play could lead to social bonds between audiences. This third finding, of interactive art's sociability, was something I decided to investigate further in my next projects.

Fig. 40 Man having fun at SIGGRAPH Art Gallery, 2010

Echidna's invitation to play was also visual and material – this invitation was my fourth insight. The sculpture was often referred to as a "creature", due to its colours, size and its organic "fussy" shape, which created a sense of the artwork being "alive". I found that the artwork's "smallness" and sound encouraged a tactile and intimate interaction, which,

with the affordance of the technology, created a bodily interface. This physical dialogue – the non-verbal dance of interaction and how it can lead to play behaviour became one of my key discoveries that I wanted to investigate further. *Echidna's* properties of the materials, the animated conductive wire, the technology and the science of the electromagnetic field invited curiosity and surprise. The work however, did not send an obvious play signal "come play with me" (wire is not inviting to touch) – instead it operated on an element of ambiguity, which led to exploration and play behaviour. We see this behaviour in the different way people tested *Echidna's* interface, waving their hands, clapping and, of course, touching *Echidna*. This play with technology and materials is part of our emergent gestural interaction in the gallery, which this thesis is exploring.

Echidna highlighted several key aspects which laid the foundation for my research and that I wanted to explore more. The sculpture became an important piece of work in my catalogue in that it allowed me to form a notion of the material invitation to play, what it is that draws us in and highlighting how the ambiguity and the animating of technology can produce surprise and play that is rewarding. The work showed how playful interactions can potentially lead to social behaviour and how reliable interfaces can lead to continued exploration. I carried these tentative findings forward into my next piece of work, *Catch Me Now* where I explored the material play affordance in a more direct way, as well as investigating how I could draw the whole body into play, instead of just the hand.

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1 Electroreception is the biological ability to detect 'weak, naturally-occurring electrostatic fields in their environment'. This ability is often seen in aquatic or amphibious animals, as water is a good conductor. 'The sense also appeared independently with the evolution of the monotreme mammals such as the platypus and echidna' and the Western, long-beaked echidna has about 2,000 electroreceptors on its bill (Hopkins, 2009: 385).

2 A Theremin is an electronic musical instrument played by the slightest touch. It was invented in 1919 in Russia by Lev Termen (or Leon Theremin from where the name originate). A Theremin has two antennae (a horizontal which controls the volume of that sound, and a vertical which one controls the pitch) which each has an electromagnetic field surrounding it. When the musician hands "disturb" the Theremin's electromagnetic fields, the interference causes an audible sound.

3 Husbandry (animal husbandry) is the agricultural practice of breeding and raising livestock.

[4] When redesigning the circuit board, we used a “breadboard”, this is an Electrical Engineering term for an experimental arrangement of electronic circuits, which gives access to all the components, so that modifications can be carried out easily. The “breadboard” was also what caused other engineers to recognise that we were redesigning the circuit, at such a late stage in the development.

[5] Brown further states that having played with our hands as children is an adaptive advantage and can create ‘brains that are better suited for understanding and solving problems later in life’ (Brown, 2010: 86).

[6] Animal play scholars Fagen and Burghardt both define play as episodic, consisting of rounds of activity, separated by brief pauses (Fagen, 1995: 32). Burghardt’s criteria for play includes the idea that that play exhibits many repetitive activities, carried out with abundant variations.

CATCH ME NOW

Fig. 41 Tine Bech *Catch Me Now* (2010) at the Victoria and Albert Museum

CATALOGUE
CATCH ME NOW

Catch Me Now was a unique interactive spotlight which played and interacted with the audience. A small spotlight moved randomly around on its own until someone stepped into the light, when the spotlight stopped and opened up to the audience in a play of light. The playful light when caught grew, enabling the person to step into the light and take centre stage, moving the focus to the audience and thereby encouraged participation and possibilities for play and performance.

Catch Me Now was exhibited at Watermans, London, *Unleashed Devices,* 2010, at the Victoria and Albert Museum, London, during the *V&A Digital Design Week,* 2010, at the *Kinetica Art Fair*, London, 2011, at the Science Museum during *PLAYER,* 2011, at *Bath Illuminate,* 2012 and at Electrohype, *Varnhem Square*, in Malmø, Sweden, 2013.

Catch Me Now is programmed by Tarim.

Research aims and questions

The aim of *Catch Me Now* was to create a playful interactive light which opened up the possibility for physical participation – inviting the body into play. The work explored the role of material properties (including the installation space) and the technological affordance and considered how this incites the audience to interact. A spotlight provided a known affordance (at least for most people) of performance. A round, coloured spotlight on the floor literally invited people to jump into the light, to participate – to play. The spotlight's connotation of theatre and performance stages also enabled me to explore how to create spaces for play.

Methodological developments

Catch Me Now was exhibited multiple times and this offered me the opportunity to carry out systematic observations. Tarim, the programmer, was present at all five exhibitions for several hours after the setup was completed and his impressions of the audience's interactions, as well as feedback from various sources, are included in the appendix. The

making process of *Catch Me Now* followed my iterative method, as described in the methodology chapter. Due to the many exhibitions, I was able to go through several cycles of making and redesign - testing possible interactions with audiences on several occasions.

Development and making of the artwork

During my initial idea development phase I looked for other artists working with similar materials or concepts (see methodology page 62). *Access* by Marie Sester (2003) is a robotic and acoustic artwork that also employs a spotlight to generate audience interaction[1]. Although both her work and mine use a spotlight, I maintain that they are very different. *Catch Me Now* used a different technical interface and programming, it was colourful and ran away from the audience - enticing them into a "catch me now" chase, as opposed to Sester's work, which followed participants. Sester's subject matter was dissimilar to mine in that her work explored elements such as exposure, control and transparency of surveillance. Her approach to who controlled the interactions was also very unlike mine. *Access* allowed online users to track individuals anonymously in public places, they were being surveyed and 'it is impossible to determine who is actually in control' (Sester, 2003). In *Catch Me Now* participants activated the work and controlled the play.

Catch Me Now was programmed site-specifically for each exhibition space - often in a passerby space in the gallery. When the spotlight was on its own and was not being played or interacted with it was always a small spot (approx. 30 cm). It moved occasionally to entice audiences in, whilst it roamed in its programmed play space. The spotlight reacted when a person stepped into the light and immediately opened up into an encompassing spotlight, which created an individual and personal spotlight moment. It then changed colour and stayed with the participant for a few seconds, before it became "bored" and swooped away to resume a random position changing to a small spot once again. The artwork teased the audience into a "chase me, catch me" encounter, and significant to my creative vision, turned the conventional notion of a spotlight following people on its head.

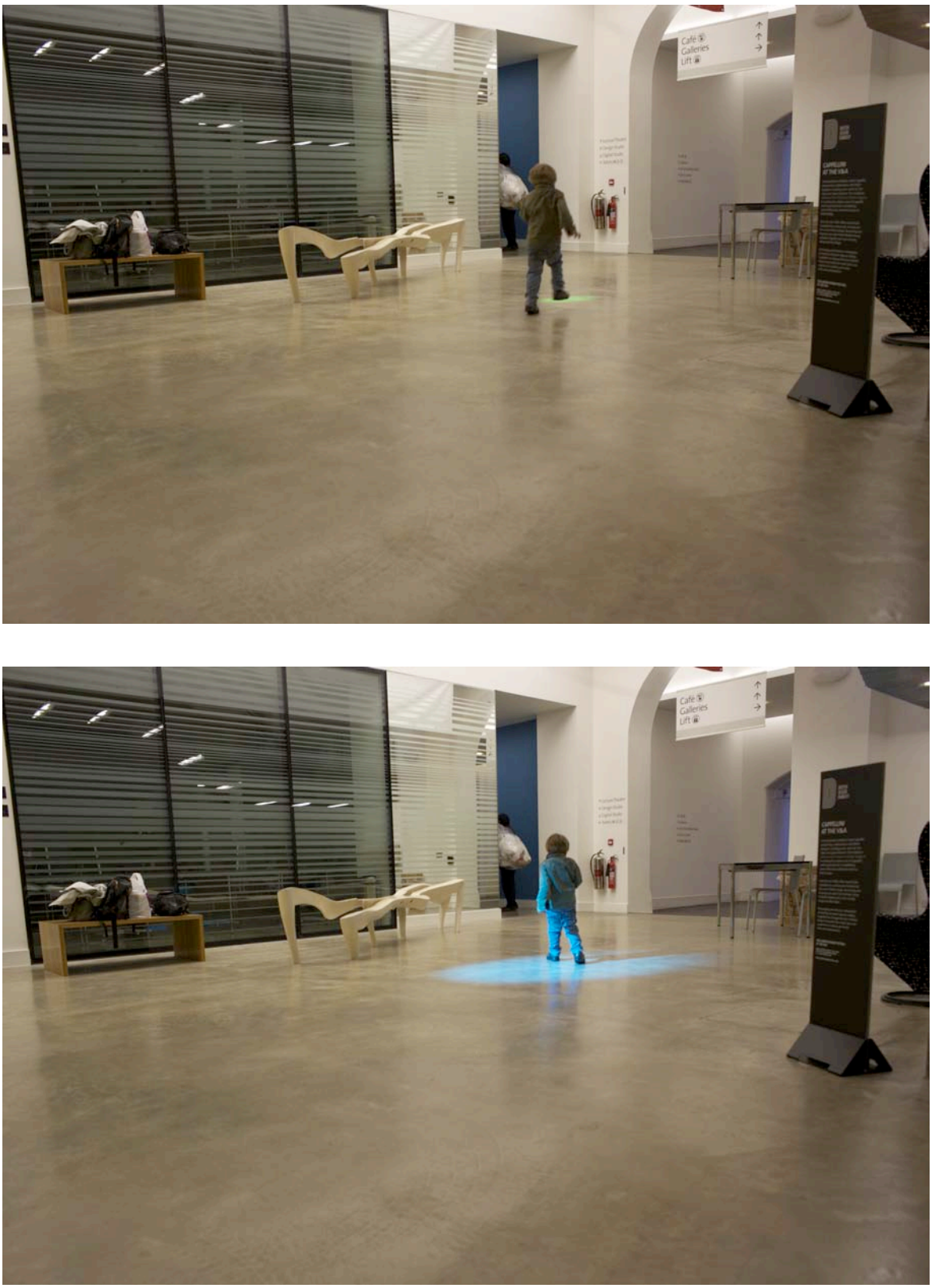


Fig. 42 Boy at the Victoria and Albert Museum, Sackler Centre chases *Catch Me Now*, 2010

My material research fairly quickly revealed that, in order to evoke the full range of playful interactions I envisioned, I would need a moderately advanced moving-head spotlight.

This in turn would need to be connected to a mechanism that detected the audience and I explored several possibilities, looking at both infrared and ultrasonic sensors. Ultimately, I decided to collaborate with technologist Tarim, who suggested a software solution using openCV and a blob analysis to detect an audience, which enabled me to design a series of cues for the spotlight. The final work consisted of a moving-head spotlight linked to a computer which, in turn, was connected to a webcam that surveyed the area (see appendix for technical illustration). The programming language used was c++ combined with a DMX communication lighting protocol. OpenCV is a software library for real time computer vision programming and a blob analysis is one of the many vision tasks that OpenCV offers. One of the material insights learned during the making of *Catch Me Now* was that I should have been more aware of hardware and software compatibility, ensuring that they could communicate easily together. Problems occurred when I tried to find a webcam that could survey a large exhibition space. OpenCV requires bitmap data, which only some webcams can do, furthermore, webcams are made for close up communication, not for surveying a large space. It would have been fruitful to research the field of imaging, and the technological development associated with it, at an earlier stage. Imaging research is a growing field, which often operates in the field of surveillance, using CCTV cameras and specialised webcams.

At the first test of *Catch Me Now's* interactivity and playability, many of my envisioned interactive features simply did not work. For example, I had imagined that after playing with several light scenarios, when people walked away, the light would follow them to the edge of its territory, then start hanging out on its own again within in its designated (and programmed) play area. However, the 'follow people' function simply did not work, the spot reacted very slowly and the audience did not notice the interaction. Furthermore, I had added too many play features, which made the work overly complex and this resulted in more confusion than play. At one point, when watching Tarim interact with the spotlight, I was reminded of Rokeby's description of programming an artwork and being astonished that the artwork did not respond properly to other people, before realising that he had not developed 'an interface that understood movement'. Rather, he had, during the testing, developed ways of artificially moving his body that fitted into the interactive design (Rokeby, 1998: 3) [2]. Many of my ideas also presumed the spotlight and programme had a technical capacity and intelligence that, in fact, a spot analysis and a programming code simply do not. I therefore, during my first observations at the Waterman's exhibition, decided to remake the interactive design and work with the

element that was the most consistent and reliable, namely the "initiate mode", in which the spotlight became large and encompassing - opening up into an invitation to play. Once the moving head opened up, after the webcam detected the participant, what followed was a series of automated actions; changing colour and a number of seconds it stayed in the same position before swooping off[3]. This series of automated playable cues were, crucially, not dependent on lots of different cues and technological abilities, instead it used just one simple cue, the webcam detecting an audience. In essence, my interactive design was not technologically driven; instead it was based on the behaviour and interactions I observed as the audience played with the spotlight together with my knowledge of human play behaviour. This simple interaction, reducing the interactive features, I discovered was an effective way of enticing people into inventive play responses. In the context of *Echidna* and its animated, but not clear invitation of play theory, *Catch Me Now* enabled me to find a balance in the ambiguity of play. Another crucial modification that I made after my observations was to redesign the programme to look for the audience's feet, rather than their heads. As the camera was mounted above the installation space this meant a body's head was the first thing that came into view. As a result the spotlight triggered too early and it went from a small spot to large before people were completely inside - before they physically jumped into the spotlight. These key changes were completed simultaneously at the Waterman's exhibition and at the V&A, 2010 exhibition, as the exhibitions overlapped.

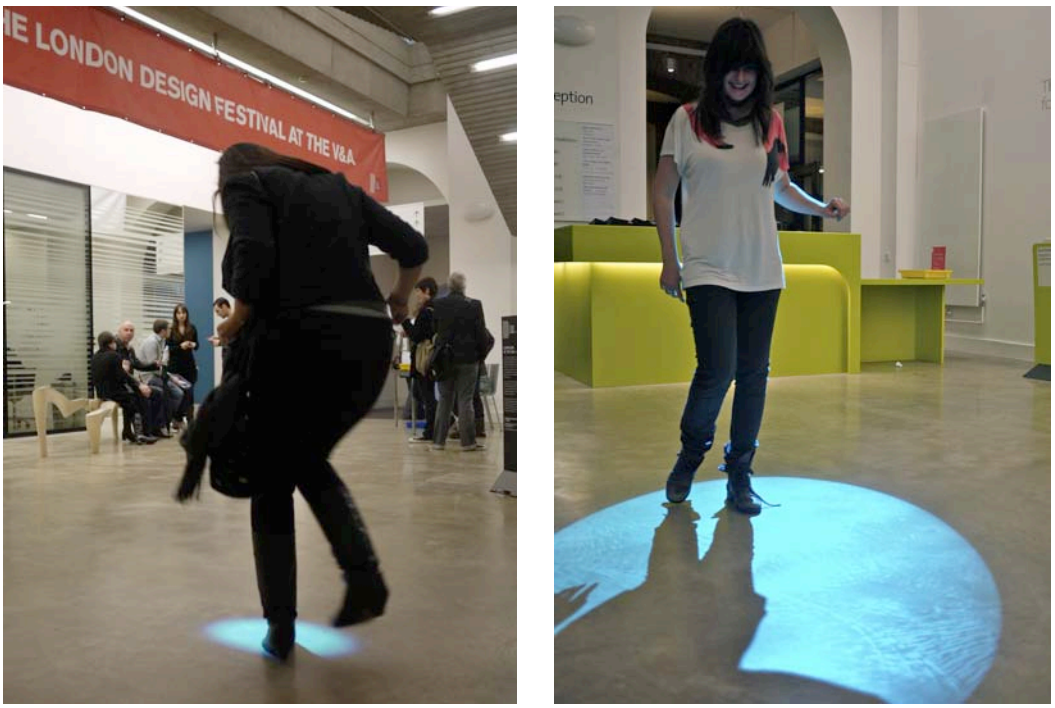


Fig. 43 Audiences at the V&A Digital Weekend, 2010, activating *Catch Me Now*

During *Catch Me Now's* many exhibitions I also tested other ideas. For example, using specific colours, (potentially to signify a time of a day and the light outside) but I found that the moving-head's mechanics was a colour wheel, which meant that in order to get colour D, it scrolled through A, B, C. By letting the colours scroll through the wheel, I achieved a faster, more reactive (and beautiful), colour change. I also tested the use of gobos[4], which projects shapes out of the light, as a method of adding new interactive features and play signals. However, the same problem of the moving head wheel scrolling through gobos happened as with selecting specific colours. During the exhibition at the Science Museum I also explored the physical size of the installation space where the light roams – asking what constituted an ideal interactive play area? How far would an audience chase the light? Did the space affect the play behaviour? These factors were, of course, determined partly by the technological limits[5], but I mainly found that the human interactive (nature) is the deciding factor in my inquiry of creating interactive features that evoke playful audience behaviours. I also tried to change the size (diameters) of the spotlight, observing how this influenced interactions, for example, how many people could stand inside the spot when it was open? This allowed me to explore notions of space and body and I return to it in my analysis.

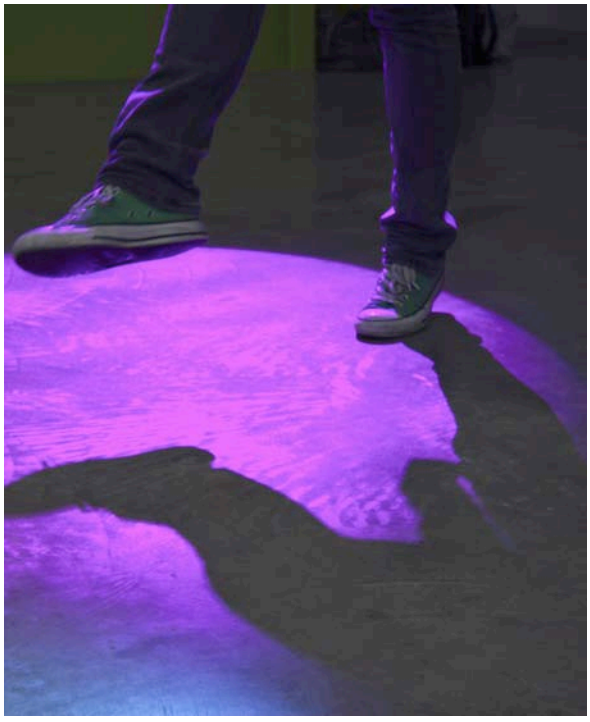


Fig. 44 A snap of the moment when the colour scrolls and changes

Fig. 45 Girls striking a pose the moment the spot opens up

Finally, I tested different timings of the interactions of the light and found that they were a key aspect of the artwork. *Catch Me Now* (when not in play) remained completely still for 30 seconds before getting "bored" and moving to a new site. This occasional movement was designed so that people noticed the light and realised that it was a moving (interactive) artwork. Once the audience stepped into the light the spot opened up and stayed with them for 1.5 seconds before swooping off – inviting people, tempting them, to chase the light. I tested different lengths of time (1.5 seconds, 2 seconds, 3 seconds and 5 seconds) that the spotlight stayed open without moving whilst observing the participants' reactions. These seconds, I found, were the moments when the audience would often perform, or strike a pose. This key performance in the light element was balanced against *Catch Me Now's* core feature, namely the thrill of the chase, the catch me now, the jump into a light puddle. This simple interface elicited an abundance of playful interactions, which I will now outline.

Observations: what play took place?

Catch Me Now elicited a range of play forms. The work clearly unlocked playful behaviour; people created fantasy play (some odd chicken impersonators were about at one point), they made small impromptu dances, did performance or theatrical poses or initiated physical demonstrations, such as cartwheels. Caillois' modes of play 'paidia turbulence, free improvisation (…) and impulsive exuberance' were predominantly observed (Caillois, 1961: 13). I also observed play behaviour which included his categories of 'agon' (competition), 'mimicry' (tag, fantasy and illusion) and 'ilinx' (spinning, running and whirling).

Fig. 46 A boy playing tag with *Catch Me Now* at The Science Museum, 2011

Often people simply enjoyed running and catching the light, with no greater purpose to their play other than the experience of it. People would frequently stay with the work longer than they first intended – catching the light over and over again. I overheard several conversations between "non-playing" audience members who wanted to move on and a player who wished to stay. *Catch Me Now* clearly demonstrated play's characteristic of being inherently attractive, leaving the player wanting to do it again. It was also clear that Csikszentmihalyi's theory of flow was demonstrated, in that participants often played longer than they had anticipated, observation showed people would have just "one last go" many times. I also noticed players would frequently return later to have "just one more go". Staff at the galleries also developed play routines and would "swing by" to have just one go. I observed staff at the Science Museum yelling 'this is my favourite', to colleagues while they were playing. *Catch Me Now's* play was immediate; people would enter into play after being intrigued by seeing the light, or after observing others, or simply by stumbling upon the light and discovering that it reacted to them. The instant the light opened up most people were captivated into staying with the work, exploring the interface and playing. The play was clearly pleasurable as evidenced by the many laughs and screams. This play was open, with no end goal and what Csikszentmihalyi describes as a 'key element of an optimal experience'. Such open ended play 'is an end in itself. Even if initially undertaken for other reasons, the activity that consumes us becomes intrinsically rewarding' (1990: 67).

Fig. 47 Children screaming and laughing while running at the Kinetica Art Fair, 2011

Observation also showed play interactions with a strong performance element, such as people "striking a pose" in the light and lots of 'look at me' and 'ta daaa! I caught the light'. I observed on multiple occasions people performing for each other, for example, a woman made a theatrical pose for her companion twice, before he then "swaggered" over to the spotlight, catching it and raising his hand in triumph saying *'YEAAA'*. Similarly, people performed for onlookers who would clap. Participants also engaged in fantasy play. I observed a little girl playing a type of magic dance at the Victoria and Albert Museum, where she turned my concept upside down and played around the large spotlight edges then, when catching the light, she ran away, as in her own hide and seek game[6]. At one point during my observations at *Bath Illuminate* (2012) a girl pretended she was a chicken, running, squeaking 'bok, bagok' and flapping her arms while catching the light (I overheard her saying 'Dad, I am a chicken'). She was clearly having fun and performing for the gathering crowd.

Fig. 48 Girl pretending she is a chicken at *Bath Illuminate*

The play and interactions that took place were both solo, between the light and the player, or between the players in groups. The main play observed was tag, or playing catch with the light. This took place in various forms. Groups or families would spread

out in the installation space, taking turns to catch and jump into the light. When single audience members (often children) played tag, I observed them yelling 'I got it', or, 'got'ya', every time they tagged the spotlight. If groups were playing I would overhear people saying, 'it got you'. Often competitive games developed when groups played together which were reminiscent of classic rough and tumble play. When groups of children interacted, the dominant game would be who catches the light first, spotting where the light went and running fast. Some friendly stepping on toes and pushing others out of the light – 'it's mine' also happened. I also observed adults saying, 'No, it's my spotlight' while playing. On one occasion I observed a group of children (a school class visiting the Science Museum) creating a physical game, squashing as many bodies as possible inside the light.

Fig. 49 Young child plays with *Catch Me Now* at The Kinetica Art Fair 2011

The play behaviour was noticeably different between adults and children. Or rather, children seemed to enter into play mode more quickly and they would play for longer, children were often called away by impatient adults after ten minutes. I frequently overhead remarks such as, 'one more go, then say bye-bye light' and the reply, 'nooo, more goes please'. Adults playing were more tentative in their physical play and, more often than not, a child would steal the light from the adult, who would gladly step back and let the younger person play. Observations made at all exhibition venues showed

repeated behaviour in which adults gave the space away to children who wanted to play. This tweet by an audience member attending *Illuminate Bath*, 2012, illustrates this, 'Loved all the installations at @Illuminatebath tonight. Missed having a go on @t_bech Spotlight tomorrow = #moveoverchildren' (Tweet feed: @hannah_ab 25/01/2012). However, I did observe that adults played in similar ways with *Catch Me Now* and just as vigorously as children. This was confirmed during observations conducted at the Science Museum late nights (which was open to adults only), as did this fun late night tweet from *Illuminate Bath*: 'Chased an interactive spotlight around Abbey Churchyard on the way home at 12.30am @Illuminatebath. Me and hubby giggling like kids' (Tweet feed: @ArtBathSpa 25/01/2012).

Fig. 50 Adult audience playing at the Science Museum exhibition, 2011

Evaluation

A key gambit of *Catch Me Now* was my decision to focus on creating a reliable interface. After observing audiences interact during the first exhibition I realised that the unreliable (and complex) interface created more confusion than play. I found that the reliable and robust interface (consistent and fast reaction) led to multiple playful interactions. This confirmed my explorations in *Echidna* and became a key play gambit in my model of making. Another key element was the physical interface of *Catch Me Now*. Using a webcam, made me aware of how play opens up in situations which require no previous learning - it was not a "click and play" interaction, rather the audience "wandered" into the work and their bodies activated the artwork, thereby opening up the possibility for

bodily play. *Catch Me Now* elicited many forms of play, but most dominant was the physical (often joyful) playfulness that was observed on many occasions. This physical ilinx of play is what Panksepp and Biven noted led to the generation of positive emotions, writing that 'the highest levels of childhood laughter occur when children are physically playing' (2012: 367). The same, I argue, is the case for the adult's playful interaction observed in *Catch Me Now.* A third significant facet of *Catch Me Now* was the simple interface - an encompassing spotlight that ran away, leading participants on a chase and a merry dance.

The artwork did not evoke narrative play and there were no clear, forward-driving goals. Instead, the work was simple and open-ended, allowing the audience to devise their own games. This notion of open work and how it created a meaningful experience for people is something I explored more in my next two artworks *The Big Swim* and *Tracking You.*

Finally, my observations revealed that adults would step back and let children play – at times children would take over the installation, physically pushing adults away from participating. This potentially suggests a hierarchy of play with young people at the top. The spotlight immediately captivated children, nonetheless, I also found that adults will play if enticed and that they have many facets to their play, such as sneaking up on the light, or pretending not to play and yet play. This new understanding, or challenge, of creating playful artwork in which adults get room and allow themselves to play when children are playing opened up an inquiry which I explored further in *Tracking You*.

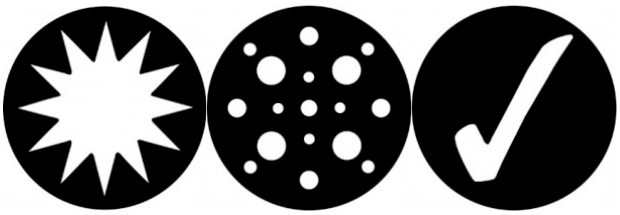
Catch Me Now became a key in my research and practice into physical play; it was exhibited multiple times and was played vigorously by many audiences. The simplicity (stripping away my ideas) of the artwork elicited an abundance of inventive play behaviour. It was subtle and activated the exhibition space without dominating it. *Catch Me Now* invited the audience to play through the affordance of the material and technology and this agency of the materials became a key discovery in my research. *Catch Me Now* engaged the whole body into play without using technologically complex interfaces. This was something that I decided to explore more in my next project – how do human nature, space and materials combine to create interactivity? *The Big Swim* explored an embodied experience, immersing the audience without a technological interface - jumping and swimming through colour, clouds and water.

[1] Other relevant contextual artworks are *Flock* by KMA (2007) and *Underscan and Body Movies* by Rafael Lozano-Hemmer. These are examples of work which encourage interaction between people in public spaces, using projected light. In Lozano-Hemmer's work, *Underscan,* the public can find portraits through interacting with shadows in the light. *Flock* is a large scale, outdoor, multiple spotlight installation, employing Tchaikovsky's *Swan Lake*, in which pedestrians become performers and are allocated their own spot, where ghostly projections and stories are revealed.

[2] Interactive artist Rokeby has also anecdotally described the difficulty in programming systems to identify moving bodies in a public environment, full of moving objects. His solution, while not relevant to *Catch Me Now*, is interesting. He devised a programming parameter that states: if the moving object is taller than it is wide and if it moves sideways, it is a human being.

[3] The reactive technological aspect of CMN is that the webcam takes a snapshot of the installation area and, if the next snapshot (is different) shows a blob (a person) where the spotlight is, the programme instructs the spotlight to execute a series of automated actions. In other words if A is true, then do B, C and D.

[4] A gobo is a small metal plate, placed inside the spotlight, in front of the lamp, with a cut out shape, which then allows a projected light shape.



Examples of gobos which were tested.

[5] A spotlight diameter is affected by how high the light source (moving head) is mounted. The higher it is hung the bigger the spotlight. This is the throw angle. Equally, the throw angle affects how distorted the roundness of the spotlight becomes (the further away the spot, the more distorted it is). This is further combined with possible DMX protocols of adjusting the iris. I wanted to achieve a perfectly round spotlight, to send a clear performance invitation to play. I accomplished this by, for example, hanging the light at the right height as well as using the DMX channels differently.

[6] Observing the little girl playing and dancing around the spotlight it was, of course, impossible to determine what her fantasy was, however, she was clearly playing. What is fantasy and what is not is difficult to determine, but, as Brown notes, it is usually adults who are concerned with determining what is fantasy – what is pretend and what is real (2010: 86).

THE BIG SWIM

Fig. 51 *The Big Swim* at Camberwell Leisure Centre, London, 2011

CATALOGUE
THE BIG SWIM

My third artwork in the catalogue, *The Big Swim,* was an immersive and playful light installation where participants interacted and experienced swimming in a cloud of light and colour in a public pool. The colour cloud hovered over the water and was created using mist and light. As the outside light faded, the colours changed inside and the colour cloud became more and more visible, creating an immersive and playful experience. The installation was a unique live event exhibited during the Cultural Olympiad on the 23rd July, 2011, between 6pm and 10pm, at Camberwell Leisure Centre, London, and on the 24th July, 2011, between 4pm and 8pm, at Barton Leisure Centre, Oxford. The event was free and, at Camberwell Leisure Centre, the balcony was open for non-swimmers.

The Big Swim was awarded the Inspire Mark, a 2012 Olympic initiative, which was a community and participatory programme that enabled non-commercial organisations across the UK to link their events and projects to the London 2012 Games. The Creative Campus Initiative (CCI) commissioned the installation. The CCI was a HEFCE funded programme that created community and public art events as part of the London, 2012 Cultural Olympiad, programme.

Fig. 52 *The Big Swim* at Barton Leisure Centre, Oxford, 2011

Research aims and questions

The Big Swim explored how to create a playful experience, asking what are the conditions and possibilities for play? *The Big Swim* in particular, offered the opportunity to explore interactivity without the use of digital technology. Focused on light, colour and locality the project was intentionally accessible and aimed to enhance the familiar surroundings of a swimming pool as a way of creating art in unexpected places. Swimming is a natural physical play activity and I wished to exploit this to create a play space - an installation, in which participants could play and swim through a coloured membrane - evoking the physical sense of freedom often experienced when diving and swimming through water. The installation asked how artists can conceptualise the role of the body (kinetic, tactile, sensory) to create artworks where the audience literally immerse themselves in the artwork?

Methodological developments

The making process of *The Big Swim* was slightly different from the previous artworks due to the event based nature of the installation. The iterative making process described in *Catch Me Now* was replaced with a process of alternating between a series of production meetings and a more familiar method of exploring materials and testing colours. Another methodological development was the way in which I gathered my play evidence. In addition to my normal methods of observation, visual recordings (video) and observations were carried out by an expert user. I asked an extra observer, a recent social science graduate, to provide feedback and carry out interviews because of the event based nature and short window of opportunity for gathering observational evidence. A documentary team also carried out short, structured, video interviews with participants asking about their experience; these participant insights are reflected in my review of the observations later in the catalogue. While the interviews provided additional evidence, my main method of evaluation was still to record people's physical interactions, not to find out about people's inner thoughts, as explained in the methodology chapter.

Development and making of the artwork

The making process of *The Big Swim* was a parallel method of experimenting with the aesthetics of light, colours and fog effects, together with production meetings. Meetings almost became part of the making process and were concerned with site research of

swimming pools, meeting pool managers, visiting special effects companies to test fog effects, as well as a series of council and leisure centre meetings regarding health and safety.

The Big Swim was created using massive moving-head floodlights, mist and two carefully selected sites/swimming pools. The fog was created using a high pressure mist system by MeeFog, which literally "cracks" the water into tiny particles as it is pushed through specially designed valves. I have previously used a similar system and wished to use the method again because the fog is formed from pure water and is, therefore, safe to swim in. *The Big Swim* used the same concept of fog and light to create an immersive, live installation. A mist hovered naturally over the pool area, much as a fog will hover in the early morning over areas of water in the natural environment. By using the mist's tendency to hover over the pool and then lighting it, I was able to create an almost sculptural, coloured cloud that the audience could swim and play in. The fog was side lit from above and the side by coloured lighting creating an ephemeral and immersive transformation of the swimming pool. I experimented using different colours and types of light and was "allowed" to play with different lighting effects at Panalux (a large film lighting rental business). I also used colour gels to cover existing pool lights, to avoid the "neon" lighting effect that swimming pools often have. This was aimed at framing the pool, making a line of colour around it. My vision for the installation was akin to making a painting that the audience could dive into. I looked at paintings by Rothko, planning and creating the installation as a massive immersive painting[1]. I also purchased neon green swimming hats for the participants to wear, thinking this would create an effect of green dots floating around "in the painting", whilst simultaneously inviting the audience into play - dressing up (even on a small scale) is a classic play gambit. Finally, I decided not to include sound as I felt this would invite immersive play (play in the mind) rather than physical playful immersion.

The Big Swim is partly site sensitive, for example, it was essential that the pool (the site) should only have a limited amount of natural daylight and I visited 16 pools to find a suitable space. Whilst I wished to have time based light changes over the course of the evening, as can clearly be seen in the timelapse recorded, a swimming pool which is flooded with natural light would simply not have worked. The aim of the installation was to transform a pool into an interactive playful artwork, using its inherent affordance of play. The event based nature of the installation inevitably meant that the production was

concerned with promotion, making sure audiences were aware of the opportunity to swim through a coloured cloud. It also meant that I needed to employ staff to video document and observe the event, in order to ensure that enough evidence and visual material was gathered over the two days. I produced participant handouts and generally worked in close collaboration with the pool management and staff, most particularly with regard to health and safety issues.

Redacted due to copyright

Fig. 53 View of *The Big Swim* at Camberwell, from above
Fig. 54 Rothko *Yellow, Pink and Lavender on Rose* 1950

Health and Safety

The Big Swim created serious Health and Safety (H&S) concerns. Whilst a robust H&S approach is normal in the case of public art projects, my experience with *The Big Swim* was unusually rigorous. After initially receiving a positive response from the pool managers, a long battle with the council and the leisure centre management began. The main concern was that the lifeguards would not be able to see the bottom of the pool, which is a cornerstone in lifeguarding. I drew on all my powers of negotiation to keep my artistic vision intact. To do this I produced several safety protocols and certifications[2]. I adjusted the number of participants allowed in the pool at any one time and I compromised on the age of the participants, only allowing people over 8 years old to participate and stipulating that those under 16 had to be accompanied by a competent adult swimmer. Nine lifeguards were hired and participants were asked to fill out a health form, in addition to a research consent form. I argued for creating one form only, as I

believe form filling can be a barrier to participation. Furthermore, the lifeguards briefed the participants about the additional safety protocol. Unfortunately, this latter element created a sense of fear and anti-play according to one participant. My experience when creating a similar installation in 2005, in the UK, and in 2006, in Denmark, was notably different with regard to health and safety protocols. Based on these three experiences it is possible to suggest that our attitude to risk and play has changed considerably in recent years. While this change may not be intended as an anti-play agenda, but instead aims to avoid potential insurance claims, it nevertheless, has had a snowball effect, influencing culture and our attitude to public play. Crucially for the research, I found a balance between my artistic goals and the concerns of the leisure centre and the council. Over 200 people participated in the installation, initiating multiple play interactions, which I will now describe.

Observations: What play emerged?

The play behaviour observed was being expressed physically. *The Big Swim* was described as colourful, mystical, eerie, awesome, fun and unexpected by audience members who were asked to describe their experience in one word. It was clear from the observations conducted by me, and others, that *The Big Swim* created a sense of intrigue and wonder as people swam in the pool. Swimmers spent time watching the light reflect and many commented on the bodily awareness that the light and mist created. *The Big Swim* play experience heightens participant's awareness of their bodies. A participant commented that it was a 'disorientating dream' where the fog and light created a physical awareness and a sense of anonymity (the fog effect). Some imaginary play took place as well. A participant described pretending to be a synchronised swimmer, another remarked that it was like being in a film. However, *The Big Swim* was predominantly an immersive experience and the fantasy play was to 'bend the reality of our ordinary lives' (Brown, 2010: 93). There is no doubt that make believe continues to be enjoyable in adult play (Smith, 2010; Schechner, 2006)[3]. One participant took the pretend play a step further and arrived wearing a pink wig (which in turn generated a series of funny comments from the lifeguards, over the walkie-talkie system).

Fig. 55 Pink wig, couple dressing up for play looking into the pool at Camberwell Leisure Centre

Fig. 56 Romantic encounters at Camberwell Leisure Centre

A lot of the play observed was immersive and otherworldly. Several people described it as an upside down world. Participants commented that when they went underwater and came up again it was like entering another world (vision was clear underwater but above water swimmers disappeared in the fog). The immersive quality of the installation particularly elicited a sense of solitary contemplation, almost all participants would leave their group (if had they come in one) and go into the middle of the fog on their own. People drifted in and out of "being together" and drifting on their back, on their own. The cloud fog also created an interface which enabled participants to create hide and seek games. Groups played tag, sneaking up to others, hiding in the mist and then emerging to surprise, tag, or push friends under the water. Others would "bob" in and out of the fog. A participant even commented 'that man looks like a sea lion bobbing in the sea'. Two young girls carefully synchronised their "bobbing" and spent time communicating with each other underwater. Others played with styles of swimming, making up funny movements.

Fig. 57 Handstands at Camberwell Leisure Centre

The installation also enhanced play which would normally occur in a pool, such as: splashing each other, swimming underwater fetching something from the bottom of the pool (where visibility was good), underwater handstands, jumping in from the edge (the

latter occurred more frequently in Oxford), taking off as fast as possible from the edge, throwing friends and children - propelling them up into the air so they could make a big splash, pushing friends under the water and racing. People also played with the pool rules, sometimes breaking the rules deliberately.

Fig. 58 Splashing at Barton Leisure Centre

The focus on risk (and health and safety) by the leisure centre was reflected in the participants' feedback. Several commented that they felt hindered by the lifeguard's briefing, reporting that 'The lifeguards briefing was off putting', or comments such as, 'We're told not to play around by the lifeguards', and that 'The lifeguards acted like there were sharks in the water, their response seemed inappropriate - and there were so many of them'. *The Big Swim* illustrated how play and risk (danger and control) are connected and how safety measures can potentially reduce the artworks' playability. *The Big Swim* illustrated how risk is an intrinsic part of play. In play something is at risk, there is a feeling of anticipation and uncertainty as play proceeds. As Huizinga writes about play when expressed in language 'Play and danger, risk, chance, feat - it is all a single field of action where something is at stake' (1950: 40). It was noticeable that, on the second day in Oxford, when the lifeguards had familiarised themselves with the installation and therefore were more relaxed, the participants were allowed to engage in more physical play, such as rough and tumble, making splashes and doing handstands underwater -

playing in the fog. Another key factor was that the Oxford pool was not so deep, which therefore offered an affordance for physical play.

Fig. 59 Lifeguard watching out

Evaluation

The physical environment of *The Big Swim* evoked playful behaviours - the space itself became a material affordance for play - and light and mist became an ideal interface where immersive and playful experiences took place. For example, at Camberwell where the fog was thicker in the deep end of the pool, this seemed to attract more play and the shallow end was where people talked and socialised. Seen from a sculptural interactive art view, a pool offers more possibilities than simply swimming and exercising, it is a natural space for play that provides a sense of physical interactivity. By transforming this space, using ephemeral materials to create a cloud of colour, an immersive and visual invitation to play - to jump in, to explore and play games - arose. Light is a powerful substance and humans have an almost primal connection to it. This affordance, plus the use of the playability of the space, created an enchanted environment and moments of 'that's amazing' and ohhh, look' (the intake of breath).

Part of the environment and the material affordance was also the staff; the lifeguards, technical crew and filmmakers. However, the biggest impact on the play vocabulary observed were the constraints imposed by the H&S and the lifeguards' attitude of fear. Despite the apparent play connotation that a swimming pool has today it is often an area of control. Play in an overtly controlled space becomes less exuberant, as indicated by the mother who commented that the 'initial safety briefing made them feel that it wasn't a place for being playful'. However once, as observed at the Oxford event, the control was relaxed, more excited physical play emerged. *The Big Swim'*s upside down world played with control and play, touching on dark play, such as rule breaking and risk taking, which led to a greater understanding of risk and play's inherent connections to it and its effect on play behaviour [4]. This clash of control and *The Big Swim's* obvious material invitation to play was a fruitful area of research into rules and open artwork and became an important finding. Rules, in the context of *The Big Swim*'s negative H&S experience, were in opposition to the concept of an open artwork and the many kinds of play possible in a swimming pool. This highlighted the fact that interactive artworks are not defined by their use of technology but can be created by other means. Rules can also be an invitation to secret play – breaking the rules is a powerful form of play. Playing with the rules of a swimming pool is perhaps similar to playing with the public rules of engagement in the gallery, as seen with *Echidna*. In this context the social rules of the pool are similar to our social rules in the gallery. This, in turn, renewed my artistic conviction, which first emerged in C*atch Me Now,* to make interactive artwork that is open and that is created by taking into account humans "interactive" nature.

The Big Swim elicited physicality and immersive experiences and confirmed my research interest in the body playing and this resulted in me exploring the notion of the body in play in another (more direct) form of immersion in *Tracking You,* where I used wearables (capes augmented with technology).

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[1] Contextually *The Big Swim* can also be linked to artworks such as those of Olafur Eliasson's *Your Atmospheric Atlas* (2009), where the audience become immersed in colour, walking around a closed room, filled with smoke and lit with coloured light from above. (I experienced the work myself). However, Eliasson's work largely focuses on perception rather more than immersion. James Turrell, while seeking to make the quality and sensation of light itself something quite tactile, also asks us to think about the light itself. He says 'you cannot mould it with your hands, you have to use thought to form it' (1993: 26).

[2] In addition to those mentioned my health and safety protocols also included; risk assessment, documentation of previous maintenance of all equipment, legionella disease prevention protocols (water contamination), method statements from all specialist staff, insurance letters and emergency protocols. Participants were also given a sheet with general information about the installation and the research, a data and media consent form and a health form.

[3] Adult pretend and fantasy play is evident in the many forms it takes, such as amateur dramatics, re-enactments, dressing up parties, sci-fi conventions and more.

[4] The debate about play and risk is an extensive and on-going discussion. Play theorists in particular voice concerns about the increasing regulation, which are seen to limit play. For example, Yumi Gosso points out that institutions often respond to perceived risk through health and safety measures, which, in turn, has a direct effect on play behaviour. This was demonstrated in *The Big Swim*. Gosso describes how this institutional approach affects children:

> This concern, sometimes excessive, and the constant supervising that results from it, may hinder the child in learning the limits of his or her own competence, as well as that of his or her companions during play (Smith, 2010: 96)

Brown (2010) also describes his concern that children have less opportunity for rough and tumble play today. He points out that children need to learn to judge danger and, in particular, boys need to engage in rough and tumble play. In fact, lack of rough and tumble play can hinder 'the normal give-and-take necessary for social mastery, and has been linked to poor control of violent impulses later in life' (Brown, 2010: 89, see also 108).

In the context of risk and play it is also possible to argue that children today are, more often than not, under observation, or they play in a child-adult scenario. This is very different to the play I remember when growing up, where play took place in mixed age groups and was unsupervised. I posit that this fear of perceived risk is one of the reasons children and young people are more supervised today. Gosso draws attention to the Parakana culture where risk is understated. He writes that among the Parakana children sharp objects are accessible and yet there seem to be no accidents. Gosso speculates that the knowledge of the sharp objects, and the behaviour around them, is transmitted to the younger ones by older children (Smith, 2010: 96).

TRACKING YOU

Fig. 60 Tine Bech *Tracking* You (2012) Victoria and Albert Museum, Digital weekend 2012

CATALOGUE
TRACKING YOU

My final artwork, undertaken to investigate the research questions and to gain new knowledge, was *Tracking You,* an interactive sound installation, which used people's movements to generate sound. People were invited to wear different capes, augmented with tracked RFID tags (Radio Frequency Identification). Through the use of real-time position technology the capes (and participants) were tracked and generated sounds, depending on where people were positioned in the space and where they were in relation to each other. Participants were able to choose between five different silk capes, printed with the same digital pattern, in five different, playful colours.

Tracking You was exhibited at the Victoria and Albert Museum Sackler Centre, as part of the V&A Digital Weekend, September 2012

Dr. Tom Mitchell, from the department of Computer Science and Creative Technologies, UWE, Bristol, programmed the installation.

Research aims and questions

Tracking You was my final artwork and in this project I deliberately wanted to enable group play, as well as single play scenarios. My previous artwork, *Echidna*, evoked mostly solo interaction with some group play, like taking turns, and whilst both *Catch Me Now* and *The Big Swim* elicited group play, it just as often created solo play. I therefore wished to explore collaborative play by creating possibilities for family, friends and strangers to interact together. This investigation was linked to the research question: What kind of play takes place in and around interactive artwork? Finally, I also wanted to create an artwork that initiated group play through physical participation, using the body as an interface and to consider how artists can conceptualise physical participation and play in interactive artworks. *Tracking You* was therefore visceral, connecting the human body (using capes) with sound and immersive technology, in order to create a playful

interactive installation. Lastly, the idea of using capes was also linked to my investigation into material affordance and how this can create possibilities for play in and around interactive artwork.

Tracking You was linked to my previous installation *Mememe* (2005-06) in which I employed a similar technical interface of turning movement into sound. Participants were invited to wear modified sculptural shoes and the participants were able to compose their own sounds by playing with walking styles, location and speed. The soundscape was made up of a mix of animal and industrial sounds. The interactive design in *Mememe* often did not work and, whilst the artwork was successful, in the context of my PhD research, the work created chaotic and confused interactive behaviour rather than play behaviour in the gallery.

Fig 61 Wearable sculptural shoes with RFID tags in *Mememe* at Aarhus Centre for Contemporary Art, Denmark, 2006

Methodological developments

My methods and strategies for creating artworks as a means to investigate my research questions were well established by this stage. The research and the development of the work followed my iterative process of making, testing, observing audience behaviour (in this case a test audience at the Pervasive Media Studio) and then re-making. The project was collaborative and I worked with Dr Tom Mitchell, who programmed the installation. The collaboration was easy - we encountered very few problems and generally had fruitful conversations about sound in the context of the affordance of the technology. Observations were carried out as described in the methodology chapter, using my iPhone notes and filming instances of significant play behaviour, combined with peer reviews. As outlined in the methodology, my analysis does not rely on peer review, but rather functions as a method for balancing my assumptions. In the case of *Tracking You* the review was written by a student who helped during the installation and I found it was somewhat influenced by the conversations we had during the exhibition period.

Development and making of the artwork

It was two years before I started the actual development of *Tracking You*. I decided on the concept of capes and movement in the early stage of my PhD and during a short test with students at Imperial College, London, where I gained insight into the technology[1]. Contextually, the capes in *Tracking You* can be seen as a reference to the Brazilian artist Hélio Oiticica's artwork *Parangolés* (1964). *Parangolés* was one of the first participatory artworks to explore different ways of interacting in museums. Oiticica's interpretation was that by wearing capes the audience shifted from being individuals to becoming participants (Bishop, 2005: 107)[2]. Another contextual reference, relevant to media art more than to sculpture, is the work of contemporary artist Thecla Schiphorst, who has created works where she explores wearable technologies.

Tracking You consisted of five capes that were augmented with RFID tags. Participants wearing the capes triggered sounds, either by movement (walking and running), proximity to other participants, or by entering different sound zones. The capes had an active RFID (a tag) on each shoulder which sent a unique signal, which made it possible to correlate specific sounds with each particular wearable cape. The movement, as well as the interaction between each cape wearer, generated a soundscape. The sounds

were a mix of abstract and recognisable foley sounds (sound effects). The capes were an invitation to play and gambol - their strong, bright and playful colours were a visible enticement that encouraged the audience to participate. A cape's material affordance is to be worn and therefore to participate; to dance, to run, to fly. They represent a reference to childhood, to games, to heroes, to taking on a persona, to dressing up - to enter into play. At the exhibition the capes were hung in a row on a wall, to create a visual invitation. The capes were made from soft habotai silk, chosen both for its flowing quality and because I was able to print on it digitally. Habotai silk also allowed the print to penetrate through the fabric, so that the image was visible on both sides when participants ran with the capes flowing out from them. To ensure that there was no barrier to participation I created "one-size fits all' capes (in other words any audience member could very easily put a cape on). During the exhibition I learned that the capes did fit all sizes but that they did not stay on during wild movement. Essentially, the making decisions of the capes shape were too directed by my wish to lower the barrier to participation. My decision to place the tags on the shoulders was based on my previous experience of working with RFID signals in the *Mememe* shoes. By placing tags on the shoulders I avoided the signals between tag and sensor being blocked by other participants (the high water content of the human body could potentially block the signal). Furthermore, by having clear data signals I achieved a better data update rate which, in turn, led to a robust and reliable play interface between the participant's action and the technology reacting. The aspect of readable, reliable and robust interface was now a key finding and I return to this important aspect in my chapter on the analysis.

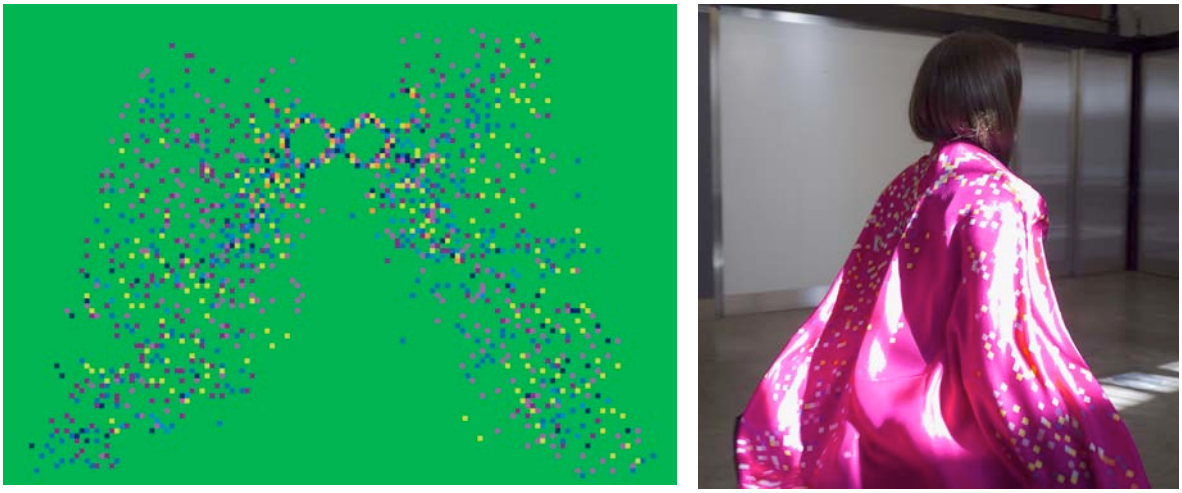

Fig. 62 Examples of the cape's print. The capes digital pixel design was a deliberate reference to the digital world, highlighting the link between code and the physical world of art

The installation was centred on Ubisense technology, together with MAX MSP programming. A unique programmed interactive framework, created by Tom, integrates the Ubisense spatial tracking system with a real-time audio interaction engine, developed in Max/MSP and C++. Ubisense technology combines an ultrawideband (UWB) technology platform with a real-time software solution to provide an automatic location aware computing platform, using a system of fixed sensors and mobile active RFID tags (attached to objects/people), to give real-time location tracking. Ubisense is essentially a location-based technology, a surveillance system that allowed me to track capes worn by the audience in the exhibition space. Six sensors (receivers) were hung high up, around the edges of the space, to ensure that the capes' signals were picked up everywhere the audience moved within the installation space.

The audio design for *Tracking You* was informed by my experience of working with *Mememe.* A key issue in the previous installation was that the sound samples were too long. When the audience triggered a sound, either by moving location or entering into a sound zone, the sound would still be playing, even though participants had moved out of the sound zone, or had stopped moving. This meant that the interactions were not distinguishable and the participants lost the feeling of "If I do this, then that happens". Creating readable multiple sound interactions is difficult. Sound is non-spatial; it belongs nowhere and flows into the exhibition space. It is therefore difficult for the participant to discern the link between their interactions and the sounds they generate. To counteract this, the soundscape in *Tracking You* consisted of fewer and shorter sounds, all aimed at being distinguishable, as well as being able to blend with other sounds. Tom also programmed a quadruple surround sound design, which made the capes sound profile more discernible. The underlying aim of *Tracking You* was to initiate play and games and all the sounds, therefore, were focused primarily on eliciting interactivity. Consequently, I modified and mixed Foley sound samples, reminiscent of sci-fi/robotic/digital sounds, which were characteristic of being playful, coupled with recognisable sounds such as shooting. The testing of the interactivity and playability was done at the Pervasive Media Studio. During the play tests I scrutinised the outcomes to see if the sound was legible and clearly reactive when people moved at different speeds[3]. I also considered what it sounded like when all capes moved at the same time and I aimed to create a playful and fascinating soundscape.

The *Tracking You* soundscape consisted of six interactive sound features [1-6]. The two main interfaces were the sounds created when participants moved (accelerated) and when they were close to each other (proximity). These two sound profiles were unique to each cape. The other sounds were collective (the same for all capes). [1] The walking and running (accelerating) sounds changed as people moved faster. This interface was explicitly interactive and the sound was by far the most dominant in the installation. As soon as people stopped moving the sound would stop. I created this interface to encourage people to move and it led to a lot of play and gambolling. [2] The proximity sound was generated when the capes got too close to each other (approximately 50 cm between participants/capes) and at this point individual shooting sounds would emerge. The shooting sounds were continual until participants moved further away from each other. This shooting interface led, as anticipated, to a lot of play and games, which are described later, in the play observation. [3] The first feature the participants heard was a "start up" sound, triggered when they entered into the play space. This facilitated an immediate play mode and clearly illustrated "the name of the game". [4] The capes also triggered an exit sound when people left the space. [5] An applause zone was placed in the middle of the exhibition space and when participants entered it clapping sounds were heard. This zone was big enough to contain five bodies if players stood close to each other. The more people who were inside the zone, the more intense the clapping and applause sound became. The concept of a secret clapping zone was included to encourage and reward collaboration. [6] I also tested a wall zone (approx. 0.5 m wide) that ran along the edge of the exhibition space, which I did not use at the final exhibition. My intention was to propel people into action, counteracting participants' shyness, standing by the wall and "looking on", rather than participating. For a more in-depth description of the sound development please see the appendix: Making process, *Tracking You*.

Fig. 63 Girl inside the clapping zone at the V&A Digital weekend, 2012

Fig. 64 Two people running, wearing black and pink capes, at the V&A Digital weekend, 2012

During the V&A exhibition, I made changes to the interactive design after observing the audience for a few hours. The alarm wall zone was very loud and overrode the sounds, and, because of this, it was disabled. I also modified the acceleration moving sound to be more reactive; participants were initially more tentative than anticipated, walking more gingerly than I had expected and therefore generating very little sound. After the modifications the audience became immediately intrigued and would start moving faster, experimenting with speed and rhythm, trying to work out how the sound was created. The clapping zone, on the other hand, was not detected. People were running so fast, and were so completely absorbed in a play mood, chasing, jumping and shooting each other, that they did not pay any attention to the interface. The running and the shooting sound was, by far, the most successful interface and elicited a plentiful number of play scenarios, which I will now describe.

Fig. 65 Participants playing and gambolling

Observations: What play emerged?

Predominately, *Tracking You* enabled group play between families and friends, as well as between some strangers, mainly in the form of physical play, such as rough and tumble play. Once people had entered into the play space wearing a cape they would start to explore, first tentatively walking, and then engaging in full play mode. I witnessed lots of laughter, play fighting, shooting games, tagging and catch games, dancing and performances. *Tracking You* illustrated clearly, as described in *Catch Me Now,* that some of the loudest laughter occurred when people were playing physically, or when they tried to perform (Panksepp and Biven, 2012: 367). The play observed was inherently attractive and people often played longer than they intended. I also overhead some interesting comments that illustrated the power of flow and how play can break down social barriers people have when entering into play, one audience member said, 'I had so much fun, I forgot to be embarrassed'. A similar situation was when the father in a family group ended up joining in after stating, 'I'm definitely not going to wear a cape'.

Tracking You demonstrated play as exploration; where the cape wearer first worked things out, discovering the installation's interfaces and features, before going on to playing with others – and playing with the system. For example, a participant tried all the different capes on to hear the different sounds, playing first on her own and then later with other people. Brown describes exploration as a play personality, and suggests that it is the way people stay connected with finding out new things throughout life (2010: 67). *Tracking You* also encouraged some performance play; cape wearers "paraded around", people danced or performed physical displays, such as twirling, or using funny walking styles. People were clearly improvising, making it up as they went along. I learned that this latter aspect is something that is a central characteristic when developing an open artwork in which play is elicited. The sense of performance was also highlighted by the setup of the installation space which had the suggestion of a stage, because of a line on the floor marking the "play space" and the act of putting on capes, which is like taking on a play persona. Often friends stood on the sideline, watching and cheering. There was some posing for cameras and people assumed heroic postures.

Fig. 66 Posing in front of the camera. This was perhaps what led an audience member to exclaim that people are '…like cartoons'.

Fig. 67 A participant laughing discovering the sounds

Once participants had worked out and mastered the interface, the play was often reminiscent of Caillois' paidia, with its instinctive exuberance and improvisation. This was frequently combined with elements of agôn's game and competition. *Tracking You* sparked countless rough and tumble play situations, participants played tag, ran and chased each other, then collided and shot each other. On numerous occasions I observed people running up to each other and bumping their shoulders against each other, in order to shoot each other. I witnessed play fighting and fight posing, particularly between men where, for instance, two friends would go into an animal like bout of headbutting and bumping into each other. I also often observed participants move towards each other using a staggered gait, or the looped approach described by animal researchers. Smith, for example, describes play fighting as social play, which in animal play often starts with a "bouncy approach" (2010: 45-46). Fagen also points to the similarity between animal play and human's tag and hide and seek play (1981: xi). There was also some sneaky shooting, even though it was almost impossible to sneak up on people (due to sounds generated by movement). In one instance, a couple were leaving the installation space when, just before the man left the play space, the woman sneaked up, "shooting him", laughingly saying 'Ha, ha, ha, I got you'. Strangers would also try and sneak up on each other; playing on the fact they did not know each other. Panksepp and

Biven see rough and tumble play (what he calls the PLAY system) as the 'most fundamental form of play' (2012: 365). Rough and tumble play is also characterised as 'social play' by both Smith and Brown. Brown includes play as friendship and belonging, and incorporates celebratory and ritual play in the social play category (2010: 88).

Fig. 68 Series of photos showing participants engaged in shoulder bumping

Tracking You was the most collaborative playful work in the catalogue. This was illustrated by situations where people would start by playing on their own, then leave and come back bringing friends to play with. Families and friends mainly played together, however, some strangers also interacted and the shooting interface particularly encouraged strangers to play together. In families it was notable that fathers with children frequently played 'catch and shoot'. I also noticed the classic play scenario in

which a parent held a child's hands and, with arms stretched out, swung them around and around. Some participants danced together, ignoring the fact that when they came too close together the shooting sound emerged, instead they would hold hands at arm's length (where no shooting sounds were activated) and spin around whilst laughing. I observed friends playing together on multiple occasions, a case in point was a group of five girls playing together, walking around tentatively and trying to work out how the sound was created. They all stood still at the same time and then burst into running together while laughing loudly. This group also coordinated their movement, standing still and then taking turns moving, running and leaping – what Smith would categorise as physical, gross motor play with its characteristic of rotating the whole body, twisting, spinning, jumping (2010: 9 and 45). I also witnessed play scenes where participants created sound scenes, conducting each other as instruments. A group of six young women invented a command and conduct game where the person not wearing a cape (as there only were five available) joined in by standing in the installation space and conducting her friends sound creations by yelling, 'green cape move', or 'blue cape stand still' (she used their names, not the cape colour). The same interactions took place with people standing on the sideline, ordering friends and family around.

Fig. 69 and 70 Girls "stop and run" play and play fighting rough and tumble play

Tracking You confirmed my previous research finding, from *Catch Me Now,* that adults step away to let children play. In *Tracking You* children and adults (outside families) rarely

occupied the installation space at the same time. Often play waves took place where groups of children played, followed by families, or groups of adults. The moment children played, other children would join in, or adults would read the installation as "only for children" and step back. Children who were unfamiliar with each other would readily play together. Children connected with the artwork and each other mainly through the shooting interface of *Tracking You* and, in some instances, the younger children[4] did not seem to grasp the concept that sound was generated through acceleration. Children would quickly establish a shooting game, to shoot as many others as possible, in a match with everybody against everybody else. In one instance I witnessed a poor adult, who entered (bravely against the wave of children) into the installation, while four children were deep in play. He was ambushed immediately and shot repeatedly. He never stood a chance – to explore, to play – and it was clear that he was confused and bewildered by the tumult. Overall, the installation attracted more grown up interaction; conceivably, this was due to the nature of an audience at a digital arts festival. However, I also observed several occasions when an adult would put a cape on and then try to get their children to join in, saying ‘come on, come in and play’ to older, self conscious shy children. The installation’s setup, a room with a green piece of tape marking the installation area, created a stage like feeling. This entry area was often lined with onlookers and participants waiting to take turns, which resulted in a sense of being watched (performing). Consequently, older children often took a long time to enter into play, some standing for a considerable amount of time on the sideline before joining in with family play. However, as observed earlier, most participants did engage after putting a cape on and often completely forgot themselves - the cape wearers were in the moment, as in Csikszentmihalyi’s concept of flow, where people focus on the immediate demands of the activity and become lost to the world. The installation proved how audiences could overcome their resistance to participation if the invitation to play is thought through and gambits of play, such as material and technological affordance, invite physical interaction, if the interactions are readable, reliable and robust enough to be played with.

Fig. 71 Children playing catch and shoot

Evaluation

The playability and interactivity of *Tracking You* built on my previous research findings and, with small modifications made during the exhibition, the installation worked well and met my expectations. *Tracking You* enabled me to both explore the challenge in creating interactivity for adults' and children's participation further, as well as allowing me to test new play gambits, such as creating both collaborative and individual play. *Tracking You* also strengthened my notion of the body as an interface. Using wearables invites the body to play and new forms of interaction occur. Similarly, I added to my knowledge about readable, reliable and robust interfaces.

My main challenge in working with sound was to find ways to make the audience connect their interactivity to the sounds generated and thereby create readability of the interactions. By testing the work with the Pervasive Media Studio residents (and by working in collaboration with Tom) the interactive soundscape and, in particular, the acceleration interface became consistent, reacting immediately. This in turn led participants to explore and thereby enter into full play mode, confirming that this play gambit is central in generating play agency. Another example of readability and

consistency was the clapping zone. I created this zone to reward participants if they explored and collaborated. However, what happened instead was that the zone created a break in consistency which caused confusion. In my first setup of the installation at the V&A the participants became confused when they were unable to shoot inside the zone but could do so everywhere else. Later, after I modified the zone to allow shooting but still trigger the clapping, people still did not interact with the clapping feature and were puzzled by the sound. What counteracted the confusion (which stops full play mode) was that the audience were so absorbed in play governed by impulsive exuberance that people simply continued to play at full speed, ignoring the clapping[5].

Fig. 72 Two girls dancing and spinning together

Tracking You evidently evoked physical and joyful play interactions with lots of gambolling. People would perform, run, chase, spin and bounce into the air. This physical interface facilitated several types of play and games, in particular the proximity feature, with its clearly discernible shooting sounds of “bang”, “boom” and “pheww”, led to lots of rough and tumble play – some of which had visual similarities to animal play. Physical play and rough and tumble play often translate across all mammalian species, however, animals do not share the human characteristic of creating fantasies around rough and tumble play, such as children describing their play fighting as pretending to be superheroes. Panksepp and Biven write that while we can expect that especially ‘raw

effects (social) joy, will translate across all mammalian species (but) how we translate humor within our tertiary-process networks of our minds will not' (2012: 352).

The work also demonstrated play's characteristic of self handicapping in order to keep playing, in particular, in rough and tumble play situations. The collaborative play was often of a rough and tumble nature (which, as mentioned, is classified as social play) and in this I observed an intimacy, a clear social bond. The shoulder bumping was both caring and a game element. People would gently bump against each other to show friends what to do, or simply to make a connection. *Tracking You* potentially illustrated that 'play nourishes the roots of trust, empathy, caring and sharing' (Brown 2010: 197). Supporting this was the evident flow and loss of self, which in turn broke down social barriers.

Tracking You was, despite the capes need to be redesigned, a very playful installation and became a significant catalogue in my research. The work enabled a sense of play mastery, as also seen in *Catch Me Now*, which arose from the material invitation as well as the interface's readability and reliability. One of the research aims of *Tracking You* was to create an interface that enabled both collaborative and single play. The installation proved to evoke multiple collaborative play scenarios, in fact, the installation worked better if more people participated, as is clearly illustrated in the review of my observations. *Tracking You* facilitated social play and possibilities for both adults and children to play equally. I discovered that learned behaviour and imitation amongst audiences (seeing that others play) has the possibility to break down adults' hesitancy to play when children are playing. Another key finding was how interactive playful artworks can lead to a sense of flow; a loss of self, and so promote the breaking down of social barriers. There is no doubt that interactive and participatory artworks heighten, often positively, the social atmosphere. This finding was echoed in all previous artworks.

People are incredibly impulsive creatures at times, and play behaviour is wonderfully unpredictable, as seen in my many observations across all the artworks produced for the research. However, as the aim of my research is to explore how to create possibilities for play in and around interactive art I argue that I, as an artist, can anticipate some audience behaviour and so create intending to elicit it by using the gambits of play, which have emerged from the catalogues. These gambits draw on my sculptural background and creative use of interaction design and art methods, which have allowed

me to create playful behaviour without producing a behaviour management system for play, such as perhaps an HCI methodology would have it.

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[1] In 2010 I initially collaborated with the Department of Computing at Imperial College, London, where a team of five MA students from the college were briefed to test the programme architecture using MAX MSP, Ubisense (.net) and a Java code written to bridge the two systems.

[2] Oiticica's work often focused on engaging audiences in sensorial explorations (much like fellow Brazilian artist Ernesto Neto). Oiticica's notion of the violation of an individual in the world, shifting to become a participant, was linked to the political movements at the time. Oiticica saw (1960s) *Parangolés* as an analogy in which the individual audience member (body) becomes part of the environment, thereby forming a resistance to the, at the time, oppressive dictatorship (Bishop, 2005).

[3] The testing of the sounds was carried out in parallel to sewing and designing the capes. Tom and I therefore tested the sound and interactivity by moving a ruler with two tags taped to the ends, in order to imitate shoulders. This led to an interesting insight into creating interactivity using an object vs using the body. A ruler's affordance (in this situation) is to swing it, to point it - to use it as a sword. A ruler can also be swung much faster than a body wearing a cape can move and accelerate. A *Tracking You* cape is an embodied object; it is a wearable, which merges the body and the technology and is a very different interaction design scheme to create for.

An additional aspect is that a ruler, or an object, allows the participant to "game" the interaction in a way that a cape does not. For example, when using the controller playing Wii, people can play tennis sitting on the sofa, just flicking their wrist (which I have observed on several occasions) instead of standing up and swinging the arm - participating with the body fully to imitate the sensation of hitting the tennis ball. By flicking the controller, the player shows he has figured out the interactive parameters - he is "gaming" the Wii game itself. In contrast, a cape, a wearable piece of textile with embedded electronics in it, requires that you move your body, using it to create dialogue and play.

[4] I asked some of the younger children playing how old they were, particularly those who did not seem to really grasp the fact that they generated the sound by moving. This age group just enjoyed running and, in fact, sometimes the smaller children simply wanted to play and wear a cape – this was their play, not participating in an interactive artwork. If they were very young – around two or three – they would just run around without a cape and participate in the physical gambolling and running that was taking place in the installation space. It is worth noting that my observation notes do not reflect the age of participants and my interest in their age is merely

anecdotal. As described in the methodology, I am predominantly interested in how to elicit play, not in which age or gender groups would participate in play. Nevertheless, after *Catch Me Now,* where children would take over the play space, I became aware of the challenge in creating artwork that elicits play for all ages.

[5] Whilst the clapping zone was modified after my first hours of observation, in light of the fact that it caused confusion because participants could not shoot inside the zone, the zone was still a break in the consistency of the simple play rules established - to run and move to create sound and to shoot when near someone. These rules enabled a play of ilinx and paidia, combined with some competition (agon). The clapping zone seemed to elicit a different kind of play, incompatible with the play established.

ANALYSIS
THE GAMBITS OF PLAY

I am for an art that is political-erotical-mystical, that does something other than sit on its ass in a museum (Oldenburg, 1961: 335)

Introduction and research questions

The artworks presented in the catalogue were concerned with creating playful art experiences and allowed investigation into how I could create conditions and possibilities for play within interactive artworks. The research focused on the development of a model for making playful and interactive artworks and the creation of a vocabulary of play that demonstrates the different kinds of play initiated through interactive artwork. In this chapter I analyse the research findings accumulated through the practice and then outline my theoretical and practical positions which arose from the research. These outcomes are assembled into a series of useful findings in order to create a tangible model for making. I focus on six making gambits that I consider the most important requirements when creating playful interactive artworks.

As mentioned in the introduction, the intention in making a model for creating playful interactions is not to define a good, or successful, interactive artwork. Rather, the analysis focuses on how to make artworks that elicit play and interactions, in order to address my three main questions: 1] How do the properties and affordances of materials and technologies foster play and interactions? 2] How can artists conceptualise physical participation and play in interactive artworks? 3] What kind of play takes place in and around interactive artwork? I explored these questions through a practice based methodology and my analysis is based on my evaluation of the artworks (their interactivity and playability) and the observations made of audience behaviour, as outlined in the catalogue. The analysis is from the perspective of play theory and focuses on the making process from a visual arts point of view. I examine in what ways the affordance of the materials both entices the audience and implies how they might interact. I also ask how I can create collaborative interaction and how the levels of

readability and reliability of the artwork enable, or hinder, interaction - in other words, how these aspects shape agency and play. The analysis is focused on the making process, and, while my research has an emphasis on both the playmaker (how to make) and the player (documenting the audience interacting and playing), it is the discovery of the gambits for making that is the aim of my analysis.

The agency of materials

A key finding in my research and practice is my use of the agency of materials, which arose from my sculptural and visual arts approach to creating interactivity. I understand materials by playing with them, testing them both in the studio Page 141 of 59and with audiences during exhibitions. Materials cannot be understood by reading, or by assuming we know what they can do, they are understood through exploration and inquiry. To create an artwork it is necessary to make, and to make, it is necessary to explore the material 'It is as simple as that' (Armitage, 2011: 2)[1]. The making of interactive artwork which creates possibilities for play requires that attention is paid to all the making components which, in my view, include both materials and audience behaviour. I explored how the inherent properties of a material and the technological affordances influence how an audience plays, or does not play. I also considered how the quality of a particular space affects how an audience interacts. Artists have always been interested in how things are made. When artists go to galleries we do not only experience and appreciate the artworks, we look at how the art is made, how the painting is framed, if the photo is backlit, how the sculpture is fixed together and what potential technology makes interactive art reactive – just as I did when playing with Maurizio Cattelan's artwork *Charlie*, trying to discover the technical aspects of the interaction, as described in the background to the research on page 49.

In my PhD practice, as well as in my previous practice, I have used materials that are intriguing and encouraged the production of play. My material thinking is concerned with the properties and affordances of materials (the perceived value and function of materials and things). Bolt describes this as a form of material intelligence within arts practice methodologies (see page 63). Sullivan also highlights the visual arts tradition of using technological affordance and material properties to influence the ways in which the audience might read the artwork (2006: 1). The material intelligence is linked to the artist's intentions, the subject matter and research questions, in other words, my sculptural material approach in the context of interactivity and play influences the audience's

interactions. However, critically, I include the audience's behaviour (and the behaviour of the technology, but I return to this later) as part of my making process. In a traditional art making approach audience behaviour is not usually part of the making process. I argue that the interaction of the audience can become a "material" that the artist works with – this is the iterative making process – observing audiences, recording play behaviours and then remaking. I have also described in the methodology, and demonstrated in the catalogue, how audience behaviour becomes part of the making process and informs the making of, and changes to, the artwork.

Fig. 73 *Tracking You* capes are an invitation to play and *Catch Me Now's* spotlight is a material affordance of performance

The making gambit of using the agency of materials - their play affordance and properties, specifically, how objects and materials behave and how they are experienced and interacted with – is a sculptural approach to interactivity which enabled me to create playful interactions using the materials meta message of play. Some materials look and feel intriguing; they are colourful or sensory. Their affordance is playful, either because culturally we are familiar with the material as a play medium and performance element such as capes and spotlights, or because the material has an animated, creature like appearance such as *Echidna*. For example, in *Catch Me Now,* the spotlight is something most people will associate with performance – with playing. The affordance of a spotlight is that people will be enticed to step into the light and, with additional interactive

elements, engage in play. Another example of material agency is *Echidna,* where a woman pretended to be hurt when touching the sculpture by playing on the connotations of pain associated with wires and electric sounds. In *Tracking You* the capes suggested heroes, play and fantasy. In this framework I also discovered that wearables can become a play affordance - capes are made for wearing, for taking on a play persona and engaging in performance, they invite the body in. The capes were made of silk which added a quality of movement, inviting the participants to run – a cape is a perfect play signal. My tactic was to deliberately use certain playful materials which I found created an "opening" into the artwork – it is an invitation. I observed that it also makes it easier for the audience to approach the work, to step into action and play.

In addition, I discovered that the space in which artworks are shown also defines and influences audiences' play and agency and becomes part of the making gambit of material agency which artists can consider in their making. For example, *Catch Me Now* was shown in a passerby space, an inbetween space, in the gallery. Such a space attracts an audience who are simply wandering by (an aspect I return to later). The advantage of this is that it provides an audience with a non-determined set of expectations, as opposed to the "white cube" of a gallery where people often conform to an expected set of acceptable behaviours. However, if the space becomes too crowded the artwork disappears. This happened in *Catch Me Now* when the spotlight landed on people's backs instead of the floor. Spaces, like materials, naturally offer affordances, sometimes in ways we perceive as the potential for activity. For example, *The Big Swim* took place in a swimming pool, a space which to most people is a clear play invitation, either from childhood memories or simply the water's "splashiness", or the physical embrace from the water's lessened gravity. There is no doubt that the physical disposition and size of a space equally invites the audience to play, as well as the interface and the materials. Smith's research into space versus physical play showed that 'physical vigorous activity showed a clear increase as more space was available' (Smith, 2010: 102). Whilst Smith's observation is about children's play and not about interactive art it is, nevertheless, relevant and mirrors my observations in *The Big Swim, Tracking You* and *Catch Me Now*. Space tempts our curiosity and invites people to engage in physically big locomotor play. A large empty space, in which a colourful spotlight roams around, entices people to jump into it, or a space where five colourful capes hang is a tantalising invitation – it is a licence to play, to move and to interact. However, too big a space can limit play, or feel daunting. For example, in *Tracking You,* a

line was marked on the floor with tape, visually creating a performance invitation, an affordance of stepping onto a stage, which, in some cases, made participants self-conscious and shy. I return to the issue of space and body self awareness later in the text.

Fig. 74 *Tracking You,* line marked on the floor indicating the play space

The agency of materials: animating technology

My Interactive art in this thesis sits at the axis of sculpture's traditions of using material properties and play theory's notion that the environment and objects (including toys) strongly influence our play behaviour. Play behaviour is also connected with our toy tradition and our changing expectations of their interactivity as briefly described in the introduction. In today's world play is often initiated through media and video games, which in turn, mean our affordance for play is becoming increasingly media related. We play with media to make sense of the world; play is how we learn to navigate the world, as Eberle would argue (2009). More relevant to my analysis and sculptural approach to technology is play theory's argument that 'the objects made available to children have meaning, and indeed can be loaded with cultural values from the society to which they belong' (Smith, 2010: 94). In the same way that objects are loaded with cultural values,

interactive sculptures can become loaded with feelings (emotions)[2]. In the catalogue technology was used to animate materials and create sculptures that became "alive", *Echidna,* or *Chromatic Play,* were both referred to as "creatures" by audiences (see catalogue page 76 and 87). Audience members animated the artwork, for example, made comments about *Catch Me Now,* such as, 'it got you' and 'is it 3 because there are 3 of us here?' in reply to the light turning into a prism, or addressing the spotlight as an entity 'I thought you weren't supposed to disturb it'.

When artists use objects in new ways, or hack technology and transform places, they create the unexpected. Artwork that reacts with a playful anthropomorphic life is liable to take us by surprise. This connects us with the work and we pay attention. My analysis here is similar to Germano Celant's assessment of Höller's work, where he writes it 'attempts to jolt viewers out of mental and psychological habits, impelling us to shake off the passive detachment that we tend to feel when looking at art objects' (2011: 203). Furthermore, I argue that the approach of surprise and animating technology counteracts the mind's tendency to name and categorise our surroundings without really looking. In this context Richard Gold's 'This is not a pipe' in which he describes the role of ubiquitous computing and the re-enchantment of objects, is relevant:

> This new augmented reality is perhaps a little like the enchanted village in which common objects have magically acquired new abilities, a village where toy blocks really do sing and dance when I turn out the lights (Gold, 1993: 1).

I understand technology as neither a tool nor a medium, but approach it as a material. Armitage writes that 'technology is not always a tool, an engineering substrate; it can be something to mould, to shape, to sculpt with' (2011: 1). Flanagan highlights a similar approach within critical play writing games:

> representation systems and styles, rules of progress, (…) winning and losing paradigms (…) they are the material properties of games, much like marble and chisel or pen and ink bring with them their own intended possibilities, limitations, and conventions (2009: 4).

Armitage's viewpoint is similar to the long tradition in visual art of exploring materials. Technologies have affordances and properties just like any material, just as the grain of the wood allows me to make a particular kind of shape so it is by understanding the materiality of the technology that I can shape experiences; by working with the grain, or hacking it, to create art. An ultrasonic sensor "grain" is different to a PIR sensor.

Electronics have their own fascinations and the immateriality of technology can be equally tactile and sensory. Seeing technology as a material means that the interface can take on a sculptural feel. In this context Krueger represents a different point, which I feel reflects a fairly common view within interactive art:

> The only aesthetic concern should be the quality of the interaction, which may be judged by general criteria: the ability to interest, involve and move people, to alter perception, and to define a new category of beauty (1991: 17).

Whilst his statement is true, in that the interactive quality should be of the highest concern to any interactive artist, I do not agree that it should be our only concern, or that, as he also writes, it is only 'the relationships between action and response that is important'. In particular, I disagree with the idea that 'the beauty of the visual and aural response is secondary' (Krueger, 1991: 86). Interactive art can be equally a sculpture, using visual arts aesthetics, as well as interactive, using technological affordances. In *Catch Me Now* and *Tracking You* technology (sensors, RFIDs, webcams, code) is a material to sculpt with – its material properties are the embedded gestures and interactivity, it is a material which does something. In *Echidna* the circuit board is reclaimed from a standard old circuit board designed to generate magnetic fields and is then modified, in order to create proximity and an invisible interface. The enamelled copper wires that the sculptures are made from reference digital aesthetics and have, at the same time, a function of connectivity (to the circuit) and conductivity (with the body) - inviting both the hand and mind to interact and play. In this connection Arn's comment about media is also relevant:

> Since this increasing medial composedness in the form of radio waves, computer interfaces and everyday applications remains predominantly transparent or invisible and thus goes unnoticed, many of these artistic projects set to work on making these transparencies visible or discernible. (2007: n/p)

Artists who create artworks using the immaterial as a material, in my view, create an important tactile and kinetic experience of the technology. *Catch Me Now* and *Tracking You* made surveillance technologies "visible". In the encounter with *Tracking You* audiences are not distant observers but active participants, and noisy play, freedom and movement replace soundless, invisible surveillance technology. In *The Big Swim* the audience was immersed into the interactive system. This sculptural approach to interactive art means the immaterial can become material, visibly and physically.

Fig. 75 *Echidna, Tracking You, Catch Me Now and The Big Swim*

In considering technology as a sculptural material I draw on the tradition of the Japanese Automata, which employ a similar methodology. These historical Japanese robotic dolls, *Karakuri ningyo,* are 'mechanical devices to tease, trick, or take a person by surprise'. Central to the Karakuri philosophy is that the technology is hidden and that it is combined with an art aesthetic, which aims to 'evoke feelings and emotion' (Boyle 2008: 1). This is similar to the emotional connection we have to materials and animated objects. What is notable about the methodology of automata is the concept of technology entwined with art and how this thinking possibly fuels today's creative and artistic experimentation with technology in Japan. A similar approach is found in my artwork and is also described by Scott Snibbe as:

> It's not at all about new technology. It's about a way to emotionally and socially engage people to participate in a work of art or a science exhibit (2009a: 42).

Fig. 76 Japanese Automata, *Chahakobi Ningyo* (Tea Serving Doll), by SHOBEI Tamaya IX, with *Aibo,* by Sony

Materials as an invitation to play

By animating technology artists can insert play into galleries and into our increasingly technology-driven public surroundings. Playful animalism and sculptural interfaces can propel us out of our passive detachment to our surroundings and bridge the gap between doing and looking. Materials and computers (or pervasive media) are 'much like chattering animals in a living jungle, sometimes exchanging detailed information, sometimes just noting who's around', calling us to action (Gold, 1993: 1). We know that play signals are an invitation as well as the metacommunication that "this is play". In a sculptural view the agency of materials is the "wink" that propels us into play, just as most dogs will recognise the classic 'play bow' from the animal world and take off in a wild gambol together (Burghardt, 2005; Fagen, 1981). Humans similarly have ways of physically sending invitations to play, a look on a face, a joke, a pun. In the context of my research question the artwork's material properties and the affordance becomes a play signal – it is a sculptural invitation to play. Using this gambit of making - to deliberately use certain materials and by animating technology - artists can entice audiences into playful interaction. Crucially, this strategy of play also creates the opening into the interactive artwork that the audience need - the playful sculptural invitation makes it easier for the audience to approach the artwork (to read it) and people are less restrained and more open to the invitation to interact and participate. I believe that this sculptural approach to interactive art can lead to new knowledge about how artists can create interactivity. It allows us to move away from the traditional immaterial approach to technology within interactive art which, in turn, enables us to focus on the art and what it does, instead of on the technology.

Don't just stand there (DJST)

In my research into material agency I discovered that my sculptural approach to interaction meant that the body was invited into play. I found that these modes of interaction became crucial in my thinking of how I, as an artist, can activate the audience into playful interaction. The playful interactive artworks presented in the catalogue became an exploration into creating playful interactive experiences through the involvement of the body and includes gestures, touching and moving. These kinetic interactions are a distinct mode of interaction, where the body is activated into play such as, gambolling, jumping, dancing and running; what, in turn, and central to the context of this thesis, a play anthropologist such as Bateson would read as play behaviour. Indeed, movement is the most primal element and is found in all forms of play (Brown, 2010: 84). For example, *Catch Me Now* elicited lots of physical bodily interactions, such as cartwheels, jumping (in light puddles) and games of tag. Games of tag and catch and shooting acts were also played in *Tracking You,* as well as a variety of rough and tumble play, for example, shoulder bumping and play fighting. In *The Big Swim's* ephemeral mist participants swam and the sculptural fog, the pool and the colours all invited the body into play. The installation and the enchanted environment evoked a sensory quality, as well as an eerie and amazing upside down world, where participants connected with their body noticing the lights reflection on their body and immersing themselves into the fog. *Echidna* also encouraged a bodily tactile interaction, squashing, tickling and touching the artwork – one participant even playfully did this with his nose. The scientific principal of an electro-magnetic field which reacts to water makes the human body (around 60% water) the ideal interface and *Echidna's* animated technology employed this effectively. These embodied interactions of the body playing - jumping, running and gambolling are reminiscent of Caillois' play modes of 'paidia' with its implication of:

> happy exuberance which effects an immediate and disordered agitation, an impulsive and easy recreation, but readily carried to excess, whose impromptu and unruly character remains its essential if not unique reason for being. From somersaults to scribbling, from squabble to uproar, perfectly clear illustrations are not lacking of the comparable symptoms of movements, colors, or noises (Caillois 1961: 28)

Physical elements, such as the size of the spotlight in *Catch Me Now,* also influenced the bodily interactions. As described in the catalogue I tested this by using smaller or bigger diameter sized spotlights for the artworks play mode. This, in turn, led the audience into

a physical and intimate interaction, where they explored how many bodies can be immersed in the spotlight. This use of the body as an interface also affects collaborative play, as Sheets-Johnstone writes

> When we learn our bodies and the bodies of others, we learn a common kinetic language, becoming as kinetically attuned to the movements of others as we are kinesthetically attuned to our own (2003: 413).

I address aspects of collaborative play later in the chapter. One of the problems in interactive artwork is that often the audience does not know how they are supposed to behave: should they touch or not? Graham (1999) argues that interactive art often negates people's bodily experience, that audiences are concerned with intimacy and body issues which, for example, arise from other people watching while they interact. Graham's research on whether the audience experience was 'intimidating' indicated that some women felt that their bodies were exposed when interacting 'rather than, for example, finding the high technology itself intimidating' (Graham, 1999: 327). Her findings around self-awareness reflect my observations, in particular, the shyness observed in *Tracking You*, when participants became aware of other people looking at them. Or in *Catch Me Now*, when I exhibited it at the Science Museum and programmed the spotlight to roam in a large play area/ installation space, participants would not run the distance to catch the light. Whilst this could be ascribed to laziness, my impression, from my observation, indicated (particularly with adults) that they felt watched and self-conscious – that the running drew too much attention to them and the continued desire to play, to catch the light, to jump just one more time, was overruled by 'I will wait coolly here, till the light comes back to me'. Rokeby also notes about his work and people's interactions that audiences often have strong resistance to movement in public, he says:

> They still don't think enough about their body, in general. They think more about feeling comfortable or uncomfortable in the space. But at a certain point they might become seduced enough by the experience so they aren't thinking about that anymore, and then they're surprised at what they just finished doing (Rokeby, 1985: 7)

My own observations in *Tracking You* and *Catch Me Now* reflect Rokeby's comment, in that participants would forget to be self-conscious once they were absorbed into the play and interactivity, exclaiming 'I had so much fun, I forgot to be embarrassed'.

I consider physical participation and bodily interaction as the nexus of audience engagement and key gambits for creating playful interaction in the gallery. Play theorists Brown, Panksepp and Fagen all emphasise how movement is a gateway into play -

(Brown, 2012; Panksepp and Biven, 2012). Using the body as an interface has become more possible, or rather accessible, with technological developments such as arduino, sensors, RFIDs, cameras, and tracking technology. These technological developments reflect a shift in contemporary culture, which has moved into an era of participation and interaction. Similarly, our knowledge and use of interactive gestures in everyday life is growing. This was illustrated by people clapping to try and activate *Echidna's* sound, or audiences waving a hand high under *Catch Me Now's* spotlight (as if breaking an invisible beam sensor). These gestures are a reflection of an ever more sensory public environment, where doors sense us coming, where we wave our hands in public bathrooms to turn on the water tap and clap to start music or turn on lights. Gestures here are understood as movement – it is these interactive movements that are transformed into performance and play in the gallery.

Happened upon

In order to invite the body into kinetic play it is useful to implement seamless interfaces. By using an immediate or seamless interface the artwork is "happened upon" and the audience become participants by "wandering" into the work. For instance, in *Catch Me Now,* a webcam sees the exhibition space and the instant a member of the audience steps into the spotlight it opens up and this enticed most people into staying with the work. This is made possible by using interfaces which require no previous skillsets and need little conscious effort to activate, as well as technologies which invite a bodily interface, such as motion or sound sensors and imaging cameras (Polaine, 2005: 4). This frees people and allows them to interact without the barriers of having to read an exhibition sign, as suggested by Costello (2009: 189-191), or having to download a smartphone App to translate a QR code before the artwork is unlocked. "Happened upon" enables the audience to move into the art's embedded meaning of play and the creation of experiences. This strategy of embedding technology is somewhat similar to Mark Weiser's text about ubiquitous computing, where he states that 'the most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it' (1991: 94). Whilst his agenda is different, there is nevertheless a link between the philosophy of pervasive media and my approach to creating playful physical interaction. In the context of my thesis these are technologies which invite a bodily interaction, enabling audiences to become players in the gallery. I return to the notion of the playful body in my conclusion. It is not always possible to create an objectless interface, for instance, in *Tracking You* people needed to

put on a cape. To counteract this potential barrier the capes were deliberately designed to be easy to slip on and one size fitted all. *Tracking You* was not a happen upon artwork, rather, it played on the affordance of capes and tactics of using wearables to draw in the body.

Readable, reliable, robust and simple interfaces

Linked to my research findings of calling the body into action in the gallery are strategies of employing simple, reliable and consistent interfaces. I found that using simple interfaces that match the skills of a general audience creates in them a sense of confidence, which is needed if people are to enter into play. This approach is linked to Csikszentmihalyi's theory of enjoyable experiences, which makes the case that flow takes place when the 'actor's ability to act matches the requirements for action in his environment' (2009b: 45). Once a balance between anxiety (when requirements are outnumbered by the participant's ability) and boredom (too few possibilities for the ability) is achieved, the participant will experience flow and lose awareness of the exterior world.

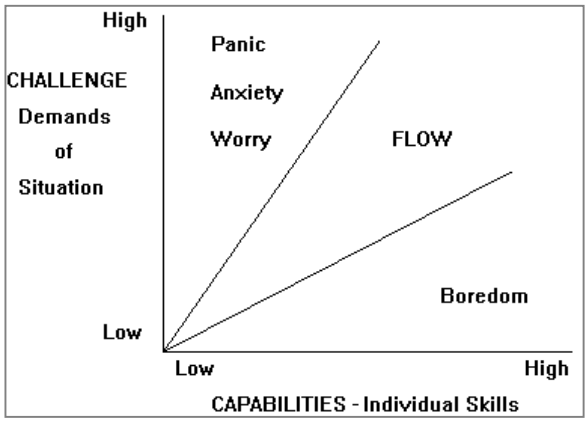


Fig. 77 Csikszentmihalyi's model illustrating the principal of flow

Catch Me Now invites the audience into a simple interface – the work detects audiences wandering into the spotlight roaming on the floor, it then opens up into an encompassing spotlight before zooming off, thereby titillating the audience to pursue it. This, combined with the material invitation of a colourful spotlight, created an irresistible urge in participants to play again and again. I described in the catalogue that I had originally envisioned *Catch Me Now* consisting of a range of complicated audience interactions but, after testing these features during an exhibition, I restricted the possible interactions to a simple and consistent interface, which then proved to generate an abundance of play behaviour. Polaine similarly notes that 'If nobody 'gets' your interface or is intrigued enough to explore it, the battle is lost before it has even begun. Your audience – the interactors – have already moved onto something else' (2010: 91). Simple interfaces can be historically linked to Krueger's work, *Videoplace* (a piece which is a forerunner of

much interactive screen video work today). Andy Cameron writes about *Videoplace* observing that it evokes better user experience 'because it is simpler and more intuitive and demands less initial investment from a potential spectator' (2005: 46). The concept of employing a simple interface is a preference that runs through my practice. This artistic choice, the deliberated designed restrictions, is reflected in the words of Fujihata:

> Beautifully designed restrictions activate the user in front of the system, enable him or her to dance with it. Some of the best-designed interactive art pieces generate a good atmosphere that stimulates and activates their users. If the restriction is not good, then users remain sceptical, uninvolved viewers (2001: 317)

Linked to the tactic of using simple interfaces, was the discovery that the artwork's reaction needs to be reliable and robust, in order to generate play agency. The concept of creating a readable, reliable, and robust (RRR) interface became a key gambit of play in my research. I found, as Krueger also argues, that a good interactive experience is dependent on knowing that the environment is reacting (1991: 17). In my view, it goes without saying that interactive art needs to actually work in order to be interacted with. There are those who believe that the "out of order" sign at interactive exhibitions is a Dadaistic aspect of interactive art and should be read as part of the work, in other words sometimes it works, sometimes it does not. These encounters are seen as part of the digital language - a digital aesthetic of failure, which some media artists seek deliberately. Personally, I find it creates great frustration if my own, or other artists' work, does not want to play with me. In order to create play and trust to interact, as well as to avoid confusion, it is unquestionable that an interactive artwork needs to actually work (mechanically) and that it has a robust interface, as Costello also confirms (2009: 186-187). Similarly, I believe that the artwork and the interface need to be readable in order for the audience to enter into play. *Echidna* was redesigned to ensure that the work was more readable. The circuit board was adjusted in order to stop the sculpture humming when not being touched. In *Tracking You* I also observed that the clapping zone in the middle of the "play space", where sounds generated by running had been established as a play feature, meant that there was a break in the consistency of interaction (this is also connected to sound, as a play interface has no visible or physical location). Often participants simply ignored the clapping zone, or became confused when their sound, created through running, stopped and clapping sounds emerged instead. Related to my finding of creating readable interfaces, I learned that reliable interfaces also avoid the confusion that arises in audiences when the interface is not legible. Audiences, I feel, will always try to work out the interface/artwork and, if there is confusion or the work does

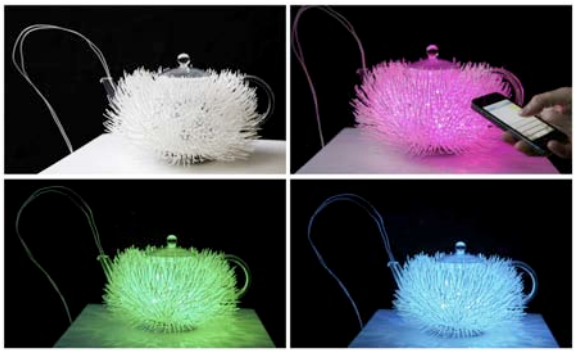
not react consistently it will stop the play exploration, and subsequently prevent them getting to the content of the work – to play! My research builds on Costello's assertion that 'responsiveness and robustness are important, not so much in terms of stimulating a play experience but more in terms of maintaining a play experience' (2009: 184). Adding to her research, I found that reliable and robust interfaces are the "win or lose" moment in interactions – it is the to play, or not to play, moment. If we miss the sweet spot, we become aware of the technological challenge, lose the flow of play and the focus shifts to irritation. It stops play exploration which will lead to play mastery and flow, as I will explain in the next section. Play theory states that play follows exploration; in fact it is 'in exploration individuals extract attributes of and uses for objects and individuals and then use those attributes as bases for play bouts' (Pellegrini et al. 2007: 265).

It is by creating readable, reliable and robust interfaces that match the skills of the general audience, that enables audience members to work things out which, in turn, crucially allows trust to emerge. RRR interfaces provide the audience with the confidence to enter into play. Artists can, I believe, deliberately use these tactics to develop ways to break down the barrier to participation in the gallery – inviting the audience to step over the threshold. This type of making, the call to action, intuitive and simple interfaces and knowing that there is an environment that is reacting reliably and robustly is central to creating agency. By creating a reliable and robust interface I do not mean that the artwork must be simplistic or devoid of magic, "laying bare" the issues and meaning of the artwork. Audiences, I find, will read their own meaning into the work, adding their own intrinsic physical play behaviour and experience creations. These open readings become possible by creating 'open artwork' – a gambit of play described later in the chapter.

Play mastery and ownership

Once the audiences enter into play mode, having experienced "ah ha moments" (understanding) and 'Yea I figured it out' (new knowledge and skills,) they are able to develop a sense of mastery where flow and spontaneity emerge (Eberle, 2009). This sense of mastery is a key research finding which emerged through my practice, where I found that by materialising the audience's physical interactions it enhances their engagement significantly. It creates a sense of victory - a 'Yay, I caught the spotlight' moment. As described earlier, it is pointless (and the moment of victory impossible) if the

audience is not made of aware of their interaction. This sense of "ownership" is reflected in Graham's research when she states that 'the primary pleasure of interactions is that of control, which is why the thwarting of audience control or the realisation of token control is a site of such displeasure' (1997b: 171). Humans and animals both play to learn, play is a method by which to explore the world and it is also how we test the rules that govern the world. For example, during *Tracking You* participants would often develop play mastery by first exploring the capes' individual sounds then enter into full play controlling the sound, or, as seen in the groups of girls playing together, who first worked out who was creating what sound, and then developed a playful "conducting game", or children who learned about the shooting interface and proceeded to count who tagged/shot the most, or who took turns to chase and shoot each other. It is through this playful exploring that the audience learned to play with the artwork, and in doing so, developed their own rewards.



Woman showing her sense of victory, after getting a teapot to change colour by texting it, during *Chi-TEK,* at the V&A Digital weekend. An audience member also commented on the simple interaction that 'it's oddly pleasing'. *LightPot* is not in the catalogue, but the image illustrates my argument of a sense of victory.

Fig. 78 Tine Bech *LightPot*, 2011.

The question of who controls the artwork, the audience or the artist, is a debatable issue. As David Rokeby writes:

> For many people, interaction has come to mean control. People look to interactive technology for empowerment, and such technologies can certainly give the interactor a strong sense of power (1995: 147).

However, it is important to acknowledge that the participants' control over the interactions is often limited. The artist's overriding methodology is to influence the audience's interactions through the material affordance, the programming and the

subject matter. I believe that the artist creates a framework for the interactions as explained in my next section 'open work'. In this reading 'Interaction is about encounter rather than control' (Rokeby, 1995: 148). I found in my research that audience members do not participate with an illusion of power; rather the ambiguous aspect of control is implicit and accepted, even though unspoken. This is the Bateson meta message of play - the audience knows that they are playing. In other words, the playful interaction is what Bateson describes as 'the playful nip denotes the bite, but it does not denote what would be denoted by the bite' (Bateson, 2006: 317).

Rokeby points out that artists 'are looking for ways to give away some of the control over the final actualizations of their works' (1995: 137). This is related to the interactive arts tradition of giving the "control" of the artwork over to the audience in greater degree than perhaps some other art fields. More importantly it is related to notions of co-creation. My practice and research seeks to engage audiences into dialogue - it is through this interaction that experience creations arise. My research presents the proposition that interactive artists construct the frame from which possibilities and meaning arise. In my view, artists are sending "meta signals" through the choice of materials, the technology and the interactive restrictions. I believe, as Fujihata argues, that it is because of the artistic decisions and the positions taken that the artist's vision is revealed and communicated to the audience (Fujihata, 2001: 317). My PhD offers an account of these play "nip, not bite" signals as well as a series of making gambits. Interactive artworks are traditionally enhanced by, and dependent on, audience participation in order to be realised - it naturally follows that audiences will actualise the work in order to develop playful experiences. This play, in my thesis, is often unlocked through artistic material intelligence, kinetic interaction, and creative use of interactive design.

Open work

The invitation of the agency of material, the bodily interface and the readability and reliability of the interface are what allow the audience to gain a sense of play mastery. This, I believe, when combined with the ethos of open artwork, can produce meaningful play interactions. My artworks were created using a sculptural aesthetic but they are also artworks that are realised by participants. Key to this is that my work is concerned with creating playful interactions - these play encounters are not controlled – they are "open". Drawing on Eco's (1962) notion of 'open work' these potential interactions and

participations can be understood in the tradition in which the audience 'complete the work', or, in my case, activate the work. 'Open work' is 'the invitation to *make the work* together with the author' (in my case the artist). However, this open work is not a just a mix of random components, rather, the artist constructs the work (thereby making it a 'work') in such a way that the 'possibility of numerous different personal interventions' arise (Eco, 1962: 37 and 36). I discovered that artworks which are 'open works' enabled the audience to put their personalities into the work and thereby create a deeper, more meaningful, experience. Open work is made possible by various means and creative qualities in my practice. For example, as described in the evaluation of *Catch Me Now*, the work did not facilitate a narrative play, or take the player through interactive levels, rather, the work was open-ended, allowing the audience to play and add their own style of play to the artwork. *Tracking You* was also open artwork using material sculptural aesthetics, restrictions and interactive elements that aimed to create collaborative play. The work also echoed Hélio Oiticica's work which, in the words of Bishop, was:

> as open-ended objects that did not enforce a particular reading or response, and as situations that permitted the participant to realise their own creative potential through a direct engagement with the world (2005: 64).

The Big Swim demonstrated a simple open artwork – a big transformed swimming pool, open to play and immersion. It is this open and simple interface that is the 'true interface, the open invitation to play' as Pesce writes (1996: 4). This making gambit of employing an ethos of open work, I found, "opened" the artwork up to agency and the audience starts to develop their own intrinsic play and games, finding ways of playing with the system or, in the case of *The Big Swim*, immersing themselves into the system. This play, when combined with the body in interaction, I observed, was often exhilarating and chaotic, it is Caillois' paidia of play. Open artworks are, as Sutton-Smith tells us about play 'inherently ambiguous and unpredictable. That is its nature' (2001: 150). In the disorder and excitement of paidia, we play without any restrictions about what is right or wrong.

Rules

In this context I have discovered that some rules or parameters seem to be better than none. Flanagan also notes that:

> Creating play in both games and art springs from rule making at a fundamental level, even open play scenarios like role-playing, require rule making at some level. (2009: 253).

Play and rules are naturally entwined, as demonstrated in *The Big Swim.* It is the convergence between the anarchy of paidia and the more rule bound ludus (Caillois 1961). People are inherently playful and curious, and, once they have accepted the invitation to engage, they will try to deduce the rules and limits of the installation - they will want to play with the system. Rules can also elicit secret play - breaking the rules is part of the attributes of play (Eberle, 2009). This was observed in *The Big Swim,* where participants played with the restrictions and rules of the swimming pool. Other secret play can also be observed in museums, when visitors ignore instructions and take photos and make pretend poses with art, while hiding from overzealous invigilators. Or, as in Eliasson's work, *The Weather Project* (described on page 48), where the audience's drive to play and to create their own experience overruled the artist's intention. Sutton-Smith describes this "playing with the rules" as the trickster 'who is breaking the rule is being ruled by some other rules of play' (2001: 150). The same was illustrated by the woman playing with *Echidna* and the conventional behaviour in a gallery, what Sutton-Smith would define as the 'playful would be that which plays with the frames of play' (2001: 148). The rule breaker, the trickster, is also a common artistic practice and Fuch's 'ludic interface' is derived from the 'attitude of the trickster' where the artist deliberately neglects the rules (Fuch, 2010: 56). These tactics break the 'art circle's magic' (revealing the inherent rules of what defines art), however, this does not constitute a departure from Zimmerman and Salen's magic circle because it is exactly through the artist's activity that meaning arises. In the words of Fuch it is the 'playful mode of trespassing the rules that reinitiates the magic circle in the very moment it seems to have broken into pieces' (2010: 57). My making tactics of rules includes both playing with our social conventions (acceptable behaviour in the gallery/in the pool) as well as employing 'beautifully designed restrictions', some of which are necessitated by the affordance of the technology and the software's limits and failure (Fujihata, 2001: 317).

HCI versus open artworks

Some of my gambits of play, such as my notion of readability and reliability are also features of HCI. However, one of the differences between HCI and interactive art is the art world's strong tradition of Eco's 'open work', where the artwork is open to interpretation, made possible by the interactivity. Stephen Boyd Davis offers insight into the different approaches between HCI and visual art (2005). Davis sees the art world's strong tradition of open work, where artists create open outcomes, as an unwillingness to help the audience to understand the artwork. HCI, on the other hand, aims to create a

clear feedback loop all the way through the users' experience. Davis argues that artists' unwillingness to explain their work originates from the avant-garde, when artists started to become deliberately subversive. In this view the artist's approach, of creating experiences that are open to interpretation, clashes with the classic concept in HCI of clearly defined goals using visual representation and feedback loops. What is considered as a mistake by HCI would, in the art world, depend on the artist's intention. I believe that, other than the two worlds' apparent methodological differences, artists are willing (and able) to incorporate "mistakes" and randomness as part of the creative solution and let soft/hardware failure/limits and affordance become part of the design. For example, Blast Theory's *Can You See Me Now?* (2001) is a game of chase between runners on the street and virtual participants online and was designed to use seams, GPS shadows (areas where GPS does not cover/reach). Online participants are virtually dropped in locations around a city and the runners use their mobile devices to track and chase them in the real world. The people hiding would know and use this technical GPS flaw. The same material approach, of using the affordance and the limit of technology, was adapted in *Catch Me Now*, as described in the catalogue. Viewing the issue from a theory perspective, it is possible to link artists' strategies of open work and the acceptances of "mistakes" to Sutton-Smith's (2001) descriptions of play as quirkiness, redundancy and flexibility, to that of the artist's vocabulary of using mistakes and the unexpected.

Creating collaborative and singular play

One of the challenges I encountered in my research was how to create artworks that worked well in both individual and group situations. I, as an artist, find that interactive art is often designed (or only works well) with one person interacting at a time, as Graham also confirms:

> If an artist is to play 'host' with a participative artwork, then some parties are small intimate affairs, whilst some are merrier with more. Many interactive artworks are designed exclusively for one person at a time, which presents a challenge when showing interactive works in conventional gallery settings (1996: 2)

Graham also highlights other issues around both the interactivity and the audience during exhibitions, such as too many people at the same time wanting to experience the work, making it impossible to interact, people waiting in line making others feel hurried, people in the way making others lose patience, or causing them to become annoyed. Flanagan points out in her 'critical play' research that in the making process 'there tends to be a gap between what was intended and what was actually created' (2009: 258). My

research contributes to these concerns and explores the development of playful interfaces which encourage multiple players and diverse audiences.

Tracking You was therefore designed to become collaborative through several deliberate designs, for example, the shoot and tag other participants interface, which proved very successful and the clapping sounds, which proved less successful. The five capes presented a clear visual (material) signal to encourage group play. However, the work was also designed to be played with by single participants, for example, the legible acceleration of speed to create different sounds worked well. In one case a woman tried all five capes, exploring each soundscape. *Tracking You* demonstrated how, by simply being aware of the issue, it is possible to create interfaces which can be played with alone or in groups. In fact, *Tracking You* proved to work better with more participants interacting, made evident in situations where people would stop their solo play, leave and then return with friends to play again. *Catch Me Now* resulted in an equal number of single and group play scenarios. Audiences would play on their own, but often games of tag developed, or people would steal the light from each other, or perform for their friends and the audience standing on the sideline. As described earlier, I also experimented with the physical size (diameter of the open spotlight), making it bigger as a method for encouraging more participants to chase the light together. The prism, for example, was triggered after seven consecutive activations of the spotlight and thereby enabled more participants to perform at the same time. Another way people played together involved turn taking, this was observed with both *Echidna* and *Catch Me Now*. Often, in situations where the audience takes turns, the people waiting (watching) will often learn what the interface is (how to interact) from the sidelines. This in turn means they will enter into full play mode immediately (skipping the discovery stage) and play exuberantly, or they would simply quickly test what they had observed and then leave. Other group related play occurred when participants played jokes on each other, such as the woman “shooting” her partner just as they were leaving the *Tracking You* installation space. Finally, another form of social collaborative play which I frequently observed, occurred when participants developed play scenes whilst taking photos, which I saw as a form of performance play in which audience members pose for friends and for the camera. My observations showed that the more relaxed and excited people became, the more photos they took and, in many cases, another bout of play erupted and participants then engaged in new play rounds.

Becoming critically aware of the making process - the artistic intention and play values embedded into the practice, can reshape the artists' approach to creating interactivity and play. As Flanagan points out it is by becoming aware of 'design methodologies' that artists can include key values and human concerns to 'become a fundamental part of the process' (2009: 251 and 257). Making interactive art is much like planning a social event. Artists need to know how people might behave (act/play/perform) so that we, in the words of Krueger, can 'anticipate the participant's possible reactions and compose different relationships for each alternative' (1991: xiii). Graham suggests that the role of the interactive artist is similar to that of a 'party host', using the metaphor for 'a role that may control the guests (tightly) or supply only the necessary social lubricants' (1999: 327). All the artworks in the catalogue clearly encouraged dialogue between audience members (including those who did not already know each other) and identified the artist as a 'skilful host', enabling strangers to talk together, not only about how the artwork functioned, but also in playing together, very much what happens at a successful dinner party. In summary, increased awareness is a powerful gambit of play, which can create meaningful interaction.

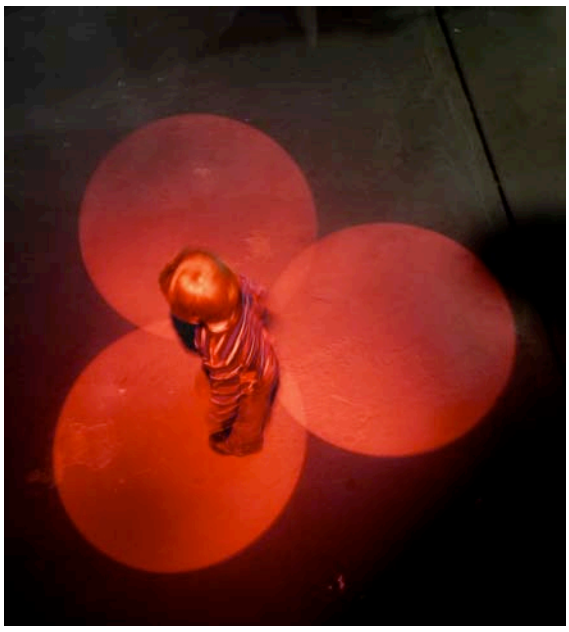


Fig. 79 *Catch Me Now* prism light
Fig. 80 Audience playing and posing as heroes in front of the camera

Creating play for adults

Both adults and children alike recognise an invitation to play almost instinctively, but there is no doubt that children get it faster, or rather, act on it faster. During my observation of *Catch Me Now* and *Tracking You* I found that adults played more

hesitantly and, if children played, then adults played more cautiously. Adults would step back, accepting what seems to be an unspoken rule of "children play first", or they would interpret the work as "for children only". At other times it was simply a matter of children playing so enthusiastically that there was no room for adults to participate, even when they wanted to. I observed this at *Bath Illuminate* when an audience member tweeted 'move over children' or in *Tracking You* where waves of children playing would take over the installation for a while. There is no doubt that when people get older they often play more reluctantly (particularly amongst strangers). Free impromptu play becomes less frequent and play tends to become more organised, controlled and self-disciplined for example football, chess, or performance play, such as amateur theatre or even historical re-enactments. Schechner (2006) also notes the fact that children's play is more free and explorative and they spend more time playing. Adults often have to organise their work so they can play. An obvious reason why adults play less is that they have more responsibilities and have busy lives. Another argument comes from play theory and is connected to the function of play, which states that as we get older we will have less need to acquire adaptive skills. There may be many more reasons why adults play less but they lie outside the focus of my research. What is of interest is to ask whether artists can create invitations to play which both adults and children will act on.

Examining this question, I found that there is a strong cultural separation between adult and children's play that I believe is derived from the rhetoric of 'play as progress' which shows an exaggerated dichotomy between adult and children's play (Sutton-Smith, 1995). In this view children's play is seen as a 'transfer to some other kinds of progress that are not in themselves forms of play', in other words, children's play is the acquisition of skills to be used later in life and adults play is leisure (Sutton-Smith 1995, 1997)[3]. This rhetoric of play as progress, I believe, leads to the notion that (in general) children) have society's permission to play, whereas most adults feel constrained in playing freely. My key point here is not that the position of 'play as progress' is flawed - it is not – but that the exaggerated rhetoric between children and adults perpetuates the belief that:

> …play is seen largely as what children do but not what adults do; why children play but adults only recreate; why play is said to be important for children's growth but is merely a diversion for adults (Sutton-Smith, 2001: 7).

What is missed are the similarities between adult and child play - this was certainly the case in my observations of the play behaviour that took place during my exhibitions[4]. A related cultural assumption to play's rhetoric of progress, which potentially hinders easy

adult playful interaction in the gallery, is how the playful is perceived as not serious, as established in the background to the research. Adults are not playful; they participate in organised games and leisure. This belief system can also be linked to the dualistic work versus play assumption, as Sutton-Smith describes it:

> At the same time, there is also a modern tendency to idealize the playful, but to say that the more routine forms of games, sports, recreations, entertainments are only play. The duality of play and the playful tends, in these cases, to be assimilated by the duality of work and play, the adult and the child, the serious and the nonserious, the heavy and the light, the corrupted and the innocent (Sutton Smith, 2001: 147).

Whilst the rhetoric of play as progress explains why adults in the gallery step back and let children play, it does not provide strategies for artist makers to overcome the issue. It does, however, provide insight and empower the making process from which I was able to develop some making tactics. After discovering that adults would play if other adults played, I relied on tactics of imitation and at times I would deliberately break the wave of children playing by suggesting/telling adults that they could play. At other times I became the demonstrator, facilitating the invitation to play by playing myself. Gallery invigilators could potentially also do this (just as many of the staff did at both The Science Museum and The V&A). Another issue to bear in mind is that to play, people need to feel relatively safe. To ensure that audiences accept the invitation to play - the call to action in the gallery, artists need to draw on materials agency and make readable and reliable interfaces which enable play mastery. This is particularly important when creating a physical, bodily interface where audiences have to overcome body issues, as well as the cultural barriers outlined above. Once a sense of mastery arises trust develops and play agency of all kinds emerges – because, just as theory argues, the basis of human interaction and trust is often established through play signals.

Summary

The Gambits of Play developed forms a substantial making model for how I, as an artist, can create conditions and possibilities for playful interaction in and around interactive artworks. The gambits outlined are a series of tactics – a strategy to create playful interactive artworks. Summarised briefly they are a sculptural approach to interactivity, where materials are an invitation to play (The agency of materials), which enables a bodily playful participation (Don't just stand there, DJST), and where a reliable simple interface (Robust, Readable & Reliable) lead to play mastery and agency (Play mastery and taking ownership), from which the emergence of the audience's agency and play behaviour and

personalities was made possible (Open work), and finally I discovered issues around creating collaborative and singular play above. A table of these Gambits of Play linked to practice catalogued is included in the appendix (also see below illustration of the model). In addition to the table of gambits I included a table of the play vocabulary collated from my observations.

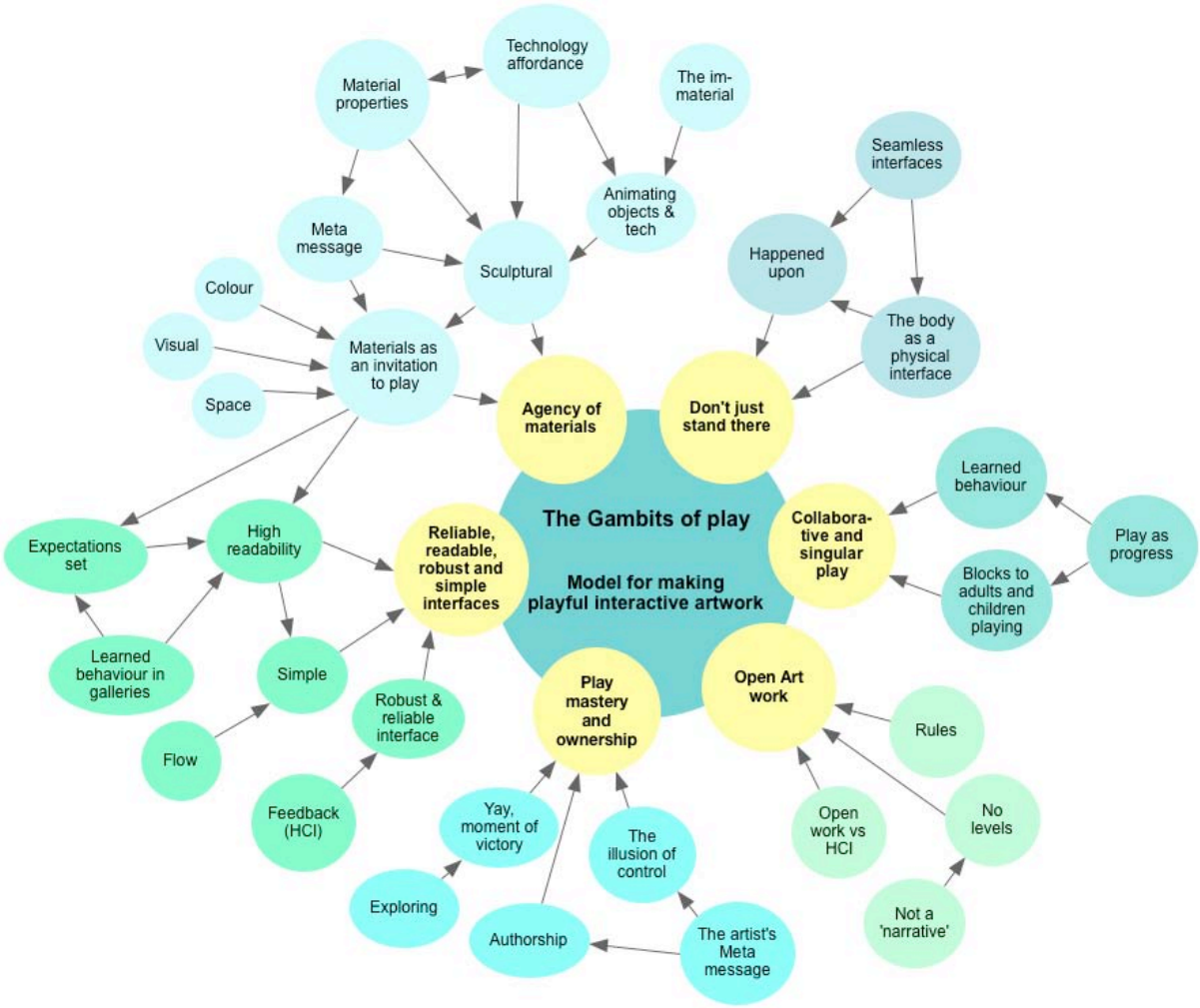


Fig. 81 Visual illustration of the different elements and tactics that form the Gambits of Play – a model for creating playful interactions.

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[1] Armitage's original text is: 'to invent a product, we need to design, and to design, we need to explore the material. It's as simple as that' (2011: 2).

[2] This can also be understood in the context of emotional design. Emotional design is a term first coined by Donald Norman who described how emotions have a crucial role in the human ability to understand the world and how people learn new things. For example, aesthetically pleasing

objects appear to the user to be more effective, by virtue of their sensual appeal. This is due to the affinity the user feels for an object that appeals to them, due to the formation of an emotional connection with the object.

Another similar approach is Kansei Engineering - an emotional, or affective, engineering. Kansei are the instantaneous feelings and emotions that we experience when we interact with things such as products and services. It was developed in the early 1970s, in Japan, and is now widely spread among Japanese companies. In the middle of the 1990s, the method reached the United States, but cultural differences may have prevented the method unfolding its whole potential.

3 Sutton-Smith suggests that part of the 'play as progress' rhetoric stems from the enlightenment view that humans are receptive to science (rationality) and consequently to progress ('progress is inevitable'). In this belief system play is children's work – children represent future progress and, therefore, play must be important to adaptation. What we fail to see in this exaggerated separation of child-adult play is 'a hypocrisy in denying our own adult play's irrationality through constantly studying only the rationality of child play' (1995: 279 and 280).

4 The similarities between adult and child play is also noted by Sutton-Smith who suggests that there is really no difference between a child playing tag and professional football (I assume he means American football). We ignore this similarity in order to sustain the rhetoric of progress and so 'put children's' play on a pedestal' (Sutton-Smith, 1995: 280). This does not mean that children and adults do not play differently, they do, as Pellegrini et al. note: 'play is observed primarily during the juvenile period in forms that are qualitatively different from seemingly similar adult behaviours' (2007: 262). For instance, children often act out adult roles and behaviour in their play. Physical play (rough and tumble and social play) is also more dominant in children. However, what is worth noting is that there is less literature about adult play than that of children (Pellegrini et al, 2007). This, in my context, also makes it difficult to form a critical analysis, or to find strategies for creating artwork, that elicits both adult and children's play.

CONCLUSION
AN INVITATION TO PLAY

Play is the swing of the rhythm in music, the bounce in the ball, the dance that delivers us from the lockstep march of life. It is the "meaningless" moment that makes the day memorable and worthwhile (Brown. 2010: 45).

A model for playful interaction and affective audience engagement

The model outlined in the analysis contributes to the ever-emergent vocabulary of interactive experiences, taking place between audience and artwork within the visual arts. This interactive vocabulary was informed by play theory and focused on play to engage audiences, exploring how participants are becoming active elements in the artist's palette. Developing from previous research by Costello, Polaine, Rokeby and Graham, as well as through my own practice, I devised a model which contains a series of tangible making gambits for evoking playful behaviour in and around interactive artworks. These making parameters propose an alternative way to think about the role of play within interactive art and centres on six key making strategies which are summarised below. The model originated from my research aim to develop my arts practice. However, the model, which emerged from my practised-based research and analysis, offers a conceptual framework for interactive art, which will be valuable for future interactive artists, as well as other fields concerned with creative experimentation, play, interaction and experience creations/designs.

1. In answer to my research question concerning how the properties and affordances of materials and technologies foster play and interactions? I suggest that the agency of materials is a call to action in the gallery. By employing a sculptural approach to interactive art, using the visual arts tradition of working with the properties of material, together with the affordances of technology (their meta messages of play), audiences are invited into playful interactions. In other words materials are play signals – it is a sculptural invitation to play. I propose that to focus on materials' affordance, rather

than only on interactive systems, is a useful and innovative way to look at media art, which provides new knowledge and additional ways to create interactivity to the existing making traditions of the interactive arts. I argue that by understanding technology as a sculptural and embodied material we can move the focus from the technology, to what the art does and says. In this view, technology is a material to socially and emotionally engage people – to invite them to interact. This in turn confirmed my view that interactivity is not about the newness of, or about our relation to technology. Ever since Duchamp artists have used everyday materials and, in today's interactive, automated sensor and gesture based modality, technology is part of the materiality of visual art. Artists are conductors of new thinking, utilising technology to create new ways of experiencing art. My practice presents an aesthetic in which sculpture merges with the digital language of technology to create sculptural interaction. This call to action, using materials affordances (including technology), draws on our deep drive to play and our innate ability to recognise an invitation to play.

2. Exploring my second research question, which addresses how artists can conceptualise physical participation and play in interactive artworks, I suggest that the use of the body - in the form of gestures, touching and moving - as the site of interaction, can bridge the gap between looking and doing. By using the body as an interface the audience can more easily interact. The physical participation emerged in various stages in my artwork: the hand touching in Echidna, the whole body participating in *Catch Me Now,* the body immersed in *The Big Swim* and "on the body"- wearables in *Tracking You*. These interactions represent different ways of participating and are an elective engagement. This also reflects a world where technologies increasingly facilitate participatory interactions. I learned how I could call upon the body to interact by using wearables and seamless interfaces (such as webcams). I investigated what might be the barriers that stop us entering into physical play and found, as also highlighted by Graham and Rokeby, how people at times find their bodies exposed, which makes them feel uncomfortable when interacting in the gallery, or how participants can be too shy to interact. I found that it is by moving that we enter into play. This key gambit of play for creating playful interaction in the gallery is reflected in play theory where Brown, Panksepp and Fagen all highlight how movement is a gateway into play. My artworks extended an invitation to play and provided pathways for the audience to physically participate. The play incited was physical often reminiscent of Caillois' ilinx; people danced and

performed, bumped and jumped, demonstrating play from rough and tumble to playful grace – this is the playful body (I describe the playful body further later in the conclusion). When we play and flow emerges, audiences forgot themselves and engaged fully. This is evident from the play vocabulary table included in the appendix, which illustrates (among other things), how audiences stayed longer than anticipated, or ended up engaging with strangers. The physical play was social and opened up ways to connect with other people and our immediate environment. I return to connecting through playing later in the conclusion in "playing well".

3. Resolving both research questions above, I argue that interactive artwork must be readable to initiate the call to action. This legibility also indicates to the audience what behaviours they may choose to engage in (for instance wearing a cape signals running). Crucially, I believe that interfaces should be reliable and robust in order for flow to emerge and for the audience to gain a sense of mastery, a key element that leads to play agency. Adding to Costello's (2009) and Polaine's (2005, 2010) research, I have found that the artworks quality of consistency of playability and interactivity is a key "win or lose the audience" moment where the participants engage, trust develops and continued play behaviour arises. As described in depth in the analysis and catalogue, I consistently found that a reliable interface enables exploration and flow, aiding the audience to go beyond "working out" the interface (how the interactivity works) and enter into play agency and appreciation of the artwork.
4. I also discovered, exploring research question one and two that the artwork's interface needs to be simple and open-ended, with basic rules. These rules included both social conventions as well as technological interfaces. This, in turn, enabled participants to invent their own games and interactions around the artwork, allowing them to reflect their own personality into the experience of the artwork. This provides depth to a simple interface, which becomes multifaceted and meaningful. I suggest that the approach of making open artwork, as defined in the analysis, enables an important balance between the artist's aesthetic (design) which include the control of the interactions and the audience's unpredictable play behaviour, thereby creating a range of possible outcomes. Open artwork gambit allows the audience to improvise, to invent something that feels new and the emergence of their authentic play self. This artistic framework when combined with the ethos of open artwork allows the emergence of meaningful play interactions.
5. Finally, in exploring my first and second research questions, I propose ways to create play opportunities for both single and group interactions, arguing that

interactive artists at times forget to take into account what may happen when different numbers of people participate with the artwork. I suggest that by becoming aware of this issue artists can anticipate the audience's reactions, as Krueger suggests and can utilize Graham's notion of the party host. In addition, I reflect on the difficulties I encountered when engaging adults into play within interactive art and raise issues concerning creating artworks where both adults and children will play and interact. The model outlines my insights into the play affordances and cues that entice individuals or groups into play. I posited that our cultural belief in 'play as progress' makes it particularly difficult to design play gambits which will allow adults to play when children are already playing. A possible strategy to overcome this is to employ imitation – using people's learnt behaviour of doing what others do in the gallery - adults are playing, therefore I can play too. The fact remains that children often need no sculptural (or formal) invitation to play, they do not hesitate to accept the call to play, whereas adults are more often reluctant. In my model an invitation to play in which material agency is the call to action, creates intrigue in the audience by using tactile curiosity and the attraction of materials; the reliable and legible interface then encourages play exploration and gives a sense of pleasure when figuring things out; this leads to the development of skill and play mastery; open work empowers participants to develop meaningful agency which, in turn, results in 'playful grace' (Eberle 2009). In this context it is possible to view my model conceptually in terms of Eberle's play stages, which describes the play experience as a process where 'Anticipation leads to, Surprise gives rise to, Pleasure enlarges, Understanding builds, Strength contributes to, Poise enables, Anticipation' (Eberle, 2009: 5.41 min).

6. In answer to my third and final research question, which asks what kind of play takes place in and around interactive artworks, I describe the playful behaviour observed during exhibitions of the artworks produced in the catalogue in detail. This play vocabulary demonstrates the audience's many tactile explorations, the emergence of social and learned play behaviour, the performance play evidenced, the trickster's playing with the rules, as well as the abundance of gambolling, playing games of catch, tagging, doing rough and tumble play, running and jumping, and propelling the body into new ways of interacting in the gallery. The play vocabulary recorded offers insight into the audience's play behaviour in and around interactive art and advances the connection between play theory and interactive arts practices. The vocabulary of play also lists the links to play theory, as iterated throughout the thesis (see appendix). The audience's playful interactions – which, with their reminiscence of Caillois' play

mode ‘paidia’ often made me smile during my observations, illustrated the undeniable contagious (and joyful) nature of play – which informed my model of making and became part of the making process. This latter finding also highlighted the need for interactive artists to include observation in the environment (gallery) as part of their methodology, allowing plenty of “live” testing with audiences as a critical element in the making process. In relation to this, my iterative making process contributes to practice-based methodology’s emergent, cyclical and reflective nature by developing a rigorous process of making, testing together with audiences, artist observations (watching what the audience actually do, in order to test and then adjust my artistic intention) and remaking.

The model for creating playful interactive artworks, summarised above (and outlined in the analysis), arose from my established art practice of sculpture and knowledge of playful materials including interactive technology and my interest in audience engagement - has, in conjunction with my research questions and theoretical insight into play theory produced answers to my research inquiry. The research offers a framework of terms, concepts and modes of attention that will be valuable to other artists. It must be noted, as also touched on in the introduction, that I do not argue that other artists can reproduce the same results. My artworks are examples of knowledge and the methodology of the research does not contend that the artworks can be replicated. The strategies devised in the model are individual gambits of making, which can be applied in different ways – they can be used by artists to further their own practice, but they will inevitably produce different results. It is important to acknowledge that the model presented is not a comprehensive A to Z instrument to create prescribed play behaviour. In fact, playfulness and play behaviours are inherently unpredictable - this is the ambiguous nature of play (Sutton-Smith, 2001). As Costello (2009) also argues, it is only by rejecting the notion that it is possible to create a recipe to elicit particular play behaviours that it is possible to develop strategies for creating playful interactions. Additionally, it is also important to recognise that the artworks described in the catalogue favour creating physical and sensory participation which generates play behaviour such as gambolling, running and jumping, excitement, rough and tumble play, tactile interaction, risk taking, immersion and performance play. The play initiated through my PhD practice was often akin to Caillois’ (2006) definition of ‘ilinx’ in its physical excitement and his category of ‘mimicry’, covering play acting/performing and fantasy, but also the competitive ‘agôn’, with its rules, such as tagging games and rule breaking.

The model does not encompass all types of play and I contend that the range of making parameters suggested does not resolve all issues around creating playful interactions. Not all playful artworks will focus on physical playful interaction - playful interfaces can also be about fantasy and imagination. Play represents a wide field of different experiences and this thesis has focused on only a small area. Furthermore, I recognise that there are many artists whose interactive aesthetic revolves around a different subject matter than play and that there are many different types of engagement that can motivate participation, exchange and reciprocity between the artwork and the audience. Finally, I should point out that my research did not explore the reasons why people did not play. I explored how to create play as well as the barriers to playful interaction in the gallery and, consequently, my methodology was that of an iterative making process. My approach did not include interviewing audiences in order to find out why they did not play, rather the perspective was that of the artist/maker, informed by observations of audiences.

My research has produced a series of playful interactive artworks, recorded a vocabulary of playful audience behaviour through observation and has provided a tangible model for making playful interactive artworks. In addition to this, it has also contributed to knowledge by discovering valuable insights into: 1] the playful body, how we interact through the body which leads to playful gestures and kinetic performances 2] the artists as the creators of experiences, developing new ways of experiencing art 3] and finally, a tentative quality of "playing well" and how we connect through play. I end my thesis by describing these three qualities.

The playful body

Physical playfulness in the context of interactive art is more than 'hey, let's play', it is instead an exploration into visceral experiences - knowing the world through other modalities than the dominant visual media of our contemporary existence. This thesis proposes the body and the creation of playful experiences as a particular mode of interaction. The play vocabulary that emerged was often a physical participation, where the body is the site for play - screaming for fun when touching *Echidna,* jumping in light puddles, doing cartwheels and 'ta daa, look at me!' performance play in *Catch Me Now*, playing hide and seek in the fog in *The Big Swim* and tagging friends, dancing and gambolling in *Tracking You.* In this modality the body was called upon to do things which

would not generally be done in a gallery setting. I argue that the playful body is what Caillois describes as ‘spontaneous manifestation of the play instinct’ (1961: 28). This new mode of interaction draws in the body and all its senses to play and kinetically interact. However, this is more than just physical participation, as explained by Huizinga:

> Play is more than a mere physiological phenomenon or a psychological reflex. It goes beyond the confines of purely physical or purely biological activity. It is a *significant* function - that is to say, there is some sense to it. In play there is something "at play" which transcends the immediate needs of life and imparts meaning to the action. All play means something (1950: 1).

It is through the playful body that we structure our understanding of the world - ‘we *think* in motion’ (Brown, 2010: 84). In the context of interactive art, Fujihata also points out that ‘to know is to interact’ (2001: 319). In embodied interactive art the perceiving body is the primary material and reference with which we try to make sense of our existence. Movement is more than a motor habit. It is not just the 'what of the movement’ for example to lift a leg and bend the knee, it is also the 'how of the movement i.e. the qualitative nature of the lift’ that is the playful body, or the dancing body in motion, as Sheets-Johnstone describes (2005: 9) The playful body’s aesthetics move through the player and, just like the metacommunication of animals in play (and mating), these 'kinetic dynamics are semantically self-sufficient: no verbal forms assist in these meanings' (2005: 7). Returning to the perspective of “play as function”, movement is, in this context, woven deeply into play and these 'qualitative kinetics, rhythm, and play enter into and affirm evolutionary continuities’ - this is for Sheets-Johnstone what is part of the ‘pan-culturality of dance' – or, as I argue, part of the playful body (2005: 1). The playful body is in this view what Huizinga points out that ‘culture arises in the form of play, that is played from the very beginning’ because in ‘the twin union of play and culture, play is primary’ (1950: 46).

When we engage in gross motor (big body) play, with its boisterous ways, we smile, we relax and we want to do it again and again, which is an essential characteristic of play. Brown asserts that movement play ‘lights up the brain’ (2010: 84). In fact, moving is an essential part of play and, indeed, if someone cannot play Brown suggests that they should simply move (2010: 84-85). Movement in interactive art by this means becomes the gateway into play. This playful embodied interactivity represents moments where we (the audience) can enter safely into play. It is possible to find many examples of the idealisation of play (including my own), what Sutton-Smith calls the ‘rhetoric of progress’, or Smith describes as a ‘*Culturally cultivated play* society’ (2010: 91). Nevertheless, it is

undeniable that play and, in particular physical play, rewards us with social joy, it 'is the most fun of all, as indicated by the abundant laughter that accompanies such activities' (Panksepp and Biven, 2012: 352-53). Although all forms of play can be rewarding there is no doubt that the obvious euphoria of engaged physical and social play is a state evident even to the untrained eye. Panksepp and Biven argue that the states of positive emotion may be one of the main adaptive functions of play (2012). Panksepp, a Neuroscientist, proves this empirically through animal research. However, it is also possible to argue that we all recognise play and know the reward it brings and the same effect, I posit, was evident in the playful interactions observed in the artworks in the catalogue. We will, if given the invitation, accept a call to engage in physical play with joy and delight. This distinct mode of embodied play holds the possibility for creating new ways of experiencing art.

Artists as experience creators

Playful physical interactions create engagement - they call the audience to action within interactive art. Play is a conversation, but in the context of my artwork, it is more than a physical dialogue. It is interactivity through a sculptural interface where the audience are allowed and encouraged to touch and where physical and immersive participation is invited. Just as Dovey argues about computer games, namely that 'the computer game answers the need for us to be able to play in the mediasphere', so does interactive art answer the need to play in the gallery and cultural spaces (2006: 138). Interactive art is where audiences can participate and express themselves – this "experience creation" becomes part of the fabric of the artwork. There is no doubt that digital developments have provided new functionalities and aesthetic territories for artists to explore – fuelling the ongoing examination of what the art process can be about. These playful interactions are not about our relation to technology, but rather about new ways of experiencing art. In this view technology becomes animated - objects come to life and surveillance technology is used to create artworks. Interactive art reflects a world where technologies increasingly afford participatory interactions and facilitates audiences to create their own experiences. People like physical things to touch, to physically interact. Screen based art and net art, for example, in my view, neglect the deep human need to interact with a material world, to feel the tug of gravity, to dive through a cloud of colour into water, to jump into light puddles. TV monitors and glass screens have no affordance when they are off. On the other hand sculptural interactive artworks offer the possibility for

reshaping the art experience. In activating the playful body in sensory environments, and around sensing objects, interactive art enables us to shift from looking to doing, towards a more visceral experience. This is also illustrated by Snibbe who states:

> Letting you touch it, letting you engage it, letting you experience it. It's so sad that the things in art museums are really meant to open up our souls, but because we put the lockdown on them, it's diminished our capacity in that way. That's why I make interactive art—it is completely open to people to play, to be social (2011: 14).

I argue that the creation of experiences is part of a shift taking place, in which artworks are moving away from the traditional representation of statements, towards artworks which produce experiences and behaviours. Artists working in this mode are changing audience's behaviour as well as the notions of what an art exhibition can be. As Fujihata writes interactivity 'can change the way one experiences art, and it can also change the type of art' (2001: 316). Equally, audiences are embracing interactive and participatory art, as illustrated in the success of Höller's recent exhibition at New Museum (New York, USA), where there was a 30% visitor increase (average 1,700 visitors daily) despite an increased entrance fee, to cover the cost of extra workers to invigilate the crowds (Kennedy, 2011b). Or, as seen at the popular V&A *Digital Weekend* where audience numbers increased from 4,881 in 2010 to 19,204 in 2012 (Papadimitriou, 2010 and 2012). My approach, of creating open playful interactive artwork, is part of a wider change, where a variety of fields are creating culture to be experienced rather than consumed. My artwork presented in the catalogue shows a methodology in which the art produces experiences, moments of encounters and connections. Similarly to what Höller (2011) states, my artworks are a proposition, in that they rely on interaction, but even if not all audience members will interact/play, they are always artworks - artworks that can also be interacted with. They invite visitors to be curious and offer different ways to approach reality – they seek to engage audiences in dialogue and the possibility for play. My artworks do not only refer to feelings of play, exuberance, delight, fear and bewilderment – they allow the audience to be all those things. It is precisely this playful relationship between artwork and audience that is the starting point for the creation of meaning. This relationship establishes a visual and auditory dialogue between the work and the participant, creating a dance between technology, art and audience. It is because of the artwork's interactive objective that it involves audiences in its aesthetic context and opens up new theories and ways of being.

Playing well

I posit that a tentative, but nevertheless powerful and meaningful, quality of "playing well" emerged in my artwork. Playing well happens when the audience becomes intrigued, accepts an invitation to play and enters into interaction without hesitation – it is to be in flow, to become physically immersed and develop play agency with fellow participants and the artwork. Playing well is akin to being alive and present. It is the pleasure of an encounter, or the 'peculiar pleasure of interaction' as Graham calls it, and it is the feeling of exuberance people experience when they enter into physical play with an interactive artwork (1997b: 161). However, it is more than the playful body in action. The audience members are comfortable in their skin, they interact easily and play as themselves, as Brown observes: 'the self that emerges through play is the core, authentic self' (2010: 107). These play personalities are unique, as is beautifully illustrated by the woman who played the trickster, screaming when she touched *Echidna*. Playing well in the context of Winnicott, is the audience being 'able to be creative and to use the whole personality, and it is only in being creative that the individual discovers the self' (971: 54). In the context of my thesis, playing well becomes an "adaptive interactive system" by which participants create meaningful experiences by experiencing themselves anew. Playing well is also Sutton-Smith's notion of 'the aesthetic satisfactions of the play performances' (2001: 11). The pleasure gained by making the right move at the right time is the playful grace in Eberle's wheel of play and was demonstrated in *Tracking You's* dancing and performing play scenes. The reward of play is pleasure, 'we experience it in our body and mind' and 'it drives and anchors play' – in my doctoral artwork *playing well* is the anchor of play (Eberle, 2012: 6.39 min).

Returning to Costello's research: she contends that while play raised the level of audience engagement this was not 'always the "meaningful audience engagement" that was initially hoped for' (2009: 204). I add to her research by arguing that in my research playing well arose from the possibility of play created through the gambits of play - the combination of sculptural, intriguing interfaces, where the artwork reacted consistently and was legible and thus enabled the audience to develop play mastery, to flourish and become fully engaged. It is the sense of victory made possible by opening the artwork up to participation, inviting the audience to interact physically – to play with the system. This sense of playing well does not leave participants feeling cheated, or trying only to discover how the artwork was made, leaving whatever meaning, or artistic intention is

embedded in the art untouched. Playing well is perhaps also the disruption of High Art and the disturbance of the levelheadedness of life (Höller, 1999; Polaine, 2005). Playing well is to scream for fun, as people did when playing with *Echidna* and the joy of running in the gallery, as in *Tracking You*. Höller described the phenomena of Valerio[1] - which is to yell something out loud for fun - embracing the absurdity of life and the ambiguity of play:

> You feel a little better after you've done it, just like after having traveled down a slide. (…) To shout "Valerio" is, of course, desperate and hopeless, but it provides relief from the burden of straightforwardness (Höller, 1999: 102 and 103).

We know from Csikszentmihalyi that when people are in flow they lose their 'self-scrutiny' (1990: 63). This aspect, combined with strategies of open artwork, facilitates play in multiple ways. There is no right or wrong way to play, only to play, or not to play! As a result play holds the ability to capture and ground people, they stop worrying about the outer world (making judgements) and become absorbed in the now. We become present, connected to the environment we are in and to the people we are with.

Connecting

The sense of playing well also arises from how playful interactive art fulfils the deep human need for communication and expression (Shusterman, 2000: 46). Interactive artworks provide a deeply social dimension. Art is not only enjoyed in isolation, in the quiet museum, but in 'groupers' to use Graham's term (1996: 326). Audiences will play in groups even at times when they are not meant to. I propose that it is also through sharing; communicating and playing, that people make the interactivity meaningful. From my observations I found that when audiences play in and around interactive artworks they are often chatty and socialise with friends and even with strangers. The victory and the pleasure of interactivity also result from communication and connectivity that arises in an interface which necessitates physical participation from all. As Sheets-Johnstone points out, it is through the body we become kinetically attuned to others (2003: 413). Graham's (1999, 1997b) metaphor of the artist as a host corresponds to my notion of playing well. When the artist as the 'skilful host' creates conditions for play, people of all ages, friends and strangers, play together and from this a sense of connecting and playing well arises. Play theory has firmly established that play is essential to developing social skills; it informs human's social ability and creates a sense of belonging (Panksepp and Biven, 2012; Brown, 2010; Eberle, 2009). It is through play that people learn to socialise. Flanagan similarly states that play holds the 'ability to empower, build

community and foster collaboration' (2009: 197). This was demonstrated several times, for example when the audiences interacting with *Tracking You,* returned with friends to play together and the audience member who commented, at the Kinetica Art Fair showing *Echidna* and *Catch Me Now* that 'I have been here and I have never talked to so many strangers around art in any other gallery. It makes you social'. Or the participant at *The Big Swim* who said to one of the observers that he felt that 'the atmosphere was relaxed, calm, happy and more chatty than when he usually came'.

Concluding words

When people accept an invitation to engage in playful interaction they invest in the moment - they care. This interface allows participants to find new ways of engaging with people emotionally and socially. Playful sculptural interactions hold the possibility to delight, tease and enchant audiences, to become players in the gallery, bridging the gap between looking and doing. This interaction is not about new technology but about creating art that moves people and allows them to find new ways of engaging, new ways of understanding and new ways of connecting. There are many social limitations in daily life that hold us back, but, once we accept the invitation to play, we engage and our surroundings once again become open to possibilities. Play has the ability to break down social barriers and, as such, it is transformative. After all, as we now know, play is the most pervasive behaviour across human cultures. Playful interaction in and around interactive artworks has the potential to become a meaningful form of interaction. The invitation is there!

I have confidence that my research findings: 1] the iterative method of making, using audience observation, evaluation and changes to improve the artworks playability 2] the conceptual framework for creating (and reflecting on) play in interactive art, 3] the vocabulary of play in and around interactive art 4] as well as the scholarly engagement and approach to various theories of play and interactive art, 5] and finally the additional insights of the playful body, artists as new experiences creators, and "playing well", will be valuable for future interactive artists and others working in fields beyond contemporary interactive art.

[1] Höller's Valerio phenomenon (after which he titled two of his slides) is described here by Höller:

> I showed last year in the Berlin Biennale – it supposedly originated at a rock concert in Italy last summer. It's an interesting example of mass hysteria. A sound technician at the concert disappeared, and someone in the audience, pretending to know his name, shouted "Valerio!". More and more people joined in. It was, apparently, infectious, and it spread beyond the concert hall. All over the city, people were shouting "Valerio! Valerio!" It actually spread from Brindisi to Rimini and other cities. There is something about the sound of this name that makes you want to shout it out loud. You feel a little better after you've done it, just like after having travelled down a slide (1999: 102).

Postscript: Future research

Throughout the research, issues and interesting questions arose which were outside the scope of my thesis and some of these are subjects for possible future research. These thoughts and questions are not fully formed but, rather, a tentative look forward. It is also possible that other researchers may find concepts that are relevant to their research. The PhD process is (as any researcher will attest) challenging at times, but it is also deeply rewarding. My practice has, as a result, become more established and it has matured and grown. The PhD has enhanced my knowledge of audience interaction and my practice's core of sculptural interaction more strongly. The research has made me aware how my practice can propel audiences to participate kinetically – through the playful body. I have also become more informed about my practice's agency of materials and its invitation to play, as well as discovering how it sits comfortably between sculpture, interactive art (and design) and play theory. It is in relation to these issues that possible future research interests arise:

- In my conclusion I describe the concept of "playing well" – this tentative concept is worthy of further exploration. In particular how playing well can be related to meaningful interaction in artworks? This could be carried out alongside a deeper exploration into how play and meaning arise in interactive art?
- Another possibility is the notion of playing well and its relation to the playful body (and meaning) and how it can be employed and explored in research areas such as the meeting between the physical and the digital, for example the 'internet of things'.
- Potential interesting research around Playing well, it is for example to look at playing well in the context of playing in the city, exploring play as a way for people to become more connected to public spaces and the city itself? How will responsive technology changed our public environment? As well as asking, how we interact with our immediate surroundings as they become more malleable? How play can be used to transform cities – The Playable City (smart city). Similarly, it is possible to explore playing well in relation to the development of permanent public interactive artwork, investigating how long responsive technology lasts. Do we keep playing and interacting – is there a "play forever"?
- In a wider context it is also important to explore how play and risk has implications for society. In particular, how the fear of risks suppresses rough and tumble play – an

important aspect of social play. The notion of playing well also leads me to ask if there is a "playing badly"? Is there a dark play, such as cheating or deliberately evoking a dissatisfied feeling and a loss of flow in the audiences, or is playing badly simply not engaging - not playing? Could playful interactive art be created in which rules are broken deliberately as a way of working with 'the peculiar pleasure of interactivity' (Graham, 1997b), invoking Sutton-Smith's (2001) trickster who plays with the rules of the rules. This in return opens up a wider important research into dark play, for example to explore the connection of power and hierarchy, in particular in interactive game art or pervasive media games.

- Similar to the point above, of playing badly and dark play - my preference for using certain playful materials (some with an almost childlike connotation) - opens up an interesting question of examining the play affordance of dark material. What is a dark material? Is there a "dark" playful aesthetic within interactive art?
- Another possible research field is the aesthetic of interactive art - how my sculptural interactivity (sculpture informing digital interactions and the approach to technology) can be turned around, using the aesthetic of the digital to create sculpture. This field is already an emerging area with artists using the digital materials and language to create new aesthetics, for example sculptures made of "digital pixels", or using wire to create sculptures or flat circuit boards to create large maps (relief).
- Lastly, it is worth considering that my representation of play and interactivity has predominantly focused on physical interaction, the playful body, and it may be interesting to explore how the gambits of play presented in the analysis can be used to create different forms of playful interactions. Perhaps other artists who apply my model for making to their own practice can transcend my notion of embodied play and imbue my findings with new meanings.

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APPENDIX I
LIST OF PUBLICATIONS AND EXHIBITIONS ARISING FROM THE RESEARCH

List of exhibitions

Microworld: Arcadia, Curated by Genetic Moo, *Catch Me Now*, Cardiff, Wales, 2013.

Electrohype, *Varnhem square: Catch Me Now*, Malmø, Sweden, 2013.

Cheriton Light Festival, *Catch Me Now*, Kent, UK, 2013.

The 3rd Art and Science International Exhibition and Symposium, *Echidna* (group exhibition) Beijing, China, 2012.

Victoria and Albert Museum, Sackler Centre, *V&A Digital weekend*, *Tracking You* (group exhibition) UK, 2012.

Surrey Light Project, Guildford Castle, *Chromatic Play* (solo exhibition) UK, 2012.

James Hockey and Foyer Galleries, *100 M*, *The Big Swim video* (group exhibition) UK, 2012.

Illuminate Bath 2012, *Catch Me Now* (public art exhibition) London UK, 2012.

Science Museum, *PLAYER*, *Catch Me Now* (group exhibition) London UK, 2011.

Cultural Olympiad, Creative Campus Initiative, *Big Swim* (Olympic Inspire Mark), (solo public art commission) UK, 2011.

Banbury Museum, *Touching Art Touching You*, BlindArt Collection, *Echidna* (group exhibition) UK, 2011.

The Kinetica Art Fair, Ambika P3 Gallery, *Echidna* and *Catch Me Now* (group exhibition) London, UK, 2011.

Victoria and Albert Museum, Sackler Centre*, London Digital Design Festival*, *Catch Me Now* (group exhibition) London, UK, 2010.

Watermans Art Centre, *Unleashed Devices, Catch Me Now* (group exhibition) London, UK, 2010.

SIGGRAPH Art Gallery, *TouchPoint: Haptic Exchange Between Digits, Echidna* (group exhibition) LA, USA, 2010.

List of own publications

Leonardo Electronic Almanac (LEA), Paper: Interactivity, Play and Audience Engagement, Touch and Go, Vol 18, issue 3.

List of research presentations

CAS/CADE 2013, *Codes of Engagement*, Watershed, 2013.

Ravensborne College of Art and Design - Research talk, London UK, 2012.

Pervasive Media Studio, Lunch time talk - Research talk, Bristol, UK, 2012.

The Crafts Council Conference, *Assemble*, - Panel member: *Making and its role in unlocking scientific & technological innovation*, London, UK, 2012.

London College of Fashion - Research talk, UK, 2012.

Bath School of Art and Design, Bath Spa University - Research talk, UK, 2012.

Watermans, *International Festival of Digital Art* - Panel member: *Art, Technology and Participation*, London, UK, 2012.

The House of Commons, The Crafts Council - Panel member: *Art, Craft & Technology in the 21st Century*, London, UK, 2011.

Oxford Brookes University, Research Programme - Research talk, UK, 2011.

Victoria and Albert Museum, Sackler Centre - Artist presentation: *CreateLive*, Digital Festival UK.

SIGGRAPH The 37th International Conference and Exhibition on Computer Graphics and Interactive Technologies - Research presentation at the Studio for Art and Emergent Technologies, LA, USA, 2010.

Victoria and Albert Museum - Artist presentation: *Digital Artist Drop-in programme*, London, UK, 2010.

List of press publications connected to the exhibitions

Metro, Fredag sista chanson försöka fånga ljuset, Malmö, Sweden, 2013.

Tsinghua University Beijing, China, Catalogue: *The 3rd Art and Science International Exhibition and Symposium*, 2012.

Surrey Advertiser, Artist shines light on link between science and theatre, 13 July, 2012.

BBC Surrey Radio, Surrey breakfast with Nick Wallis, 14 July, 2012.

The Bath Chronicle, Bath light festival to banish winter gloom from city centre, by Christopher Hansford, 19 Jan, 2012.

Design Week, *Going Swimmingly,* by Angus Montgomery, 14 July 2011.

Guardian Local, Artist creates Big Swim experience in run up to Olympic Games*,* 15 July, 2011.

WGSN blog: The Big Swim by Tine Bech, 27 July, 2011.

PAGE, Buntes Schwimmen für Olympia*,* by Sabine Danek, 22 July, 2011, Germany.

Creative Boom Magazine, Dive into art and swim through a cloud of light and colour, by Jaselyn Melling, 30 June, 2011, UK.

Swimming Times, 'Big Swim' part of the Cultural Olympiad, Vol LXXXVIII, Issue 9, September, 2011.

New Scientist, Expect the unexpected at Kinetica Art Fair 2011, 4 February, UK.

Arts Professional, Collaboration is a good thing, by Phoebe Gardiner, Issue 223, 28th February, 2011.

Vision, Getting Creative, Issues January-June, 2011.

Weave, (interactive design, konzeption & development journal), Berührend, Oct/Nov Issue, Germany, 2010.

AN Magazine, Curating new technologies by Charlotte Frost, October Issue, 2010.

Leonardo Journal, SIGGRAPH 2010 Art Papers and TouchPoint Art Gallery, Vol 43, Issue 4, USA, 2010.

Kinetica Art Fair 2010, Catalogue, 2010.

Watermans Catalogue, Unleashed devices, by Irini Papadimitriou and Tint, 2010.

Transmitter Magazine, Experiencing Art in Unexpected Places, by Reesa Amadeo Wolf, Issue 12, 2010.

Furtherfield, interview, Tine Bech artist, 24 Nov, 2010.

YouTube SIGGRAPH 2010 channel, Art Gallery, Echidna, Tine Bech, 28 July, 2010.

Embassy of Denmark, Get Interactive with light and sound, Feb, 2010

BBC News, Technology, Hackers tackle domestic devices, http://www.bbc.co.uk/news/technology-11444695, 1 Oct, 2010

Guardian, Games Blog, Art and games: three intriguing exhibitions you should try to see, by Keith Stuart, 24/8/2010

TechNews Daily, Technology Conference Shows Off Interactive Art**,** by Stuart Fox, 31 July, 2010 http://www.technewsdaily.com/technology-conference-shows-off-interactive-art--0948/5

Art of England, Safe to Touch, Issue 59, June, 2009.

APPENDIX 2:
PLAY VOCABULARY AND THE GAMBITS OF PLAY

The two tables below shows notes written during the making process, linking the gambits of play to each artwork and my play observations of the audiences playful interactions collated. These tables are not the sum of my research findings but rather significant collations of the play vocabulary and the gambits of play. Similarly, and as mentioned previously, I have tried not to repeat where the same evidence occurs in more than one artwork.

Play vocabulary collated I

Description of Play observed	Play vocabulary	Referential context	Artwork
Curiosity and surprise People step into the small spotlight, testing what will happen in *Catch Me Now (CMN)* Tentative touch, *Echidna* Tentative walking around and listening in *Tracking You* Watching other people playing ⇒ social and learned behaviour (imitation play) Facilitation - telling people what to expect in *Tracking You* enabled them to enter play mode faster Children enter into play faster than adults	Invitation to play Entering into play The play space (gallery, installation space etc.) Expectation (awareness of creating expectations) Exploration (what is this?) Magic circle	Scott Eberle Zimmerman and Salen Huizinga (Turner, the liminoid)	*Catch Me Now* *Echidna* *Tracking You* *The Big Swim*
Observed adults being hesitant or unwilling to play when children play, in *CMN* and *Tracking You* Waves of either children or adults interacting with *CMN* and *Tracking You* Flow: people stay longer than anticipated in *CMN,* children are told off by parents for not wanting to leave People come back to play again in *CMN* and *Tracking You* Flow: people let go and engage fully into play in *Tracking You*, *CMN* and *The Big Swim* Short burst of play: staff at the Science Museum start to detour to have just one go at *CMN*, audience members come back for just one short touch of *Echidna* and just one jump in *CMN*	Flow Bursts of play Is length of play/interaction an indication of quality? Adults and children enter into play differently	Brian Sutton-Smith Peter K Smith Richard Schechner Csikszentmihalyi	Catch Me Now Tracking You Echidna
Touching *Echidna* (haptic experiences), different ways of touching, playing with movement and proximity Man testing and touching *Echidna* with paper Tentative exploration in *Tracking You* Playing with proximity in *Chromatic Play* Turning objects (*Echidna's*) into instruments, playing them	Tactile exploration	Stuart Brown Peter K Smith	*Echidna* *Tracking You* *CMN* *Big Swim*

Play vocabulary collated 2

Giving *Echidna* hugs Desire to touch the creatures Swimming, world upside down, immersion in the water, solitude in *The Big Swim*			
Watching other people, to learn how to interact The development of social and learned behaviour: watching people touching *Echidna*, learning how to do it, watching people play with *CMN* then copy the observed behaviour Waiting your turn, in *Echidna* and *CMN* Participants, after watching others do a short quick play interaction, testing what they gleaned as correct actions	Social and learned behaviour Taking turns (Expectation)	Stuart Brown Brian Sutton Smith	*Echidna* *Catch Me Now* *Tracking You*
Swimming, splashing, handstands and spinning in *The Big Swim* Chasing and jumping in the spotlight in *CMN* Touching *Echidna*, tickling it Running for the joy of it in *Tracking You* People ignoring the confusion of the clapping zone in *Tracking You* and being in FULL play mode Spinning and dancing in *Tracking You* Jumping in light puddles *in CMN* Tag and Shoot in *Tracking You* Excitement (joy)	Physical participation Gambol	Roger Caillois: Ilinx Stuart Brown Peter K Smith Robert Fagen Scott Eberle	*Catch Me Now* *Echidna* *Tracking You* *The Big Swim*
Pushing others out of the spotlight Grapping others in *Tracking You* – bumping shoulders Play fighting in *Tracking You* Splashing water at friends Hide and Seek games in *The Big Swim*, sneaking up on each other, pushing friends under the water Hitting *Echidna* (being scolded by friends or invigilators) Shooting others in *Tracking You*	Rough and Tumble	Stuart Brown Peter K Smith Pellegrini	*Big Swim* *Tracking You* *CMN* *Echidna*

Play vocabulary collated 3

Giving *Echidna* hugs			
Being briefed, controlled in behaviour Surprise (shock) Playing with the rules	Risk	Stuart Brown Brian Sutton Smith	*Big Swim* *Echidna*
Not allowed to jump or make a splash in *The Big Swim* No rules in some sense, in that it was a completely open work Colour does have not a hierarchy, for example, in *Chromatic Play* this meant confusion about which colours override others *Catch Me Now* has fewer rules (or does it) More specific rules in *Tracking You*	Rules	Zimmerman Richard Schechner Roger Caillois: Paidia vs Ludus	*Big Swim* *Catch Me Now* *Chromatic Play* *The Big Swim* *Tracking You*
Games and group play Catching the light – tag! Toe stepping and pushing (‘It’s mine!’) Colour battle in *Chromatic Play* Shooting, chases and bumping shoulders in *Tracking You* Swimming races in *The Big Swim*	Competition (linked to rules) Games	Roger Caillois: Agôn, Ludus	*Catch Me Now* *Chromatic Play* *Tracking you* *Big Swim*
Turning it upside down, the joker The unexpected (not playing by the rules) Sneaking up on each other in *The Big Swim* Woman pretending to be hurt when touching *Echidna* Children screaming for fun when touching *Echidna* Woman sneaking up on friend leaving *Tracking You*	Tricksters Frivolous	Brian Sutton Smith	*Echidna* *Catch Me Now* *Tracking You* *Big Swim*
‘When I do this, it makes this happen’ – the pleasure of action/reaction *Chromatic Play*, when it did not work Confusion overlapping zone in *Tracking You*, people just played Figure it out, then games and playing with other people start	Mastery Figuring things out Ownership (empowerment) Who is in control Player and play maker	Winnicott Bateson: Meta message Brian Sutton Smith Zimmerman	*Catch Me Now* *Echidna* *Tracking you* *Chromatic Play*

Play vocabulary collated 4

'Look at me!' posing in *CMN's* spotlight, 'Ta daa!' Taking photographs of each other interacting Posing with the capes on (taking photographs) Walking funny and dancing in *Tracking You* Playing *Echidna* like an elaborate instrument, showing off Watching other people performing Looking at each other underwater in *The Big Swim*, communicating without words	Performance play Performing	Richard Schechner Scott Eberle	*Catch Me Now* *Echidna* *Tracking You*
Making up stories/illusion Pretending *Echidna* was painful to touch Pretend the spotlight in *CMN* was good/bad etc. Girl dancing around the spotlight, instead of stepping in *The Big Swim* - world is upside down: looks normal under water, but above you are in a different world. Transformation. Like a movie Making up creature stories about *Chromatic Play* Making games in and around the artworks	Fantasy	Roger Caillois: Mimicry	*Catch Me Now* *Echidna* *Big Swim* *Tracking You*
Free play, no goals No going through levels to get "rewards" or information, as in HCI or video games Curiosity No narratives (does a premade narrative stop people adding their own story into the context?)	Open ended play Authentic Play self	Roger Caillois: Paidia	*Catch Me Now* *Big Swim* *Tracking You*
Inherently attractive Want to do it again Skills are matched ('I can do it')	Pleasure Flow	Winnicott Scott Eberle Csikszentmihalyi Stuart Brown	*Catch Me Now* *Echidna* *Tracking You*

Gambits of play collated I

Gambits of play	Echidna	Catch Me Now	The Big Swim	Tracking You
The agency of materials Animating technology Materials as an invitation to play *Material properties and affordance*	Winding (coiling) the wire creates an electromagnetic field Creature like - animated Looks spiky – sound is consistent with the look Surprise/shock – delight Tickling and hitting (animating) Woman playing the trickster	Spotlight affordance is performance and play – invites people to step into the light Surprise, light runs away, upside down - animated Colour entices people in Exhibit in a passer-by-space (open empty space, no expectations) Size of the physical space it roamed in	Pool & Light & Colour is an invitation to jump in and play A pool is a natural playground (childhood memories of play) World is upside down. Enchantment and transformed space	Capes invite play - connotations of playing and pretending – "hero like" Dress up Bright colours (primary colours almost) Entry into the space is marked - creating a playground Put cape on, permission to run Sounds are all play like
DJST (Don't just stand there) Happened upon *The tug of gravity*	The body is water – the ideal interface Electromagnetic field creates proximity - tactile interaction physical proximity, exploration Tactile - playing with movement and proximity Object (size) – people hug the artwork	Run away - entices people into a merry dance Spotlight - jump into light puddles Webcam - happened upon interface Size of the spotlight	Fog entices immersions Pool invites "jumpiness", people want to jump in and make a splash Transform swimming play behaviour Sensory and eerie (world feels physically upside down). The light on the body - relating to the installation through the body Sense of physical freedom when swimming Happened upon: accessible, local and free	Wearable: Capes are invitation for movement Tactility of the silk - swirling, swinging, jumping Changed the acceleration (sound changing when moving) threshold to be lower because people were hesitant at first, not moving fast enough, not want to run Proximity interface facilitated intimate and physical interaction between all ages

Gambits of play collated 2

			event (but with age restrictions)	
Readable, reliable, robust and simple interfaces (RRR) *Develop trust in the interface*	Redesigning so it is only completely silent when not touch/approached – readable & reliable New circuit where pitch can be changed, playing with the sensitivity Proximity made audible (instrument)	Redesigning: making it simpler: webcam 'sees' people, then automated interactions are executed - step in, run away – chase Completely consistent – (except is if light lands on someone's back)	Simple concept	Sound is consistently generated when moving Length of sounds short, in order for interaction to be readable Readable is difficult as sound belongs nowhere (spatial) -when someone activates a sound elsewhere people attribute it to their actions ⇒ quadruple surround sound Clapping zone overrides the shooting/running sounds and broke the rule (leading to confusion)
Play mastery & ownership *Illusion of control* *Going through play stages (wheel of play)* *Also see play vocabulary table*	Figure it out, then playing with other people Taking photographs of each other interacting	The interaction was clear, enabling people to proceed to play mastery Flow, doing it again and again Grace Improvisation	Surprise of the transformation and fantasy Being a little scared Risk assessments – too many rules	The moving sound was explicitly interactive and gave participants an 'I did this, I own this sound' experience Flow, people forget to be embarrassed ('It's so much fun I forgot to be embarrassed', woman with him commented 'And you said you're definitely not going to wear a cape')

Gambits of play collated 3

				Playing and staying longer than intended Taking photographs of each other interacting Boy figured it out – sped up and down the space Girls playing stop, then run to hear their sound Parents/friends order kids /friends around, the conductor
Open work *Also see play vocabulary table*	Social – the intimate interface	Non-narrative Play personalities emerge Taking photographs of each other playing	No art rules – no tech programming Pool rules constrain behaviour A play frame	Open, but with rules which elicited movement, tagging
Creating collaborative and singular play	Object is small and is interactive from all sides Taking turns Watching others – mimicking other people's actions	Imitation by artist or invigilator Learned behaviour (watching others) Playing tag with the light, both group and single Getting as many people into the spot as possible Watching others perform	Work completely open to participants interactions – both collaborative and singular. *Immersive vs play – singular vs collaborative play*	Imitation by artist or invigilator Learned behaviour (watching others) 5 capes invites group play Shooting interface designed for multiple interactions Conducting (sound) People come back with friends to show them the work and play together

OBSERVATIONS
INTRODUCTION

In appendices four through to seven the observations from peer and expert users, as well as other feedback where available (such as twitter, emails or blogs) are recorded for the four artworks presented in the catalogue. The observations (where conducted) are described under each exhibition the artwork was shown in. Images and videos of final artworks, and the audience's interactions, are online at a dedicated PhD website: http://www.tinebech.com/Research/PhD/ where photos and videos are accessible.

OBSERVATIONS
ECHIDNA

SIGGRAPH Art Gallery

***TouchPoint: Haptic Exchange Between Digits,* USA, LA, 24 – 29 July, 2010.**

Observation notes by Tine Bech

Lots of people are interacting. Looks like I will be in the gallery all day. It works really well.
It was interesting to observe if people knew whether to touch or not
I overhead a guy saying '*why does it do this'* about another artwork in the gallery, then saying '*oh I forget I am in the art gallery, that's why'*
Some people do not know it's ok to touch, but most people do, it's almost like a wave where people imitate others, see someone playing with echidna, then doing it them selves
Lots of people film and photograph *Echidna* while they play with it (using one hand to touch and the other to film with their phone)
Echidna goes off sometimes, I can't work out what it is, it's almost more sensitive here
A man was playing the sculpture for a long time
People can be hard – almost hitting the sculpture
A woman made me laugh today, she made this game, screaming every time she touched the sculpture

Other feedback

Email from: Lourdes Livingston, 16 June, 2011, 22:28:02, GMT+01:00
Hi Tine: I met you at SIGGRAPH last year. I was the one who would scream every time someone would touch your wired E project…

Blog by Ricky Grove, *Notes From Siggraph, 2010, Part 1*, Renderosity.
...Some highlights of the gallery for me included *hanahanahana* by Yasuaki Kakehi, *Strata Caster* by Joseph Farbrook and the delightful *Echidna* by Tine Bech. Each of these installations provided such a unique experience that you lost track of time while experiencing each one. I liked many of the others, but something about these three stayed with me and captured my imagination.

The Kinetica Art Fair

Ambika P3 Gallery, London, 4 – 6 Feb, 2011.

Observation notes by Tine Bech

Group of 3 playing – laughing

Small group looking at woman playing tentatively. Same group take turns trying, short interaction

Man testing touching with paper (the invite)

Man playing with the proximity

Man touching the work with his nose

More touching, laughing

Child hitting the wires– then doing it again and screaming

'It's like a cartoon' young boy commenting while playing with *Echidna*

Man tells me 'I've been here and I never talked to so many strangers around art in any other gallery. It makes you social' (during a conversation with me about whether technology disconnects us).

Lots of interaction, people playing tentatively, some just a quick few touches then leave, others for longer, experimenting

Lot of the same behaviour is observed.

The 3rd Art and Science International Exhibition and Symposium

China, Beijing, 1 – 30 Nov, 2012.

Observations written by Emily Giles

This document outlines observations made by Emilie Giles of members of the public interacting with Tine Bech's *Echidna,* at The Third Art and Science International Exhibition in Beijing, between the 30th October and 2nd November, 2012.

The setup of the exhibition was interesting as *Echidna* was placed in quite close proximity to other pieces. To one side of it *Avatar Morphing Station* by Shi Danqing, a piece which morphs one's face so it resembles a Na'vi from Avatar (the people who live on Pandora) and the other side a piece consisting of dancing robots. This meant that

Echidna was not in the quietest of spaces, but people did still enjoy interacting with it and having these pieces close by created a natural flow of visitors travelling between each work. The only downside was the lack of quietness in order to fully appreciate *Echidna's* sound.

It was interesting to observe how people reacted to the sculpture differently. Some were slightly unsure about it, moving their hand towards it slowly and with caution, whilst others were braver, interacting with quick and sure movements.

It was interesting to see how people in different sized groups, and of different genders, engaged with the work. Women by themselves, or in pairs, seem more inclined to take photographs of it (see video MVI_9570.MOV), whilst, when in a group, seemed more confident in interacting with *Echidna*, often doing so at the same time (see video MVI_9572.MOV). Men were less likely to be in large groups whilst playing with the piece, but rather in pairs, or by themselves. They seemed a little more confident than the women and also seemed happier to touch the work closer to the core, rather than just hover their hands over it (see JPG below).

IMG_9482.JPG

It was also interesting to observe how people reacted with *Echidna* once they were shown how to interact. For example, in video MVI_9569.MOV (note, this file is titled *Playing together* on the PhD website. TB) you can see one of the exhibition helpers,

Nancy, showing two men how to interact with *Echidna*. After she does this they instantly jump in to do the same, in quite a forward way with one person even giving *Echidna* a little shake!

Video MVI_9572.MOV is an example of how women interacted with *Echidna* in a larger group and shows them almost mimicking each others actions with quick grabs towards the piece, not quite touching it. One lady even tested whether *Echidna* was sound reactive. Having a larger crowd around the piece attracted more people, with a few of them taking photos.

Some people interacted with the piece a first time, discovering the process of engaging with it, then coming back a second time to continue experimenting. This can be seen in videos MVI_9485.MOV and MVI_9488.MOV, where a man dabbles in playing with the work, then moves on to talking to his friend, but then comes back a second time by himself (see the second video) to spend more time with *Echidna*. This time he tries different ways of interacting with different parts of the sculpture, from the bottom of it to the side of it, moving towards the upper part of it then bringing his hand away from it and towards it again in a repetitive motion, not quite touching it but playing with it at different speeds. At the end of his interaction he nods as if satisfied with the experience.

Video MVI_9527.MOV is very short as I was trying to photograph, rather than video, the audience, but it gives a quick insight into people asking me if they could touch the piece. This was interesting as most people didn't seem to have the need to do this! They just went ahead and did it anyway.

In general I would say that everyone seemed very comfortable when interacting with *Echidna* but felt the most happy doing it when other people were around. When this was the case it became a participatory, playful experience with people mimicking each other as well as experimenting with different techniques of interaction. People were happy to engage with the work when they were alone but it appeared to take a bit more time and they were a bit more cautious. Another interesting observation was around photography. People interacting with the work did not seem to mind being filmed or having their photo taken whilst doing it, they generally just ignored me! Other observers were extremely keen to get their cameras out and document what was happening, sometimes putting this before actually interacting with *Echidna* themselves.

Other feedback: Banbury Museum

Email From: Dale Johnston (
Events & Exhibitions Officer, Banbury Museum
Recreation & Health
Cherwell District Council)

Date: 31 March 2011

Echidna has been a very popular exhibit (many fascinated and appreciative visitors, including people with visual impairments and people with special learning needs).

The exhibition is being very well received including *Echidna*, in fact I think it seems to be one of the highlights, especially among young people.

Email From: Dale Johnston

Date: 1 April, 2011, 16:49:05 GMT+01:00

Excellent. Thank you. Incidentally you may be interested to hear that we have just had a dad and son coming in asking for ‘’the hedgehog’. Seems it was a word of mouth recommendation from friends saying they should go and see your work.

OBSERVATIONS
CATCH ME NOW

Watermans

London, UK, 1 Sep - 22 Oct 2010.

Observation notes by Tine Bech

It does not work. Tarim looks like he is trying to move to the programming instead of the program moving and reacting to his body.

The function which opens the iris from small to large works consistently

The colour changes are great too

Redesign

Strip it down to what is reactive, make it simpler, test

Create a sequence of a chase……

Girls are performing, striking poses

Very theatre like

A woman who is a dancer wants to create a performance for the work

The staff, I think, are a bit puzzled

The floor is black and white - not ideal for spot analysis

The colour of people's shoes seems important

The work reacts too soon – opens up the iris before people step into it completely

Victoria and Albert Museum

Sackler Centre, London, UK, 20 – 26 Sep 2010

Observation notes Tine Bech

The idea of a simpler interface works – lots of interactions, people stay with the work

Children are playing and screaming

Woman testing how to activate the work, using her hand as the light is an invisible beam to be broken

Staff are playing

So much play, it's hard not to smile looking at people interacting

Tine: Testing length of time the spotlight stays with people before swooping off, make shorter

Change coding - look for feet (?)

Girl does cart wheels

A little girl (tourist, doesn't speak English) plays for a long time dancing on the edge of the light

An older child looks at the moving head to see where it goes (he is the first to do this)

People run and jump – splash like

Some children push others away

Children scream and point to where the light goes

Adult 'come on we need to go' to a child

Tine: It's a perfect site to show the work, a passer-by space

Some people miss it, interesting to see who notices what's going on

Floor colour is good too

The Kinetica Art Fair

London, 4 – 6 Feb 2011

Observation notes by Tine Bech

Adults do 2 to 4 activations

People watch and then do the same - learned behaviour

Younger children go on forever

Lots of people come back and play again,

A performer (an artist from the art fair) played with a child (a stranger)

Younger children push older away who also want to play

People are asking me if I control the light (I am sitting with my laptop)

People try and talk to me and see what I do on the laptop

People gather around creating a playground

When children play adults stop playing

Tine: The play with the light is between the light and the player or between the players. It's a personal experience, it's very social

Hang light high to prevent shadows and people in the way for both spot and camera

Size of the spotlight matters as it determines how many people can be inside it

Program the light not to go near objects?

The Science Museum

London, UK, 28 Sep – 2 Oct 2011

Observation notes by Tine Bech

Tuesday 28/9/11, during setup and testing:

School class playing and 20 children are inside the open spot (while we test spot light sizes)

Wednesday 28/9/11 late night opening - adults only:

LATES: The Science Museum once again throws open its doors to adults only, until 10pm. Expect the music to play, the wine to flow and the science to…do whatever active verb that science likes to do. FREE, from 6.45pm

19.30 Light triggered early stopping someone who realised it was not random

People walk though without noticing

2 girls are playing tiptoes in to see when it triggers. Activate it 5 times. The light triggering early sparked the toe play.

A lady triggers the light twice to see what it is about

19.32 a couple and a man play. They seem not to know each other? Activate 4

19.36 4 people play, activate 9 times, make poses, 2 mins later they walk back through and activate it just once.

19.39 3 small groups are taking turns activating it. Activate 6 times

19.42 4 girls activate it 5 times - exploring

19.46 couple play. Laugh

19.48 accidental triggers people don't notice. Will start to count these with 'I'

19.49 2 wheelchair users and a walker activate it. Wheel activate only once then the walker activates it 3 times

19.50 staff play. Run. They come specifically for it. One yells this is my favourite. A group watch and when it comes close to them one jumps into it.

The light lands when two people stand and they jump having see other people play

Couple play, activate it a few times. Says ‘oh’ when someone accidentally activates it. Keep playing. 'I got it' Activates it 8 times or more.

Tine: they go for it more if the spot doesn't go too far away. They don't want to run?

19.59 1 group and a couple play. Big group run. Activate it 6 times. Couple started and the big group noticed

Later after short chat big group plays again. They speed up. 'it got you' activate it 5 times

20.05 ‘no, it's my spotlight’ after 3 groups played, activate it 5 times, small groups who don't know each other take turns. A couple keep playing and run around

Tine: it works. They instinctively know what to do

20.07 couple play, girl poses for the guy twice then he swaggers to it and raises he's hand yeaaaa

20.10 woman walks through doesn't notice but it goes in her path so she turns around 1 meter and activates it. Quick and legible

20.14 four girls 5 plays, then the other 2 who were standing on the side start to play. Poses. One claps at the other. Yeaa. 12 activations approx, 3 boys also participate when it comes towards them. They are passing through and have already played.

Tine: once people learn about the work when they come near on their route they are likely to activate it again

20.20 Same group of men come back 3 times and play, 2 of them like it a lot, run 5 activations

20.24 quite a few walk through but don't notice they trigger the spot

Tine: someone walked fast, acting a little, pretending to sneak up and pretend to not run

20.26 break

21.02

A group plays, the guy slides on his knees into the spot. The floor is black marble.

3 girls play taking turns to catch the spot. They spread out into the room.

2 groups of girls jump into the light. One group are watching at first and start participating when the light comes close.

The first group start clapping when one steps into the light

A man pretends to walk quietly (acting that he is not playing, sneeking) up to the spotlight

Tine end of day thoughts:

Adults perform more poses. Children chase and scream

Children chase -they want the light to move away! 'one girl saying 'please' - inferred that she wants it to move

Adults know that a spotlight is not normally interactive

I thought that children were more observant - well they are -they see the floor, see the unusual, but this was based on the fact that they play more. At the late night event I saw adults play!

Adults have more facets to their play. Trickery, pretend play, sneak up on the light

Once analysed it will become clearer that children are in the ilinix end of play

Observations Friday 30/9/11

12.30 start

Woman with baby hanging on her plays -the baby looks at the light. Activates it 3 times, when the light travels too far she doesn't want to run

Boy tests how the light is activated, moves his hand around, jumps into the light, then try to jump over the light

2 girls pose – take turns

A mum and a boy compete, chase to see who gets there first – she lets him catch most, activates it more than 10 times

Couple activate; man 2 times, woman 3

Boy and man play, boys run activate it 6-7 times, man starts participating and they chase, slight pushing out of the light – competitive

2 older boys/adults play testing tentatively, one boy does the most activating - total 10 times - last 3 activations he runs after the light

A man reads the sign and then plays, first walks then runs – smiles

Video - 2 brothers – close in age (dressed in same shirt) play. Take turns. Placed each end activate it lots - 70! Other – adults play a few times, chasing the light. Start testing to go into the spot slowly to activate. Girls starts playing as she wants a photo of herself in the spot

Tine: there is no pushing?

Tarim observed 1 boy and 2 girls playing, activating the light over and over again (50 times). He remarked: 'they really liked it when the prism - the flower, came on as there was one for each of them'

Video - boy and man (dad?) is back – boy runs and activates it Dad sits and look, then activates it lots!

Tine methodology: no video of late night adults playing. The methodology is not a video cue, rather direct observation. Video is used as evidence and to illustrate the interface, the play, of the artwork.

Boy activates the light 6 times, looks up to the moving head, he is on his own. Gets moved along by people calling for him

Tine: this happens a lot. Parents, friends call a player away. It is the nature of a passerby space – people are on their way to somewhere else.

Space feels quiet, Friday. No schools?

I stopped writing the time down

Video (did not get the start): A man and woman play, she activates it more. Total? Maybe 10 – probably a couple

Video 2 girls, one boy (same boy who tested with his hands how it activates) plays 5-6 activations. Is called away

Video - Tarim is playing, sliding a paper into the light to activate it

2 girls start playing – Tarim plays once with his paper, they take over. Run, some pushing. Activate it lots. They stop playing and then come back to play again after looking at another display

Tine: the pushing works better when the spot diameter is smaller (mounted lower). Here the spot is bigger in diameter so more people can be inside the light

Tine: where I'm sitting I can't overhear comments (but it's good for typing, noone sees me and thinks that the laptop controls it)

Break 14.00

14.45 start

Video 3 boys playing, different ages, activate it 4-5 times, have fun but go to eat

Video few children playing – poses

Video - 3 girls/adults play a few times, laugh. Video still going, a few other adults activate it too

Video - 2 boys play (one is the same child as earlier) One more joins the game for a moment. 2 of them keep running, activating the spot

Tine:

People (adults) are self conscious

Once people know the light, they will come back, or if they are in the area take a quick play. Often people play for longer on the second time too!

Boy playing sliding into the light - 10 activations

Another boy plays

2 young boys play and scream, lots of activations

Lots more plays by children, same thing repeating itself with other actors. Saturation!!!

Tine: my counting is not accurate, Tarim's comment that he can see on the laptop there are thousands of activations hmm? Need a code to count activations

Two staff play and seems to have lots of fun. I try to film them – knowing I have their permission. My video permission for the site is wide angle only.

2 adults play, (some video – in two parts girl is asian he is white). Activate 11?

'Its a game of catch with light' child, 30/9/11, science museum

Tine end of day: I wonder if my planned observation tomorrow will be different as it is a Saturday? Otherwise it might be just more of the same observations – no more data gathering is needed by now.

It's quiet because it's sunny outside – unusually sunny, 28 degrees C – a heat wave for the 30th September. Everybody is making the most of it.

A new element is the big sign explaining or encouraging people to step into the light. I noticed few, very few, entering into play via the sign. They are wandering around the gallery reading and seeing things, viewing the world through a horizontal gaze.

Observation Saturday 1/10 15.00

Child jumps and falls into the light on purpose - with all his body – activates it LOTS !

Little girl playing saying 'gotya' every time to the spot

Two children playing saying 'I got it first. It's my turn next'

Child playing: 'I don't know where it's going' 'Where is it going?'

Adult 'one more and it's enough'

One little boy ran too early away at the flower - timing is longer at prism

Tine: Very much the same as observed elsewhere - in particular children are playing today. Families with children letting them play. Saturday feel.

Interesting as I thought children would play while parents eat but none have done while I have observed

Young children play together - strangers.

Lady playing - really running with the 2 children, nobody knows each other. Playing catch!

3 very small children playing 3 sets of parents telling them where the light is 'look it's down there'

16.20 stop

Illuminate Bath

25 – 28 January, 2012.

Observation notes by Tine Bech

People gather around creating a playground, watching participants play

'Do you want to go to the spa now (adult to a child playing) – 'nooooooo'

'Dad I am a chicken' (...catching the light and screaming)

'One more time then say bye bye light'

Older man with hat plays, is hesitant but then smiles
Big crowd around watching group of children
Lots of children playing and screaming
Woman saying ‘wow, look at that’

Tine: Similar behaviour as observed at other exhibitions, lots of catch, tag, joy and performance.

Other feedback: tweets from the audience

Adele @ArtBathSpa - 25/01/2012
Chased an interactive spotlight around Abbey Churchyard on the way home at 12.30am @Illuminatebath. Me and hubby giggling like kids :)

Hannah Brewster @hannah_ab - 25/01/2012
Loved all the installations at @Illuminatebath tonight. Missed having a go on @t_bech Spotlight. tomorrow = #moveoverchildren

GirlInTheTub @GirlInTheTub - 25/01/2012
So I liked the phone box best... &jumping in light puddles, but that goes without

saying! #childatheart @Illuminatebath

Tegan Howard @poppetpup - 25/01/2012

Looks like @Illuminatebath is off to a fantastic start; hundreds of people in the city centre, and the kids are all squealing with delight!

Zena Whalley @zeenwh - 26/01/2012

I think we'll be back again tomorrow eve - we loved it! @Illuminatebath pic.twitter.com/2yOxdCyD

Adele @ArtBathSpa - 30/01/2012

@Illuminatebath Frequency in the Roman Baths was a pretty fab experience. And I'm a big kid at heart, so Catch Me Now struck a chord :)

Laura James @lollypopstar - 26/01/2012

Braved the wind/rain/sleet to see the @illuminatebath lights. Kids loved the robospot; I loved the butterflies @WeLoveBath

Other feedback: blogs

Catch Me Now, was really shining and enticing people to play on the corner of Bath Abbey. The spotlight is dancing around and making everyone play with it - children have been jumping on the spotlight and so have the adults

Anthony Head

A deceptively simple spotlight that reacts to onlookers movements and leads them on a merry dance

Unknown blogger:

My personal favourites were *Catch Me Now* by Tine Bech - a coloured dot of light that dances around the square as you chase it, grows bigger for a second when you catch it, then whizzes off again, followed by a gang of excitable kids.

http://ohheypresto.blogspot.co.uk/2012/01/illuminate-bath.html

Catch Me Now, by Tine Bech is really shining and enticing people to play on the corner of Bath Abbey. Children have been jumping on the spotlight and so have the adults. Go on, you know you want to!

http://www.illuminatebath.org/2012/01/day-two-of-illuminate-bath-role-on-day-three/

Observation notes (all exhibitions) by Tarim

(Tarim here outlines his impressions from all the exhibitions)

Most noticeable is how children "get it" so much more quickly than adults. In the V&A I saw a child being dragged away by an adult (parent) saying, ‘Come on, what are you doing?’, in a tone that suggested the child was behaving stupidly rather than actually wanting to know what the child was doing. Wondered if this was just because children are closer to the ground, but I also think more children than adults realise they can tell where the light is if they can't immediately see it by looking at where the spotlight itself is pointing.

Theorising: Some people create theories about how it works - does it really respond to people stepping in, or does it move at random? Some (possibly more adults) test this by

creeping up on it to see if it will trigger when they reach it - or how close they can get without triggering it.

Comment from one woman watching a little girl who had been doing a lot of running and leaping into the spotlight, ‘Oh, it really does notice you - I just thought that girl had really good timing’.

Also, theorising about when it creates its 3-way prism effect. Verity from PM Studio asked, ‘Is it when there are lots of people there?’ Girl at the Science Museum, in a group of 3 children asked, ‘Is it because there are 3 of us here?’ Interesting discussions with some people afterwards who had theories; confirming that people do have confirmation bias.

Just one more go: On having to leave, many children (and me) just have to have ‘one last go’ and then another one, and so on. Never counted the maximum number of ‘last goes’I saw, but it could easily be in double figures.

Waiter at Watermans Gallery, who tended to walk around it so as not to trigger it, ‘I thought you weren't supposed to disturb it’.

Boy in Bath who, on leaping on it, exclaimed, ‘yellow jelly’, ‘green jelly’, ‘purple jelly’, according to the colour he leapt on.

Boy in Bath who tried to stop the light with his foot, as though it was a football, as it moved past him - but only once - he never tried a second time after it didn't work. (We model/understand new things in terms of what we already know?)

Over 18’s night at the Science Museum, adults playing in groups by knocking it to each other like a game of frisbee. Children tend to run around after it rather than co-operate. (My untested conjecture - adults have less energy for running around than children, rather than being less competitive.)

Comment in Bath which amused me but maybe isn't so relevant, ‘Oh that's nice - it's the sort of thing you'd see in Bristol’.

Always surprised me that so few people "test" how it works by throwing or putting objects into the spotlight. Love how Tine describes this as "cheating" when I do it. Does she have a set of preconceived ideas of how people "should" play with her spotlight?

OBSERVATIONS
THE BIG SWIM

A series of impression (data) gathering techniques was carried out for *The Big Swim* in addition to my normal methods using my own observations, visual recordings and observations by an expert user. At *The Big Swim* an additional observer was brought in who also carried out interviews. A video documentation team also conducted a series of interviews with participants about their experiences. All participants signed a data consent form. It is worth noting that my own observations from *The Big Swim* are fairly limited due to being heavily involved in producing the event, managing all staff and ensuring that things worked. However, I participated and swam in both installations, as well as doing some observations whilst walking around the pool.

Cultural Olympiad Open Weekend Camberwell Leisure Centre

London 23/7 2011

Observation notes by Tine Bech

There is a tense feeling with the lifeguards
A woman is angry because she can only take two children with her (SIGH H&S)
People are saying ‘ohhh!’
There is less play than I expected, more immersion, sensual experience, physical
A man is playing with the fog and his family
It’s hard to see what people do
People gather and talk about the light, then swim away
Lots of people float

Tine: Play is what attitude you bring with you. *The Big Swim* was perceived (thought) in so many play perspectives. This is exactly why the methodology predominately lies in observing behaviour and is not concerned with the audience’s inner thoughts.

Participant comments to me:

It was awesome

Wonderful

I was a bit scared

The lifeguards briefing made me apprehensive. Not relaxed added tension.

Tine: Unnerving: element of fear and risk (linked to play) and how an individual responds. How risk assessment interferes with play and art

It was like the Titanic 'I am in the movie Titanic'

Reality is under water, above water the world is strange (transformed)

The lifeguard briefing was off putting - anti play

Were told not to play by lifeguard

Don't tread water, keep swimming (lifeguard)

'the lifeguards acted like there were sharks in the water. It was like they were panicking. Their response seemed inappropriate. And there were so many of them'. Lifeguards everywhere - like what's going to happen when you go swimming? We were just swimming (Participant Camberwell).

Observation notes by India Alexander

I have used single quote marks to indicate actual speech/quotes by those I overheard or spoke to.

Trends, or things that I thought seemed to be repeated by many people over one or both of the days, have been italicised.

Groups referred to are indicated in brackets.

I have tried to align my thoughts with the actions they corresponded to at the time and the notes are ordered chronologically.

Researchers' thoughts	**Actions observed**
Before the event it was interesting to see the way in which the lifeguards and staff were anticipating play. In the briefing before the event it was noted that 'the first rule of life guarding is not to let people in the pool if there is limited visibility'. Does the way in which they arrange themselves have an effect on the play of those in the pool?	
	The first swimmers were hesitant, starting with lengths of the pool. People clung to the groups they arrived in. Then after a few minutes the groups moved into the middle of the pool, where the thickest mist was.
	(Father and child) pull each other through the water, with arms outstretched.
	Still sticking together, people cling to each other's upper body.
	People then break off from their clusters and move back in from the fringes of the pool to the middle, on their own.
This was something that seemed to be a reoccurrence, that, after a few minutes with friends, people felt that they wanted to move into the centre of the pool on their own to be in the thickest mist. Could be seen as a shift from an interaction, or play with people, to a more individualised experience.	
	However, some (two girls aged about 20) stay in the smaller pool, where there is less mist, for longer than others, talking to each other.
This is despite the fact that to enter the pool everyone had to be able to swim a full length, so people were choosing to move in a slower way than they were able to.	*Swimming is broken and slow in general.*
	(Two young girls) swam the length of the pool, spinning themselves as they went so that every other stroke was facing the ceiling and the whole length involved spinning.
They probably would not usually do this in the pool. Element of an exceptional/ special experience. Playing up to the camera? Play in this instance is something to show	Many people brought cameras to film themselves swimming and were eager to have others capture them in the pool (one man even asked me for a copy of the film

others/to display.	taken by the crew).
	(Two young girls) carefully synchronise bobbing underwater and looking at/communicating with each other underwater.
This relates to something one woman in the Oxford pool told me. She emphasised the way in *which one experiences their own physicality* in an environment where one can only see their one's limbs clearly in the mist, and therefore one notices the way they move and the light on them more acutely.	Woman holds up her hand to show a friend the effects of light her limbs.
	(Young man) pulls another through the water.
There was often an active/inactive relationship between people in the pool, for example, one person swimming while the other was towed.	One girl surprises her parents with a moustache made out of her wet hair.
	A couple move so that they are facing right into the mist and light and stand there for a significant amount of time.
Parent/child games are intermittent, it seems as though the parents prefer to move off into the mist on their own and it is the children who seek out the games. And there seems to be an element of testing oneself, like with the children going underwater and looking at each other.	A child makes up a game of swimming through their parents legs underwater.
	The deep end of the pool with the greater mist seems to be an area of greater 'play', where people interact in smaller groups, or by themselves, with the mist. People move into the shallow end (where there is less mist) to have prolonged conversations in bigger groups.
	One mother to her child; 'make the most of it'.
	One person spends a long time face down in the water, arms spread in a cross shape. Interestingly, she is also one of the very few I saw greet other swimmers that they didn't arrive with.
The appearance and disappearance of the mist seem to have no effect on their	One pair of male twins spend a long time swimming regulated lengths, in complete

swimming. They are almost the only people who swim fast or for a prolonged time. *Propelling oneself into the water/mist/unknown?* *Both of these actions have an active/inactive dynamic in the interaction between two people.* *The element of the visible/impaired vision in the division between the water and mist. The real/unreal. The known/unknown, in terms of the distance people can see.* Distorted impression of others, due to the smoke? It seems that to say that the experience was uniformly relaxing would be an oversimplification, because although some seem to decrease the competitive/ active nature of their movement and games, there are moments when some people splash a lot and seem really excited. This was one of the few times I noticed people who had clearly not come as a group interacting with each other. A play on the lack of visibility?	synchrony. When they are interrupted by another swimmer, they both stop and gawp (in annoyance?). A father lifts his child up into the mist, and also gets the child to push off the edge into the water as fast as they can go. One man pretends to teach his girlfriend how to swim. People swim underwater and spend time bobbing underwater with each other. People in the shallow end seem to be discussing others, despite the smoke impairing their vision. One girl imitates a rabbit, jumping in and out of the water towards her friend. One man sits on his partners' lap whilst she swims along, taking him with her. A whole family lie together on their backs, looking up. Some middle-aged friends partake in casual racing. (Young man and women in the smaller pool). Woman holds her friend at the bottom of the pool, so that the friend is lying flat on the bottom of the pool and she is bent over in the middle and looking down so that they are facing each other. Meanwhile, the man swims away in a kind of shrimp like shape, with his feet out of the water and his body underwater, to everyone's great amusement. The group pretend to creep up on each other

	and pull each other's swimming costumes off, using very over exaggerated movements, like pantomime.
Which I didn't see happen in other circumstances, it seemed as if there were insular groups, which then broke up into insular individuals who wanted time on their own.	They do handstands, until the lifeguard stops them and then a third woman joins the debate about this. She moves in towards them and joins the group. They all continue to do doggy paddle races.
A different example of the way in which people see each other/others play, with a different kind of visibility.	Lots of people go up onto the balcony to watch, before and after they go in.
They don't feel the need to search out solitary space in the thick mist?	When the pool becomes less busy, it seems as though more people begin to swim lengths and cling in groups at the edges.
Lying flat and looking upwards or downwards seems very common, giving a different perspective on the mist? This is also a good example of how people often surprised each other.	Pushing ones friend's into/under the water is common. For example, one man is lying flat, supported by another person, and then she suddenly pushes him under the water. One woman arrives in a pink wig and matching swimming costume. People surprise each other with huge splashing. People talk about the light and mist, and hold their hands up to it. 'Nice though isn't it? Lovely!'
Few games I saw were prolonged, most ended after a few minutes and seemed a little lacklustre.	A Grandfather throws his goggles to the bottom of the pool for two young girls to collect, and they give them back to him each time. Repeated many times. Lots of people launch themselves from standing up, into the water.
Both were submerged, people didn't seem to want to be out of the water, rather often re-submerged themselves.	One girl rides on a mans back.
I found this really intriguing, the way that people seemed to interact with/play	People lie on their backs and look at their feet. They also bend over double and look at

with/explore their own body.	their feet through the water.
I noticed that none of the children were crying or were arguing with the adults they were with, all seemed really *happy*. Whereas, when I was a lifeguard children more often than not got into a small argument with their parents, or were told off.	Two girls stand facing each other, legs apart and hands in a prayer position, mirroring each other's movement.
From the poolside, this looked really striking in the light, and highlighted the fact that people's forms were pretty much blacked out, so that they were almost shadows. Moreover, it seemed like a notable kind of display/signalling, between couples, if not to everyone? I wondered how much people were aware of others.	One man holds his arms right up, with flat palms and moves them around to reflect the light; he later tells me that he was pretending to be a synchronised swimmer. Another couple made hand signals across the pool to each other. A few people sit on the edge of the pool and look at/reflect on the pool and mist. At the end, when the mist was thick and the light the most intense, people all accumulated in the centre of the pool.

Interview notes by India Alexander

I think one of the most interesting things about the answers in these questionnaires is the different way in which people categorise swimming. It was noticeable that lots of people were swimming regular lengths and, when I spoke to these people, some (like the woman doing the triathlon) felt completely engaged with the light and mist, whereas other people (like the first man listed here) were reluctant to answer questions and said the experience had little effect on them. These people seemed to think about their swimming in different ways in relation to this exceptional experience, and its relation to play, when they are people who swim in the pool regularly. Similarly, the last person listed here thought that changing the way you swam the lengths counted as play. I think they all highlighted the importance of self-awareness, and the looseness of the category 'play'.

I had a few problems when doing these questionnaires, I found some people were regular swimmers who said they felt oblivious to the installation and were just swimming lengths and so were reluctant to answer questions. Also, there are gaps because a lot of the people I spoke to didn't speak very good English and had trouble understanding the questions.

It is also worth noting that most of the people I asked answered the questions in pairs, so their answers are collaborative.

Interview results by India Alexander

No People	1	2	3	4	5
How did you find the experience?	Pleasant, relaxing	Very nice. Ethereal, relaxing, removed of green- all blue and red. 'Other worldly'	Calming, a nice experience, tranquil, 'different'.	Different, fun.	Interesting, more interesting from above when you can see others, because inside the pool you can only see around you.
How would you describe the experience in one word?	Surreal	-	-	Intriguing.	This person described it literally; 'a pool with lights and dry ice'.
Do you think that the big swim enabled you to have a playful experience?	Yes	Yes	Yes, although they wouldn't have used that word.	No	Yes
Explanation	The atmosphere is conducive to relaxation, there is no compulsion to swim. Also there weren't many people which is always more relaxing. It makes you want to go underwater, where you can see better. The person asked why there wasn't music as well.	Because it feels 'light' and gentle	-	They felt like they were being hindered by the lifeguards.	Low inhibition, but this isn't the thing that is important about the experience.

Did you play while you were in the swimming pool, if so what kind of play?	Yes, a game in which one person goes underwater and makes noise and the person above water has to see if they can hear it.	Yes	Yes, it's like a film, so you play with your imagination, especially when you are in the middle of the pool.	-	Yes, he always plays in the pool. He was pretending to be a synchronised swimmer with himself.
Have you gone to many public art events before?	Once in a while	Many times	Many times	Many times	Very rarely
Have you been to the pool before?	No	Many times.	No	No	No

Observations Report by Ben Spencer

Please note, Ben mentions dry ice in the text below. This was a common misconception by many participants but, in fact, I did not use dry ice. Apart from not being safe to physically participate with, it is not the best artistic material to use.

Report on the observation of Big Swim event 23rd July 2011

This short report sets out my impressions of the event as both an observer and a participant.

I arrived at the swimming pool at approximately 6:25 pm, this was 25 minutes after the event was due to start. Due to technical issues the start of the event had been delayed and there were a number of people waiting patiently in the entrance/cafe area.

I was greeted warmly and enthusiastically by the staff behind the desk and asked to complete the medical check form and to read the instructions. The need for this paperwork was explained clearly by the desk staff.

I joined the waiting group, who all seemed to accept the wait without difficulty. Very shortly we were issued with coloured wrist bands and asked to move through the barriers to another area for a safety briefing. This was delivered by a member of pool staff in an efficient and cheerful manner with some humour. She thanked us for our patience but then went on to a long list of things that we were not allowed to do -this covered all the usual swimming pool rules, including not running and jumping, but also some additional ones about entering the pool carefully, not making too much noise, not splashing, responding immediately to lifeguard requests etc. This ended with a 'hope you have fun"

which seemed at odds with the previous list.

I paused at the doors to the pool to look through the window and get a sense of what lay ahead. A few other people also crowded round the windows, took photos and chatted enthusiastically.

The pool with the coloured lighting, dry ice and bunting looked intriguing. I made my way with the other participants to the changing rooms. Here there was a very quiet atmosphere, almost apprehensive. In the male changing area there did not appear to be any people who already knew each other, perhaps this is why it was so quiet.

Before getting changed I made my way out to the poolside. There were no swimmers in the water yet but many people around the pool, technical and artistic, as well as very many lifeguards. The atmosphere seemed quite tense, with the body language of the lifeguards and the intensity of the technical staff, no doubt contributed to by the technical difficulties leading to the delay.

I spoke to the lifeguard in the foreground of the above shot, he admitted to being sceptical about the event but said to come back to talk with him later, once he had had a chance to see how it went. He said that the pool generally had a relaxed atmosphere but could get a bit rowdy during the sessions where floats etc were available for people to play with (unfortunately I didn't get the chance to speak to him again).

After being challenged for being poolside as a participant but not in swimwear I moved up to the viewing balcony. On the way there I went through reception where there was a local woman complaining that the pool had been closed during the day. By the time I had got up to the viewing balcony people had started to enter the water. The atmosphere was still very quiet but with more of a sense of intrigue and exploration as people swam gently up and down the pool.

From the viewing area the dry ice did not seem to be very thick and the lighting was quite subdued. I watched for about 10 minutes, noting people chatting in groups, floating on their backs, taking photos and watching from the side of the pool (in the water).

When I went back down to the changing room a couple of people were leaving and I had a brief chat with them about their experience:

The first man said he had had a really good time and that the charge should be 4 or 10 times the usual rate. He was a regular (daily) user of the pool and said that on this visit it had made him think about his favourite film - Titanic - saying how much the mist reminded him of a particular scene in the film and how he had been imagining that was where he was when he was in the pool. He then admitted that he had had a couple of drinks before arriving and that the lifeguards had noticed and told him he must stay in the shallow end and watch. As a regular he said he thought that was fair and that he didn't want to risk not being able to come to the pool in future. He said he felt the atmosphere was relaxed, calm, happy and more chatty than when he usually came.

A second participant said that he had enjoyed it, that he was struck by the contrast in visibility above and below the water and how the pool had an eerie feel.

The third person I spoke to said that he had found it relaxing and had spent a lot of time floating on his back. The combination of dry ice and chlorine had been bad for his sinuses however, so he could not stay any longer. He was not a regular at the pool and said how much he liked the architecture.

I then got changed and got into the pool. I was surprised how much more dense the dry ice seemed when surrounded by it and agreed with the eeriness of seeing people looming out of the mist as they approached. By now the atmosphere seemed more relaxed, with people chatting with what appeared to be people that they already knew. It was enjoyable to experience the dry ice coming and going, with the resulting changes in visibility. I made an effort to speak to people at the side of the pool. If I had not been acting as a formal observer I would not have felt comfortable or encouraged to have these conversations, however, the people that I approached were happy to talk.

I spoke with an older woman who was a regular user of the pool. She said that she was enjoying the experience but preferred the clarity of the normal lighting in the pool. She also said that she enjoyed the atmosphere during the event and that it was a different kind of experience to her usual swim that was more for exercise. Then, unprompted, she said ‘’that man looks like a sea lion bobbing in the sea”. We then had a long conversation about her experience of seeing sea lions off the coast of Wales and she mimed how they looked popping out of the water and watching what was going on. The situation had certainly stimulated her imagination and her miming was very playful.

My other conversion was with a mother and her 15 year old daughter. They had had to leave two other siblings in the viewing gallery as they were 13 and so there were not enough adult supervisors in the group for the three daughters. The mother felt that this hadn't been expressed clearly in the information available before the event and had caused disappointment and stress for the family. Unprompted, the mother also said that she felt that the initial safety briefing had made them feel that it wasn't a place for being playful. She went on to say that the dry ice made her feel like she was in the sea, with a sea mist, although she had never had that experience. Her daughter said that the experience had been 'awesome' and 'mystical' and compared it to her experience of visiting the blue lagoon, a thermal spring in Iceland (I think these two were interviewed as they left the pool -interesting to see if their responses are consistent and/or if they felt over-researched!).

After the swim I spoke with a man who had come with his friend. Neither had used the pool previously and they said that they had enjoyed it - that it had been 'different'. The main interest of this man was the process of setting up the event and the roles and the experience of the people involved.

I also spoke briefly to the lifeguard who had been doing the snorkelling. He said that that he was very cold but didn't have much else to add.

After I left the changing rooms I met Tine and we had further conversations with people as they left. Key things I remember people saying were:

Everyone enjoyed it

One man was disappointed that there wasn't more of a community element to it - he seemed to have expected more people to be there

People liked the lights and dry ice and appreciated how they would become more interesting as the sun set.

The initial briefing was again mentioned as putting people off playing.

Conclusions

Personally I found this a very interesting and enjoyable experience - very different being a participant in the water than as an observer. I don't feel that I would have been prompted to talk to people had I not been doing the observation. On normal visits to my local swimming pool I will not generally speak to people I don't already know, although I have had brief interactions with people during 'splashdown' sessions where balls, floats and inflatables are provided and there is a raucous atmosphere - social interaction is then encouraged by sharing/exchanging the balls etc., people bumping into each other and so on.

If I had come to the Big Swim with friends or my family we would have had a great time with lots to think and talk about. I was disappointed that I didn't get to see the pool in the dark as I think the experience would have been much more powerful.

For me as a researcher the most striking aspect was the combined effect of all the messages that were anti-playful. I think this started with the medical forms to be filled in, was probably contributed to by people having to wait and was then reinforced by the health and safety briefing and the tense attitude, sheer number and the body language of the poolside staff. Given the current approach to health and safety in the UK I am not sure much could have been done about this - it would be interesting to contrast this with previous experiences Tine has had of the event and the one in Oxford. It was telling that when I spoke to the Health and Safety Officer on my way out he seemed to describe his approach as being to make very clear all the things that people couldn't do and for them to take it from there. Another comparison might be made with the normal 'fun' sessions that the pool runs when floats etc are provided.

I think it is interesting to think about what happened in terms of Caillois' spectrum of play from the free-play/more anarchic paidia end of the spectrum to the more rule-bound ludic end. With all the constraints that were put in place paidia was strongly discouraged - in fact it seemed to be a fear of free-play leading to problems of injury or drowning that was the main concern for the pool managers.

Within the constraints I think there were still examples of play going on - people linking their experience imaginatively to the Titanic and to sea lions - but this was more in the mind than expressed physically.

What is also interesting is to think about the affordances for play that were available. In terms of the physical context the water offers much potential - for splashing, diving into/under/through, jumping in, moving in a variety of ways. With other people present the possibilities for different/changing groupings of people, interacting, racing, launching etc., combined with the acoustics of the building for shouting, laughing and so on. Much of this was deliberately constrained by the rules described above. So people reported an eerie, relaxed and mystical atmosphere - I think this was good for the play of the imagination rather than of the body.

For my research this was a very interesting experience as it has confirmed the need to talk to people directly about their experiences - ideally in the behaviour setting. It is impossible to get the whole picture of what a person is doing, thinking and feeling but much more depth is possible than with observation alone. I had observed the man who talked about the Titanic standing on his own in the shallow end and was interested in

why he was doing that - finding out that he was drunk and had been restricted to that location explained a lot - including the nature of his later interaction with me! I wouldn't have known that the older woman was thinking that other swimmers looked like sea lions (perhaps she thinks similar thoughts in the pool under the usual conditions?), and the mother who kept looking up to the gallery wasn't feeling self-conscious but was checking that her children were OK.

On the other hand, part of the constrained atmosphere was due to the number of people present -the many extra lifeguards, plus technical crew and then people filming, taking photos, making notes on clipboards, interviewing them with microphones and then even asking questions in the changing rooms and on the way out - at times it felt a bit like a laboratory. It was good that Tine had made it clear to participants that all of the above was going to be happening - I wonder whether it put anyone off coming and how much it changed the atmosphere - perhaps those who attended liked all the attention? Simply in terms of the balance of numbers I wonder if it would have worked better if there had been more people allowed in the pool?

So, overall, a fascinating experience with a strong emphasis on the potential for a novel sensory experience leading to the possibilities of the play of the imagination.

Ben Spencer, 25th of July 2011.

Cultural Olympiad Open Weekend, Barton Leisure Centre

Oxford, 24 July, 2011

Observation notes by Tine Bech

There is more play – lots of tag and playing with the fog

Lot of enhanced pool behaviour play

People are smiling

People are saying 'wow' – they see the installation from the reception (this is a smaller centre)

Lifeguards are more relaxed

The pool has no deep end – maybe this allows for more play?

Lots of pool play behaviour, splashing, handstands

Words repeated many times:

Calm experience, relaxing, eerie, mystical, awesome and surprising, good fun

Observation notes by India Alexander

I took far fewer notes in Oxford, because there were fewer people and also I felt like a lot of the same behaviour was taking place and I noted it down in London.

Researchers' thoughts	**Actions observed**
The effect of the mist has an effect on how play is seen, by both the researcher and the others in the pool. Swimmers try at find their bearings?	There is a lot of movement and squealing to start with and people again cling to those they came with.
Move apart and back together, which is how the interactions between people in general seem to work.	Mother pushes her daughter away and the girl swims back to her, while the mother stands still. Even in the group of very excitable young Spaniards, after a while some break off and go into the mist on their own.
The light seems to be most intense in the spot where one is standing, and when you look to the side the other lights seem less colourful.	There is a lot of exaggerated arm movement; people fling their arms into the air. A couple lie on their backs, with their arms sticking straight out of the water. This comes at the same kind of time that the noise of laughter quietens.
Interesting seeing as the whole experience has a lot to do with insularity and so many people spend a lot of time on their own. How is this experience considered different to normal swimming?	People start talking about the pool/mist as soon as they see it, and those who are already in the pool usher others in to discuss it. Again, lots of people want their photo taken.
Is this play? Or just the exercise of regulars to the pool?	More people in Barton swim lengths than in London. However a lot of people are swimming lengths on their back, and more slowly than you might expect. Even children are swimming full lengths.
Dual experience of being in the water and mist at the same time, and the alteration of the quantity of the body in each.	When the mist was turned off, people spread outwards with the movement of the mist as it disappeared. A girl jumps out of the water, into the mist a spreads her arms out. Elaborate

Because there is more mist, or because if you stand up more of your body is in the mist rather than the water? Like the woman who talked about the experience of her physicality, maybe this is a way to experience others', when you cant see them as well as normally. There seems to be a tension between people sometimes wanting to be completely on their own, and at other times extremely close to others.	arm twirling. Much less touching/hugging/clinging to others than in London, seems here to be confined to parents and children. Some migrate to the edge of the pool and observe. People seem to gather in the shallow end. Some people start races, but they seem to have no end, and rather than having a finishing line, they just tail off into nowhere. People stand face-to-face and quite close, closer than they usually would? Again, people carry each other a lot. A couple hold their hands up to each other, palms up. A family play 'tag' and like the people in London, make a big show of sneaking up on each other.

It seems as though there are a few themes over the two days;

- Relating to ones' body through the mist, by looking at ones' feet/arms, or holding ones' arms up to signal.
- Using the mist as a base for games based on 'surprise'.
- The different layers of visibility in the pool, i.e. how you could see everyone from the balcony.
- The spatial movement of people in the pool, according to activity and over the time spent in the pool, i.e. taking the time to move into the middle of the pool alone after a few minutes.
- The splitting up/reforming of groups as people felt a compulsion to be on their own.

Interviews by India Alexander

	1	2	3	4	5
How did you find the experience?	Not bothered	Fun	-	Fun, claustrophobic, empty, holy	Brilliant, peaceful, exciting
How would you describe the experience in one word?		Fun	Cool	Weird	Relaxing, but there was more to it than just this
Do you think that the big swim enabled you to have a playful experience?		Yes	Yes	Yes	No
Explanation		Was hindered by the pool restrictions on the use of floats	Because it was very unusual	Because the pool felt bigger and more empty, especially from the middle	They said that they were usually more playful in the pool, and less so this time because they found the experience eerie and creepy
Did you play while you were in the swimming pool, if so what kind of play?	No, came solely for exercise	Yes	Yes	Yes, splashing each other and trying to 'catch' the fog	No, they were just swimming
Have you gone to many public art events before?	Once in a while	Many times	-	None	None
Have you been to the pool before?	Regularly	Many times	Very rarely	Many times	Many times

Interviews cont.

	6	7	8	9
How did you find the experience?	Fantastic, would love to have the experience in the pool more often, wished her friends were there	Not used to it, 'not normal', she said how much her children would have loved it	Different, romantic, magical	
How would you describe the experience in one word?	Glorious	Unusual		
Do you think that the big swim enabled you to have a playful experience?	Yes	Yes	Yes	
Explanation	The light on your arm (when swimming) gives a great sense of one's physicality. A good training device (she was training for a triathlon)	Because it is very different under the water 'It's like being in outer space'.	Because when swimming in fog one has to 'co-ordinate' oneself differently, you have to be more careful	
Did you play while you were in the swimming pool, if so what kind of play?			Yes, changing one's style of swimming.	
Have you gone to many public art events before?	Very rarely	Very rarely	Very rarely	
Have you been to the pool before?	Many times	Many times	Many times	

Other observation notes

Interview questions to Big Swim Lifeguard (informal interviews conducted by Tine Bech)

1. How did you find the experience - (working as a lifeguard during *The Big Swim*?)
2. How would you describe *The Big Swim* installation in one word?
3. What did you observe people do in the pool?
4. How did people generally behave?
5. What type of experience do you think (feel) *The Big Swim* enabled participants and swimmers to have?
6. What (safety) briefing were you given with regard to monitoring/controlling people's behaviour?
7. Were you aware of the safety briefing being given to people before they entered the pool (what was said to them)?

OBSERVATIONS
TRACKING YOU

Victoria and Albert Museum

V&A Digital Festival, 22 - 23 September, 2012

Observations notes by Tine Bech

22/9/2012 Observations made throughout the day, between 10.30 and 4.30, with several breaks in between.

We are telling people what to expect while helping them to put on the capes

Adults play more

Children are shy

Mother plays with child

11.15 People are already coming back to play again

Clapping sounds - absolutely nobody notices

Same people came back with friends to show them the work

11.46 we changed the speed sound because people do not want to run

Secret zones are hard to find

NEXT Add spinning sound

Same people came back with friends to show them the work (Note: This is about different groups coming back to play. Text was copy/pasted during my observation)

Group of five girls in their 20's stand still then all run at the same time

Mum and two children play tag

Tine: Everybody first thinks this is for children (and send their kid in to play) but the sound-scape is too complicated for children to figure out. They just like the capes and running

Normative behaviour. People watch and then imitate

Boy figured it out – speed up and down because his sister left the space

'Got you' comment while shooting

For the group of smaller children only shooting sound would work better.

Tine: how to create play for different age groups

Tine: Capes move around on the body a lot. Redesign them

13.10 'nice it's like cartoons' comment (about people playing)

People try different colours on

People take photos of each other

Group of strangers playing. 2 know each other. Standing still, then moving. Laughing

Tine: Play - is about making them explore. People who explore the interactive space are rewarded more.

People seem to attribute significance to the colour (which to wear). ‘I want the pink’

Tine: Techies think it’s a camera interface and that it's the colour that is tracked

Tine: General curiosity about how it works. Lots of people ask how it's made. Lots ask what the technology is normally used for.

Same people came back with friends to show them the work

Yellow cape is a more recognisable sound - galloping and this makes people do a galloping pose

14.22 Mostly adults playing, lots of group after group. Comes in flow. One group generates another ...people hear and see what goes on. Then want to play

People are shy. Child more shy

Same people came back with friends to show them the work

15.00 group of six young girls. One girl is conducting the others

More children are playing now than earlier. Age groups come in flows

Many people watching, afternoon busy

Same people came back with friends to show them the work

16.00 people are conducting each other

17.00 last people playing

'It's so much fun you forget to be embarrassed' middle age man (family who played). Woman with him commented 'and you said you’re definitely not going to wear a cape'

Tine reflection at the end of the day:

Tentative play, exploring leading to more

First lots of shyness to moving fast. Which is why we changed the variables.

Shyness is also brought on because of the playground defined space and lots of people looking on

Lots of physical play - spinning, jumping

Lots of laughing

People leave and come back bringing friends

Less posing than expected

Paidia and tumult

Less gaming than I expected, but lots of chase and shoot

Collaborative play by coordinating speed and creating collisions

Strangers playing together

Clapping: Created some confusion because people tended to play in the area and would get slightly upset that they could not shoot and got clapping instead. It broke the established rule/parameter

Today nobody figured the clapping zone out by themself. I added a green tape cross mark. Made little difference. Will change the zone to be same sound for all. Sound Clap 4

The shyness is linked to Graham's theory of people looking at you in the gallery

Day two, 23/9/2012

Observation made throughout the day, between 10.30 and 4.30, but I was not there continually throughout the day. Times below do not indicate anything significant.

Adults playing again

Tine: works better when more people are playing. Collaboration!!!

'its kinda cool'

'It's really good'

Parents order their children around 'run', stop', play'

Mum picked up child and said 'let's go for a run because everybody is running'

More adults playing. Same as yesterday.

VA is counting numbers coming in. Use this data

Woman explores and plays tentatively. One more enters

Dad and son play. Shooting each other.

- They find the clapping zone. Dad tells child to go there
- Dad tells child to go fast
- Child shoots dad
- Dad goes slowly, then fast. Tentative playing
- Mum looking on.
- Mum tells child to run

Another family is looking on. Parents try and get their child to play

Onlookers enter, dad and girl

Tine: the installation shows how playful people are. And how shy. Some run immediately, some are tentative

Invigilator asks 'Do you want to play?' 'No, I just want to watch'.

Child is 9 years old (I asked) and was able to figure out the sound/speed.

Five younger children playing shooting, focused only on the shooting

Children also seem to be just happy to be wearing the cape

Children between 2 and 10. Strangers playing together

'That's really cool', older child

A player is providing her own sounds. Horse whinnying

Two people playing again and again

Patents trying to get their child to play. Parent enters the play room but older children are too shy – want to watch. Parents ask again come play.

People STEP into the space tentatively. Explore, then performance ...which is forgotten with the excitement and ilinx

Two women dancing

Boy running and running

Woman laughing

Someone says, 'It's amazing'

Woman playing with a stranger

Woman shooting others

More strangers playing

Woman tries on different colours to hear the sounds

Mother ordering child around, 'Try and run. Can you hear your sound?'

Children like the colours. Ask to try different capes because of the colours

People look up at the sensors

3 small children and two older boys play. Children run. Boys do collision

Several people have stated that the yellow galloping is their favourite

Group playing with stop and start

Asian family perform for each other. Standing on the line the dad performs

Child suggests, 'Let's go really fast'

Girl orders 'Stand still'

Children playing, parents standing on the sideline taking photos

Adult enters while four children are playing. Children shoot him. He looks very confused

Boy runs for the joy of speed

Couples playing. Testing everything, she shoots him at the last moment, 'ha ha'

Tine: The cape helper (invigilator) encourages people to participate. Facilitation

Man playing, woman he is with does not want to play. He is in black

Lots of children now playing, group after group

Tine: I am beginning to resent children playing. Because it rolls out an 'all kid play zone' creating a playground where adults only want to watch

Children playing. One younger without a cape - just running

Tine: The playground

Tine: Children take over. Should I facilitate adults to break in?

Groups now playing. All ages

People doing funny walks

Two ladies dance together

Dad swings child around - holding child's arms and swinging him around

Three adults playing with speed

Mum and older daughter pretend they hold weapons

Mum runs with small child, she is not wearing a cape

Mum now puts capes on and plays shoot with her child

When someone activates a sound elsewhere people attribute it to their actions

Tine: Family plays well together

Tine: Groups and couples playing seem to have more fun. Some manage to play with strangers

Young girl and dad play. 'I got the horse', she says

Children do not want to be separate from parents so shooting happens all the time

Child plays for long time with different groups (adults) she knows in the applause zone and stands there for a long time, looking at her mum and dad watching (she also knows I am looking, see photo)

Tine reflections at the end of the day:

People perform for each other

NEXT make backwards movement and spinning

Felt very caring/mum-like to put the capes onto people

Joy of running (images)

Group play (got series of photos)

Photos posing hero

Waves of adults and waves of children

Poor adult soul who comes on the floor while 4 children run and have established this is about shooting, he did not have a chance (to play or to figure anything out)

Some people choose colours depending on what they are wearing, matching looks

Lots of people moved the cape themselves, swinging it around to create the sounds. … technology

Shoulder bumping - between all ages

Observations by Caldwell Akers

My name is Caldwell Akers and I am a third year Design Student at Goldsmiths' College. This summer I volunteered at the V&A for the Artist Tine Bech, on her installation *Tracking You,* in the Sackler Center of the Victoria and Albert Museum.

The most important factor to one's experience of the installation was how full the room was when they arrived. When the room was full, the loud sounds attracted a lot of attention making this the loudest and possibly most exciting time for one to experience the installation for themselves. When the room was full people were more relaxed about running around and interaction between participants was greater. It is also true that some of the more timid visitors were sometimes shy about joining in with everybody, especially with so many people standing to the side watching. There was also a big hurdle to participation when only children only occupied the floor because it wasn't clear to visitors if this was something an adult should be participating in.

There was also the problem of once somebody decided to join with the last available cape, that it was sometimes difficult to differentiate your sound from the rest of the pack of participants. Some sounds made this easier than others, such as the horse gallop, but some sounds, like the wind whooshing, faded into the mix and made pinpointing your individual effect more difficult.

The level of instruction the user received also varied depending on how packed the room was and depending on if they got a 4 minute lecture on RFID technology, or were just pointed in the right direction and told to "go", changed how long it took someone to understand what effect their movements were having on the generation of the sound.

In the end the simple effect this installation presented worked on about 99 percent of the visitors and for some they even took on the "characters" of their capes, by literally galloping when wearing the horse cape and pretending to fly with the wind cape. For all those around the age of about four, they seemed to like to run around with capes in a room full of loud noise, and didn't mind not really knowing what was going on.

The only other specific thing I noticed was that men aged 17-27 were very unlikely to give it a go unless their dates said it was alright first.

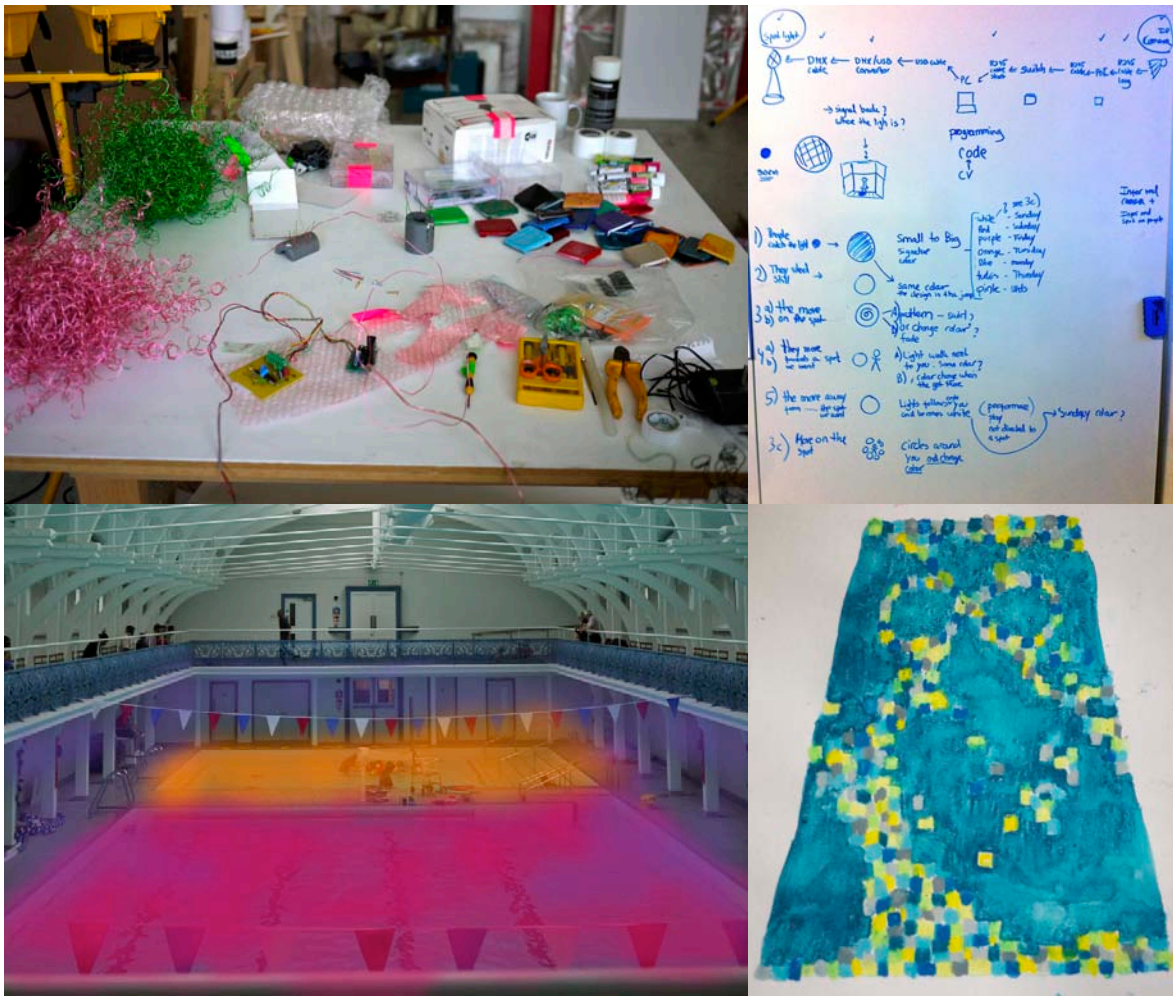
Other feedback: email

Verity McIntosh 26/9/12

'...the experience was utterly joyful. I ended up playing twice with some chums and total strangers, one of whom started spontaneously break dancing'

THE MAKING PROCESS
INTRODUCTION

In this section of the appendix a selection of images and sketches are included. They are included to illustrate some of the making process but, of course, do not cover it all. In particular I have tried, where possible, to include sketches or aspects of the making process that are referred to in the catalogue.



Figures clockwise:
Fig. 1 My studio while working on *Echidna*
Fig. 2 Thinking about possible play interactions on my whiteboard in the studio for *Catch Me Now*
Fig. 3 Testing colours for *The Big Swim* using photo shop
Fig. 4 Sketching and thinking about the capes for *Tracking You*

ECHIDNA
SKETCHES AND NOTES

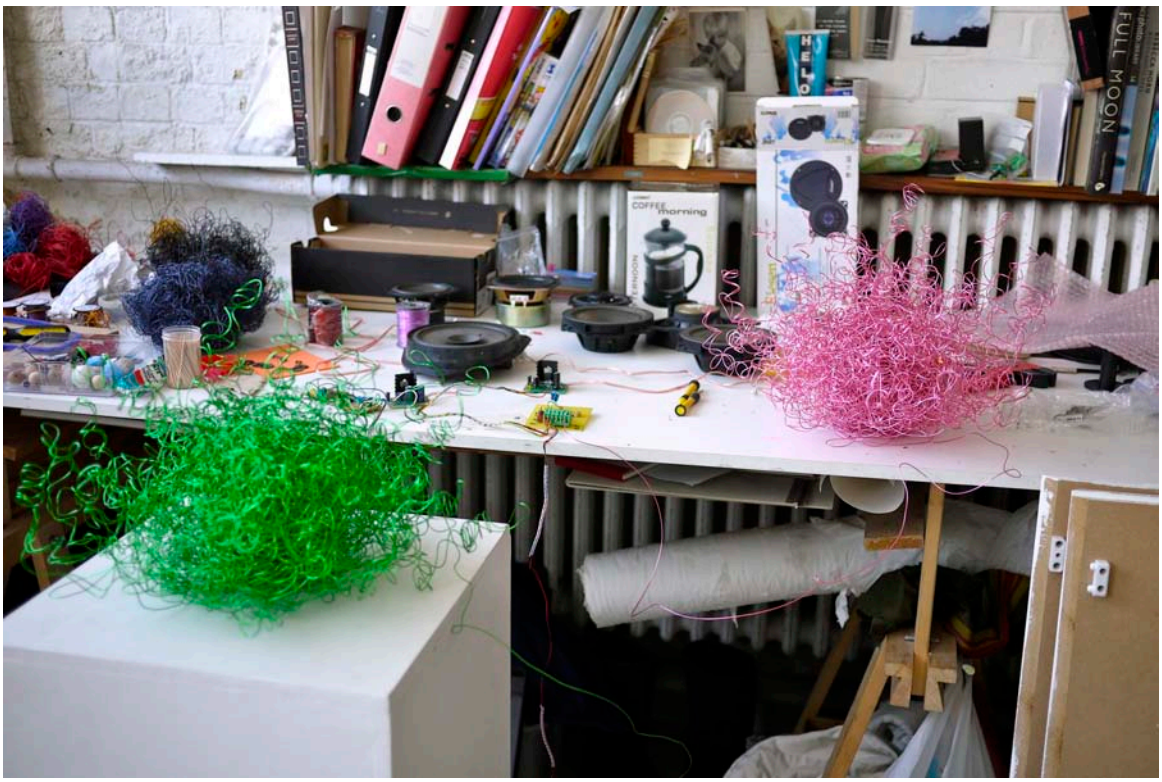


Fig. 5 *Echidna* in pink and green during the making process

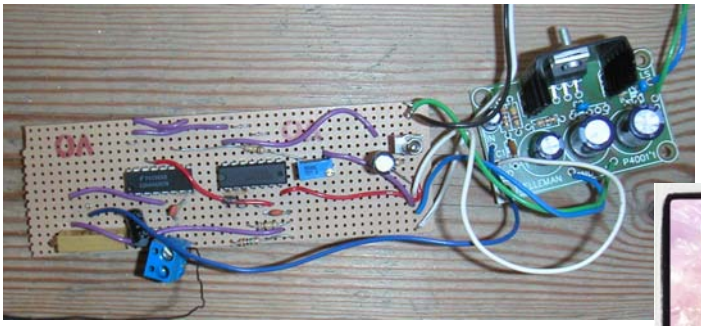


Fig. 6 Old *Echidna* circuit board which needed to be more consistent in the sound output

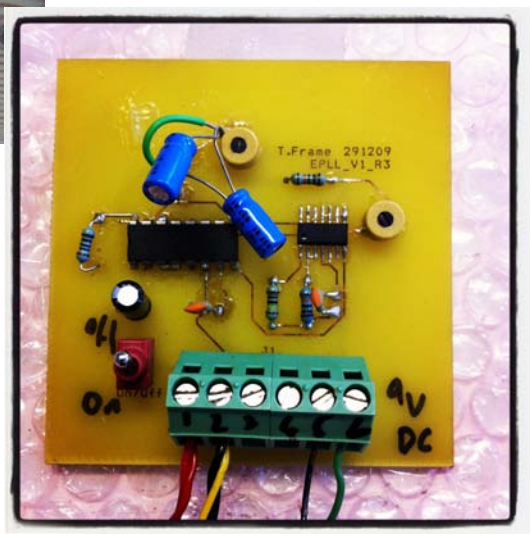


Fig. 7 New circuit board for *Echidna*

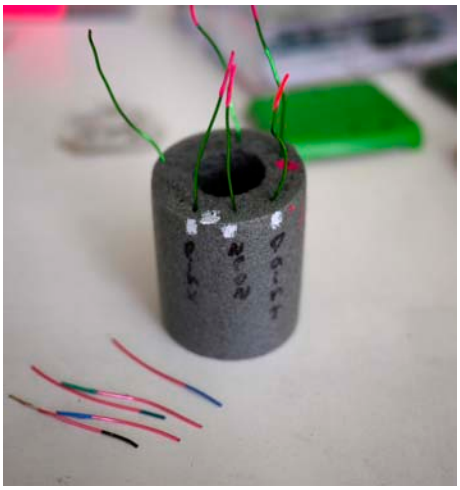


Fig. 8 Testing paint on wire and green *Echidna* with pink ends

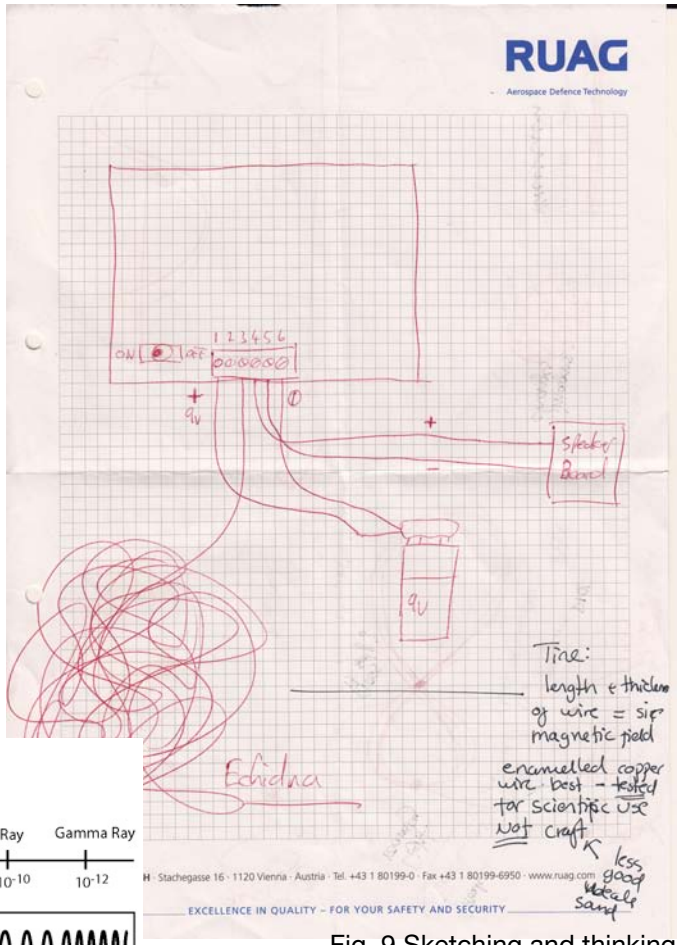


Fig. 9 Sketching and thinking

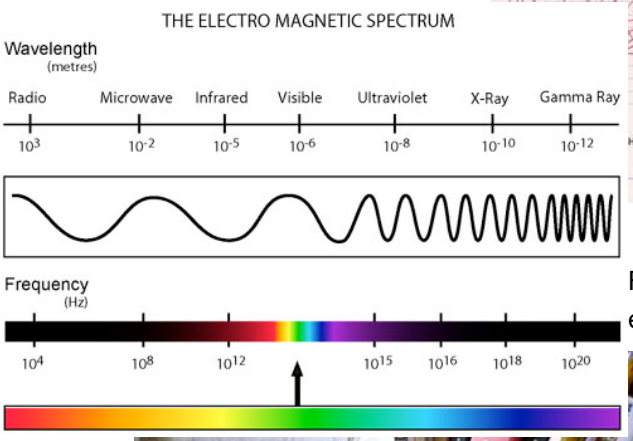


Fig. 10 Simple illustrations of the electromagnetic spectrum

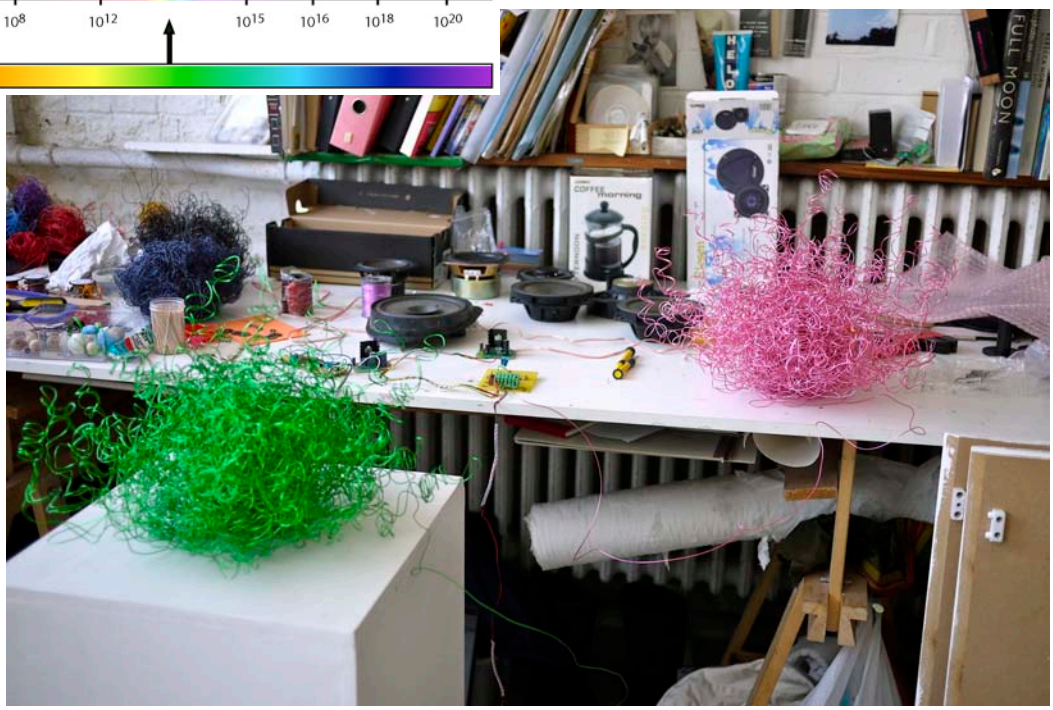


Fig. 11 Playing with colour

CATCH ME NOW
SKETCHES AND NOTES

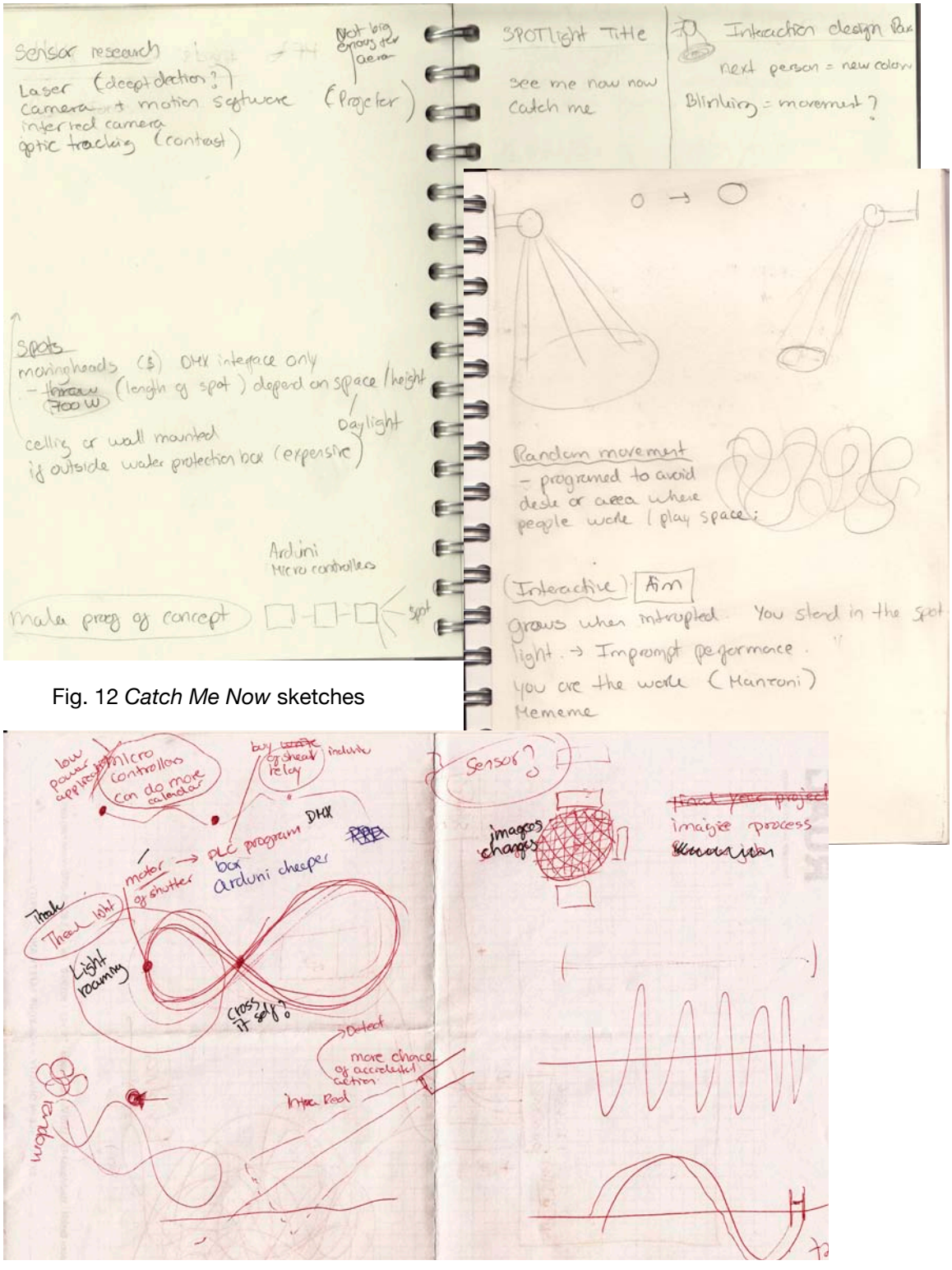


Fig. 12 *Catch Me Now* sketches

Notes on my first ideas for interactions

General:

CH 14 zoom is on the smaller lens 15”

Colour: (depends if we can we jump from colour to colour, or if we need to go through the wheel?)

Roaming (the light is on its own)

No one is around or playing with the spot:

Spotlight: Small iris CH13/255 + not in focus (appears like a blurred small spot).

It moves slowly and randomly, pauses once in a while to invite people in. The area it roams around is directly in front of where the light is mounted.

Colour: depends if we can we jump from colour to colour or if we need to go through the wheel

Future wish: roams around the edges of its territory - its play field, as to patrol the area. This will also indicate to people the ‘play space’

Colour changes throughout the day according to the time; morning, midday, afternoon, evening...

Initiate (goes into play mode)

Interaction cue: people stand/cross inside the small light (roaming mode)

Or, the light finds people if they stand still for longer than 5 (?) sec near by (looking at the light????)

Spotlight: Iris goes to large CH13/0 + the light is in focus + change colour (if we can jump between colours then it goes to complimentary colour or something (?) otherwise goes one up on the wheel)

Once the light has opened up to full iris - several play modes can happen:

First Play mode (people stay in the same spot)

Interaction cue: If people stay within the spot and move, arms etc. Or just stay/stand for longer than another 10 sec(?) *Question: is it possible to determine type of/speed of movement, or do we also need timing - length of time people stay in the area?*

Spotlight: changes colour

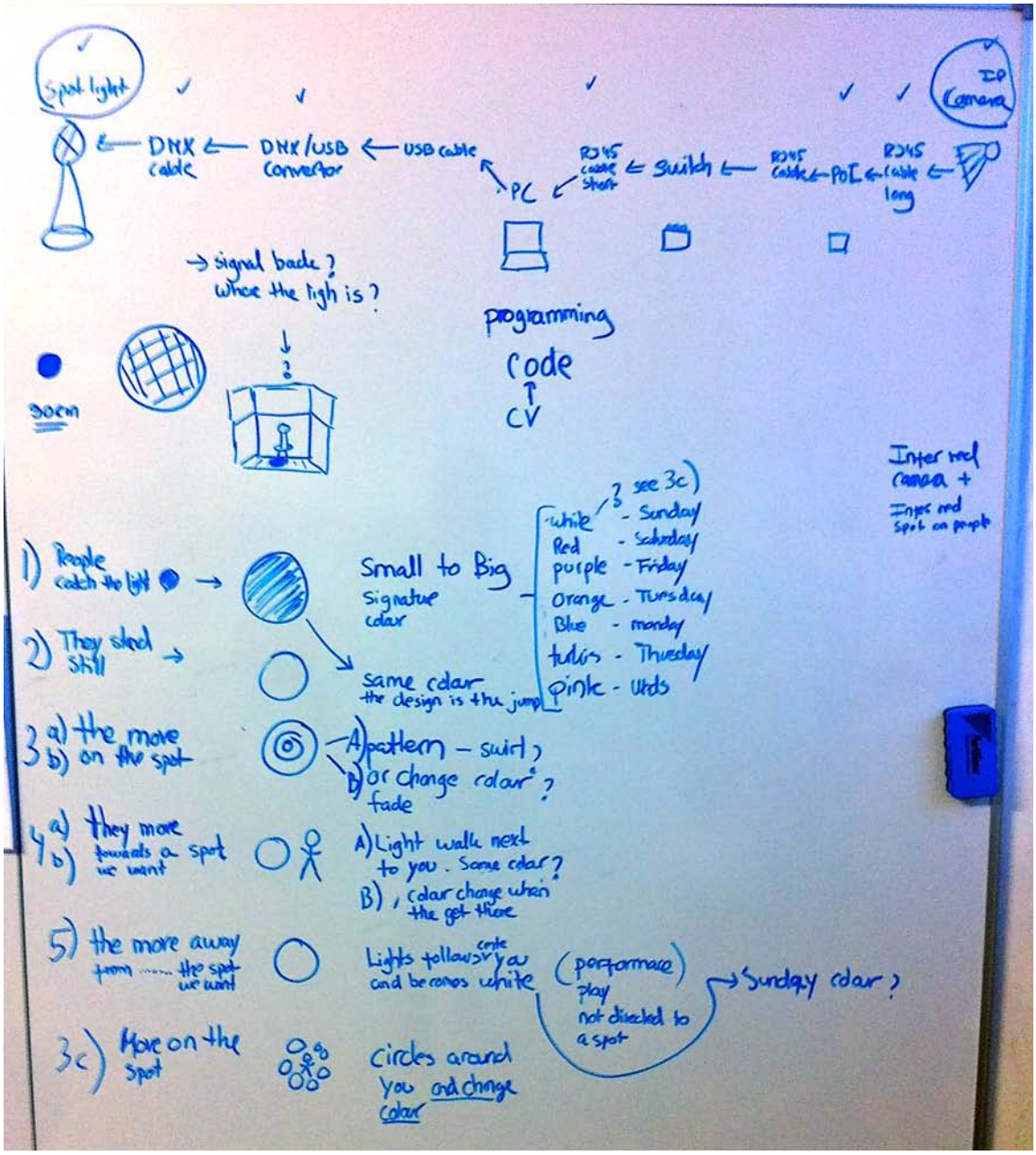


Fig. 13 Thinking about possible play interactions on my whiteboard in the studio

Exited play mode (staying in the same spot)

Interaction cue: If people still stay in the same spot/area after ? sec and move arms etc.

Spotlight: the spot goes into prism CH 9

We might need to add some cues …?

Very excited (staying in the same spot)

Interaction cue: If people still stay in the same spot/area after ? sec.

Spotlight: The prism starts to spin CH 9/3-95

We might need to add some cues …?

Follow play mode start

Interaction cue: people move away (we probably need to talk more about timing). If the spot starts to follow someone else that's cool

Spotlight: prism off, initiate mode (large iris in focus) and follows people

Follow play mode ends

Interaction cue: people leave - exit the play area (where the spot lives)

Spotlight: follows people but stops at the edge of its roaming area (changes colour when at the edge?) stays still, hovering at the edge for 5 sec, before going back into roam small mode

It is also possible the spot ends it's play with you if it starts to follow someone else???

Future wish: certain area is a 'reward area' and the spot changes colour again and shakes/prism...?

Notes made after testing new interface at Watermans and the V&A, Oct, 2010

- Use the reliable/consistent features
- Use only the initiate mode – open spot, test time it stays with audience
- Spot does not change shape when in roaming mode

New interfaces decided:

- Colours simply circle through the colour wheel (only way to get a smooth change (the wheel scrolls through all options otherwise and you see the jumping)
- Small spot size = roaming mode iris: 0 (15-30cm)
- In roaming mode the light moves randomly around, occasionally
- Large spot size + play mode iris: 100 (75 cm-1m)
- Play mode stays 1.5 sec with people
- Prism is activated after being activated 7 or 10 times in a row *The count is reset after a period of not being activated*
- *** Activation/reactions are executed right after each other (A leads to B and so on)

Fig. 14 Testing gobo's and spotlight sizes (iris and zoom)

Test done at the Science Museum

- Spot size
- How long the spot stays open (in play mode)
- The shape of the spot (includes prism)
- Rotating. Not used. Was only good with the 3 spheres/holes gobo in the spots static wheel
- Test Gobo aperture purchase = 12mm and 3mm - Check it works if using them next to each other

Note!!! No changes needed - it works as it is!

Fig. 15 Tarim at The Science Museum with *Catch Me Now*

Future possible designs:

- Spotlight Patrols its own area
- Actions in certain areas if the light is activated while near the edge a different shape always come up - can this be included if the light always goes to a random new area?
- Iris is adjusted depending on the length of the throw
- Movement of light = shake (when in play mode)

Thoughts

Spot open for longer = more performance *look at me* possibilities # less competition, thrill, chase

Spot bigger = more people inside/collaboration # less competition, intimacy

Final notes and parameters

Prefer scroll colours - not jump through colours

See feet not head programming

How large the play space is – what is ideal?

Using gobos does not work.

Timings:
Boredom time for spot is 30 sec before moving in roam mode
Play mode Open for 1.5 sec
Flower prism 3 sec - appears every 7 activations in a row

Size of spot (diameter of the spot in roam and play mode):
Size of the spotlight matters as it determines how many people can be inside it:
Play mode: variable + slightly out of focus. For 5 meters the iris value goes between 126 and 255 connected to the angle of the light.
Currently it is on open in order to get a nice round focused spot. However, when placed / mounted high up the open play mode gets very big. This can be counteracted by having a variable iris. Will also have to be slightly out of focus due to the iris when focus has an edge and does not look good or look like a spotlight.
Iris can be used to change diameter but the circle/spot is not perfectly sharp and round. It gives less distortion when in the outer edges. The lower the spot is mounted the more the distortion.

Small iris (255) + out of focus in roaming mode
Iris cannot be made smaller in roaming mode. Works well in 3 to 5 meters height. At 5 m up it is slightly too big, but there is no way to fix this (check)
The iris is set to “out of focus” to avoid the iris mechanical function showing it is a octagon (check fix Robe)
Focus for the iris is a fixed value no matter where in the space it is

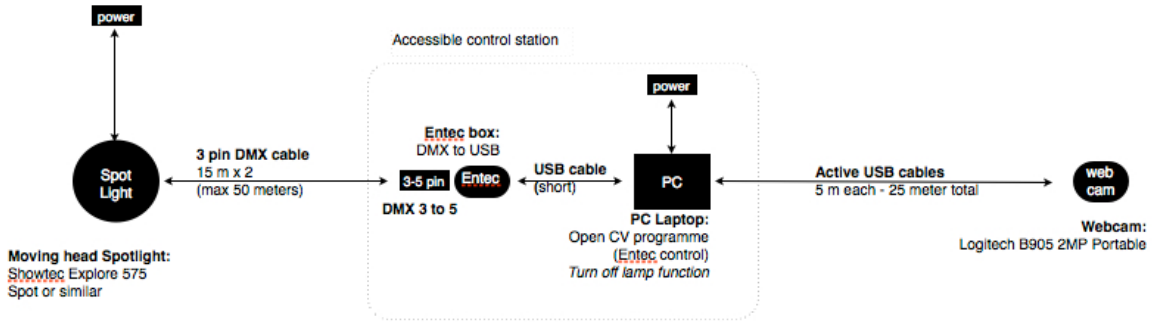


Fig. 16 *Catch Me Now* final technical setup

THE BIG SWIM
SKETCHES AND NOTES

Fig. 17 Site/Pool research, Chelsea Leisure Centre and Seymour Leisure Centre

Fig. 18 Playing with colour schemes for *The Big Swim* in photo shop

Redacted due to copyright

Fig. 19 Mark Rothko, Untitled (1960-1961)

Fig. 20 Testing colours on the VARI LITE VL3500 Wash moving head (50,000 lumens) at the Panalux warehouse

SETUP schedule, Camberwell	
12 - 2 pm	Unload gear - storage meeting room 1
	Setup of Lights balcony
	Turn off heat in pool? To avoid steam rising too much (probably not worth it as temperature falls slowly)
	All *Big Swim* crew to be briefed about pool rules: fire exit etc
	Badges for all *Big Swim* crew
	Cut gels: 31 neon lights length = 160 cm (5xA4) x 30 cm (1 x A4) = 2 rolls of gel
	Time lapse camera
	Turn off lights: ceiling and balcony (under balcony on)
2 pm	Setup of lights poolside: (pool is closed to the public)
2 – 4 pm	Lifeguards training CPD by Jo Check
4 pm	Mee fog setup (no later)
4.45	Live Test of Mee fog system: Mist level and mist cut-off
	Final risk assessment measures by Wayne Catherall
	Safety tape in place at pool and balcony
	Media form/Participant handout/Health form handouts ready at Reception
6 to 10 pm	EVENT OPEN
	Lifeguard schedule
	Film crew working in all areas including the pool
	Research observation schedule
	Interviews of willing participants 3–5 in total including different ages and gender
10 - 11.30 pm	Take down
11 -12 pm	Panalux pick up gear

SETUP schedule, Barton	
12 - 1 pm	Unload gear – storage room
	Setup lights outside (?)
	Turn off heat in pool? To avoid steam rising too much (probably not worth it as temperature falls slowly)
	All *Big Swim* crew to be briefed about pool rules: fire exit etc
	Badges for all *Big Swim* crew
	Time lapse camera
1 pm	Setup of lights poolside (pool is closed to the public)
	Turn off other lights poolside
2.30 pm	Mee fog setup (no later)
3.00 pm	Live Test of Mee fog system: Mist level and mist cut-off
	Final risk assessment measures by Wayne Catherall
	Safety tape in place at pool and balcony
	Media form/Participant hand out/Health form hand outs ready at reception
4 to 8 pm	EVENT OPEN
	Lifeguard schedule
	Film crew working in all areas including the pool
	Research observation schedule
	Interviews of willing participants 3–5 in total including different ages and gender
8 – 9.30 pm	Take down
9 pm	Panalux pick up gear

Staff:	
Tine Bech	Artist
Stephanie Kennedy	Assistant
Neil Blackman	Lighting Gaffer
Nicolai Amter	Camera
Håvard Helle	Camera and underwater camera
Mike Crowley	Mee Mist Technician (Saturday 4 pm)
Paul Dimmer	Mee Mist Technician (Sunday 2.30 pm)
Panalux Simon Rode (Nick Edwards)	Delivery of lighting
Notch	Feedback and Interviews (at Camberwell only)
India Alexander	Research: observation of people *(the researcher is also a qualified lifeguard)*
Ben Spencer	Research: observation of people at Camberwell, late evening only
Jo Cheek	Fusion Operations Manager, Camberwell pool
Wayne Catherall	HSE, Fusion
David Hunt	Operations Manager, Barton pool

Leon Popplewell	Development Manager, Divisional Sports and Community, Fusion, Oxford.
Creative Campus	HSE emergency contact
Dan Wood Janet Foskett Alvaro Branco Doran Morgan Lewis Anstock Serena-Leigh Ellis Radu Stoica Alex Migel Claire Taylor	Lifeguards, Camberwell Leisure Centre
Angus Whitburn Holly Holden Ashley Towne Spencer Florey Claire Hopkins Tim Wallis Stef Cox Jonathan Hemingway Claudia Gibas	Lifeguards, Barton Leisure Centre

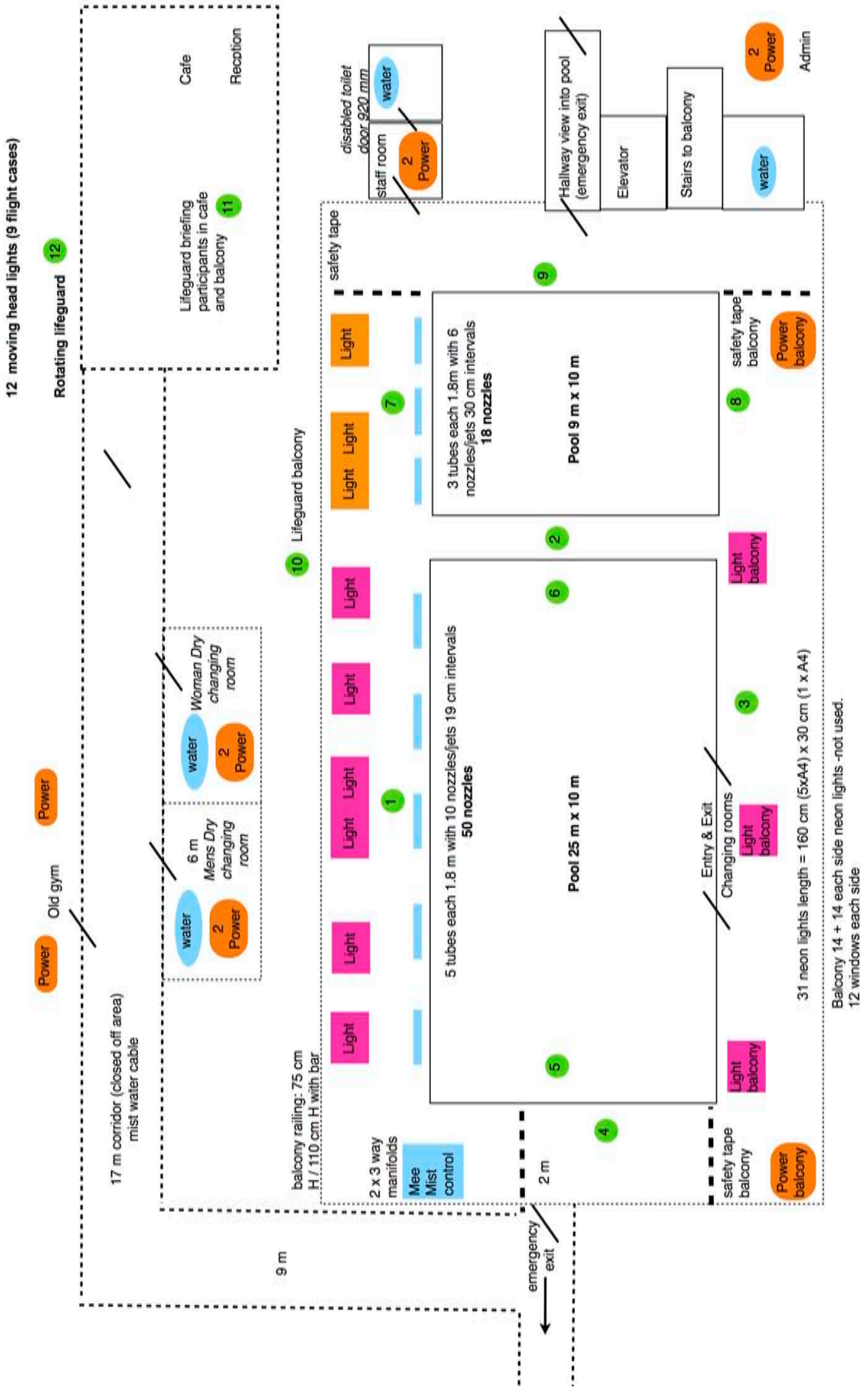


Fig. 21 Drawing of the technical setup for *The Big Swim*

Lifeguards – participant safety briefing

This is the briefing that the leisure centre wrote and briefed participants with before they entered the swimming pool:

Welcome to *The Big Swim* event at Camberwell Leisure Centre/Barton Swimming Pool.

Before we can allow you into the water there are a number of safety issues that need to be addressed.

Can all bathers swim 25 meters without the use of swimming aids?

Pool rules:

- No running
- No diving
- No jumping in from the poolside (slide entry in only)
- No play equipment
- No acrobatics or gymnastics
- No ducking or bombing
- No pushing, shouting, or horse play
- Wrist band must be worn at all times.

If you hear one short blast of a whistle - please stop what you are doing and take notice of the instruction.

If you hear one long blast of the whistle - please exit the pool and go to the changing rooms.

The Big Swim – Information sheet

Handout created by myself to inform the participants about the installation and research conducted.

What is *The Big Swim*?

The Big Swim is an interactive art installation which takes place in a swimming pool and aims to encourage playful art experiences and promote local community interest in swimming, ahead of the 2012 Games in London.

It is a live event where participants will experience swimming in a cloud of light and colour, based on one of the five Olympic colours: blue; yellow; purple; green and red.

The project is created by visual artist Tine Bech and is also as part of her doctoral research into playful interactive artwork. Throughout the event, Tine and a colleague will observe how participants interact and play. She will use note taking and video to record the observations. These impressions will support Tine Bech's research into the development of a model for making playful interactive art installations.

Who can take part?

- You must be over 8 years old to take part.
- Under 16's must be accompanied by an adult competent swimmer. *An adult competent swimmer is someone over 18 able to swim 25 metres without stopping and without swimming aids.*
- In order to participate please sign the media consent form and make note of the Leisure Centre's safety instructions.

Pool Safety

Liability
With the acceptance of this information sheet you confirm that you have read and understood the following warnings.

The event is safe but it is important to understand this is an Art event, not a regular swimming session. Participants must follow pool rules and the lifeguards' instructions at all time.

Low visibility risk
The fog/steam hovering over the pool reduces the visibility, please take extra care and keep an eye on accompanied children.

Humid environment
The environment is humid, if you have any medical condition which may be affected, please take precautions, or leave the pool area.

Do not enter the 'no access' marked areas where technical equipment is placed.

Consent to being photographed and filmed

The event will be photographed and filmed to create a documentary about the project. No participants will be singled out. No children will be photographed or filmed close up. The documentary is about the project as whole and not individual participants.

We need your permission in order to share the video and photos and therefore ask that you sign a media consent form.

If you are willing, we would also like to interview you one to one. This is optional and you can withdraw your interview at any time after the event. We will provide you with details to contact us, should you have any concerns.

Copyright

TRACKING YOU
SKETCHES AND NOTES

Fig.22 Tom Mitchell, programmer and collaborator, David Theriault from Ubisense

Fig. 23 Sketches for capes

To ensure the RFID stayed on the shoulders I experimented with a range of solutions, including using a hairdressers weighted shoulder cape, and applying felted shoulder pads. The method I eventually chose was to use foam moulded shoulder pads sewn into felt and weighed down with curtain-makers lead string. The RFID tags were inside the shoulder pads, held in place by Velcro, in order to have access for battery changes.

Fig. 24, 25, 26 Testing how to place the RFID Tags on the shoulders

Fig. 27 Sewing RFID Tags into the shoulders

Fig. 28 sound map overview – the changes made to these sound designs are described in the catalogue.

- Running zone (Y and X coordinates and velocity - speed and volume): *blips etc* - different sound for each cape [5 sounds in total]
- Tag collision zone (approx. 1 diameter, 50 cm each side): *Zap/shot/bang* - different sound for each cape [5 sounds in total]
- Centre stage zone (approx. 1.5 diameter): *clapping,* different sound depending on how many capes are in the zone – 5 x applause creates sounds of different intensity [5 sounds in total]
- Wall zone (approx. 0.7 meter wide): *Alarm* - same sound for all capes [1 sound]
- Start up zone (approx. 0.7 meter wide): entree start sound - same sound for all capes [1 sound]
- Exit zone (same zone as start up): exit sound - same sound for all capes [1 sound]

Rules list for each individual sound cape (in priority order = sound overrides the other sounds):

1. Clapping mutes everything e.g. running and shooting sounds
2. You can shot everywhere except in the clapping zone
3. Running sound stops in all other zones e.g. wall, running and centre overridden running
4. Alarm wall sound overrides other sound

Cape description	Zone: Start up sound	Moving sound: Walking - running	Proximity sound (Collision - shooting)	Zone: Centre sound	Zone: Wall sound	Zone: Exit sound
Green *Retro*	Start up sound ta daaa Same for all capes	Wind	Peuww (cowboy film sound)	Clapping intensity 1-5	Disabled same for all capes	Bow wow wow Same for all capes
Red (pink) *Gamer*	" "	Cha Ching	Pow Pow	Clapping intensity 1-5	" "	" "
Blue *Space*	" "	Waw - buzz (sci-fi)	Laser	Clapping intensity 1-5	" "	" "
Yellow *Western*	" "	Galloping (horse)	Shoot gun	Clapping intensity 1-5	" "	" "
Black *Dark Master*	" "	Hum wroww, deep tones (monk humming)	Shoot & Load	Clapping intensity 1-5	" "	" "

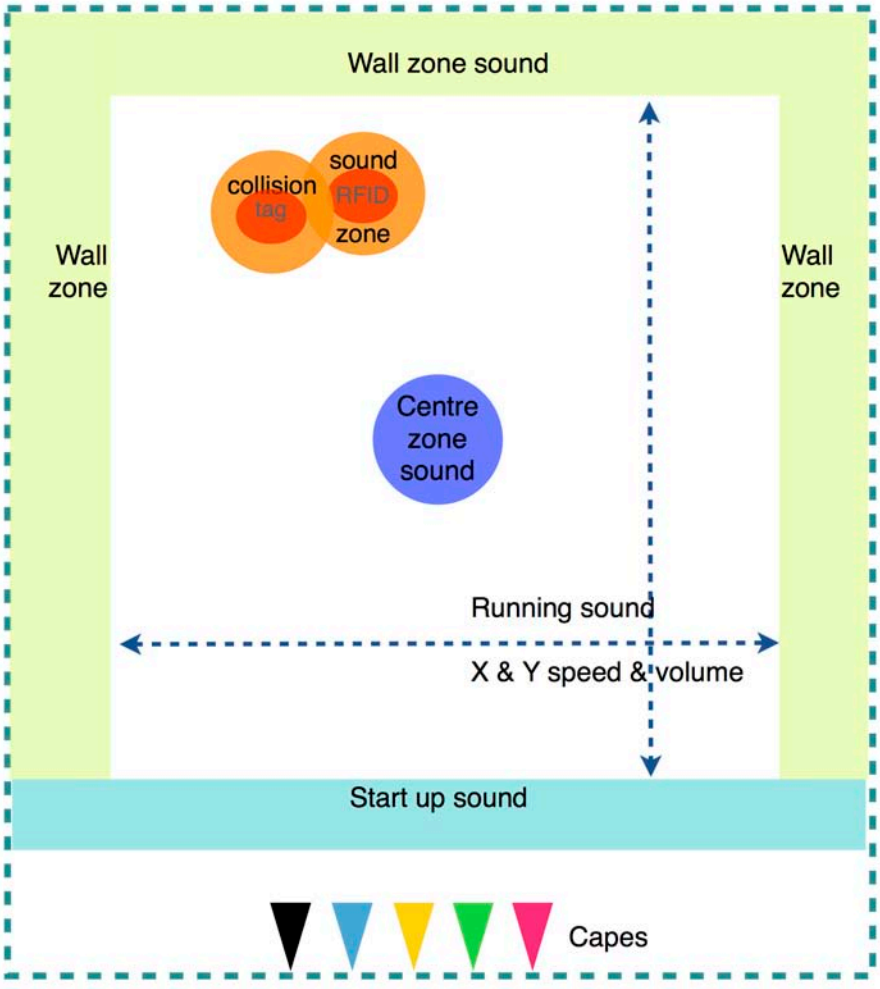
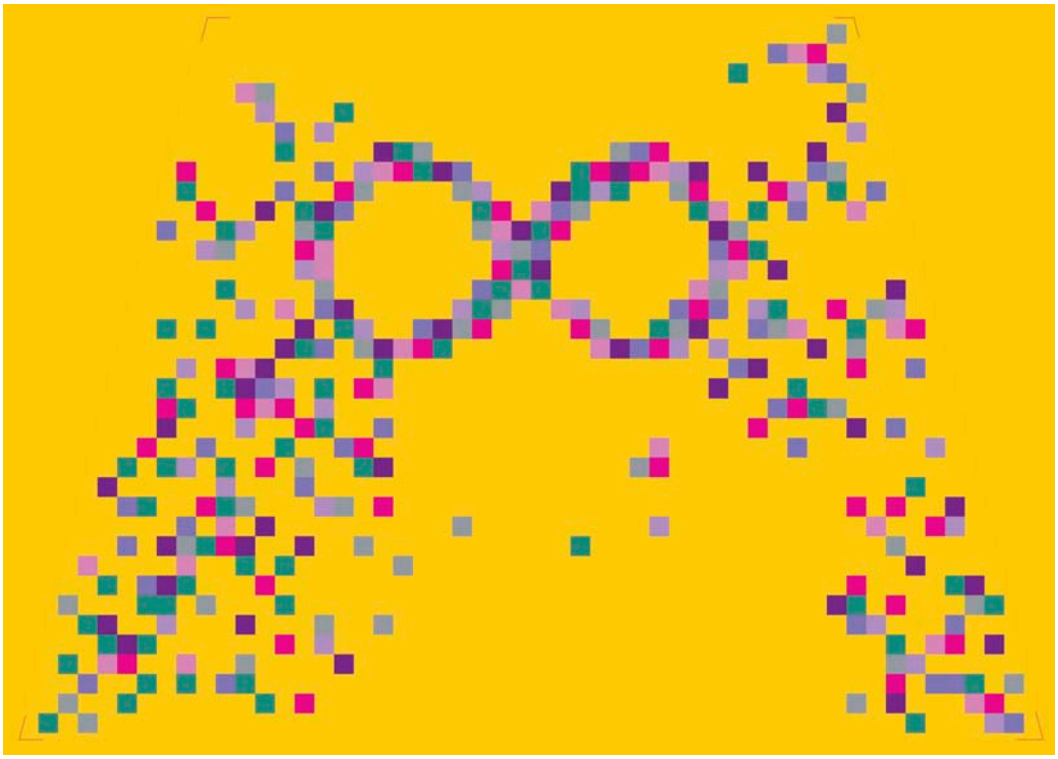


Fig. 29 sound map overview

Fig. 30 Final cape graphics 10 in total, 5 with large pixel design and 5 with small pixels



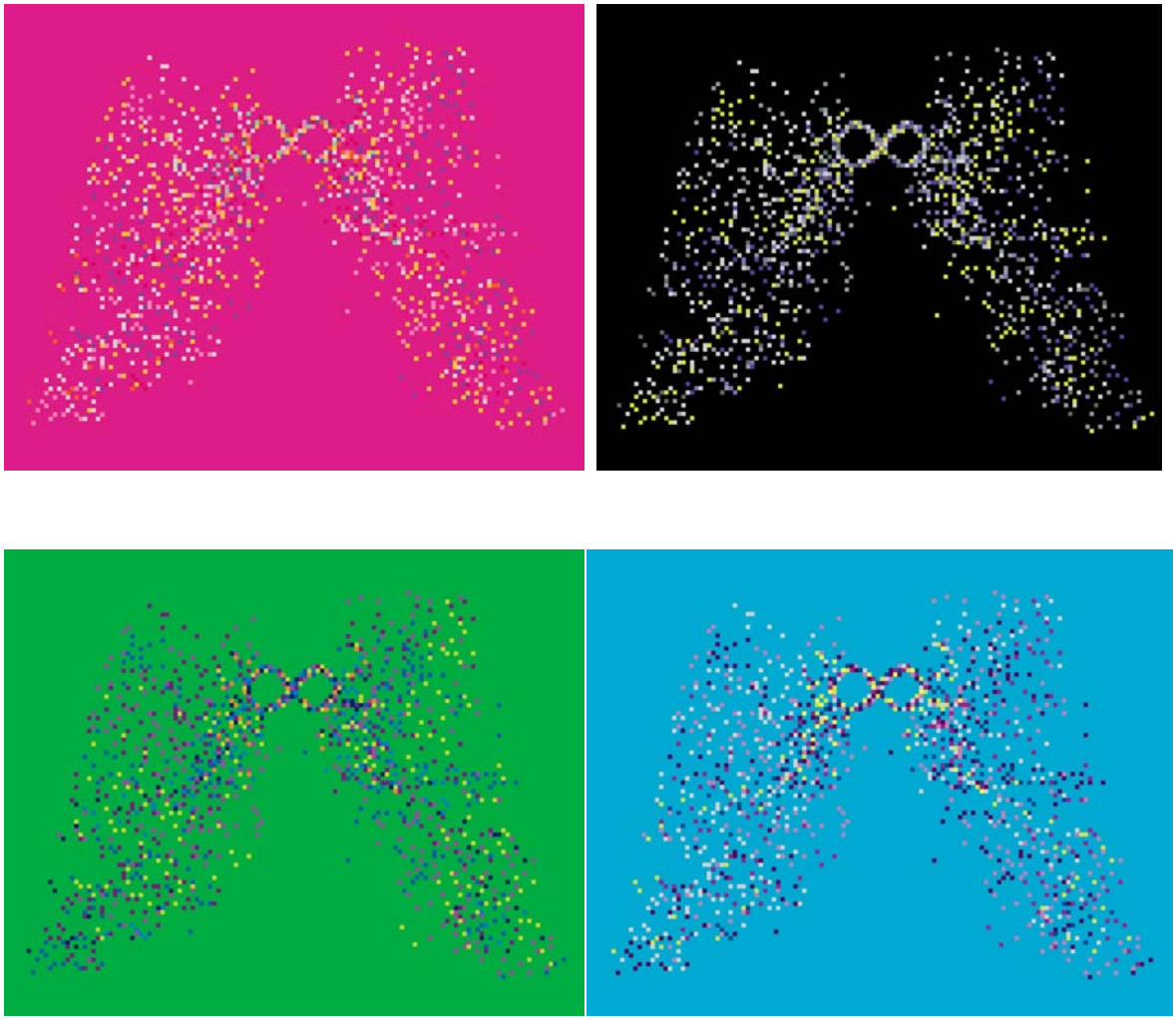


Fig. 31 Final cape graphics small pixels

APPENDIX 9
VARIOUS

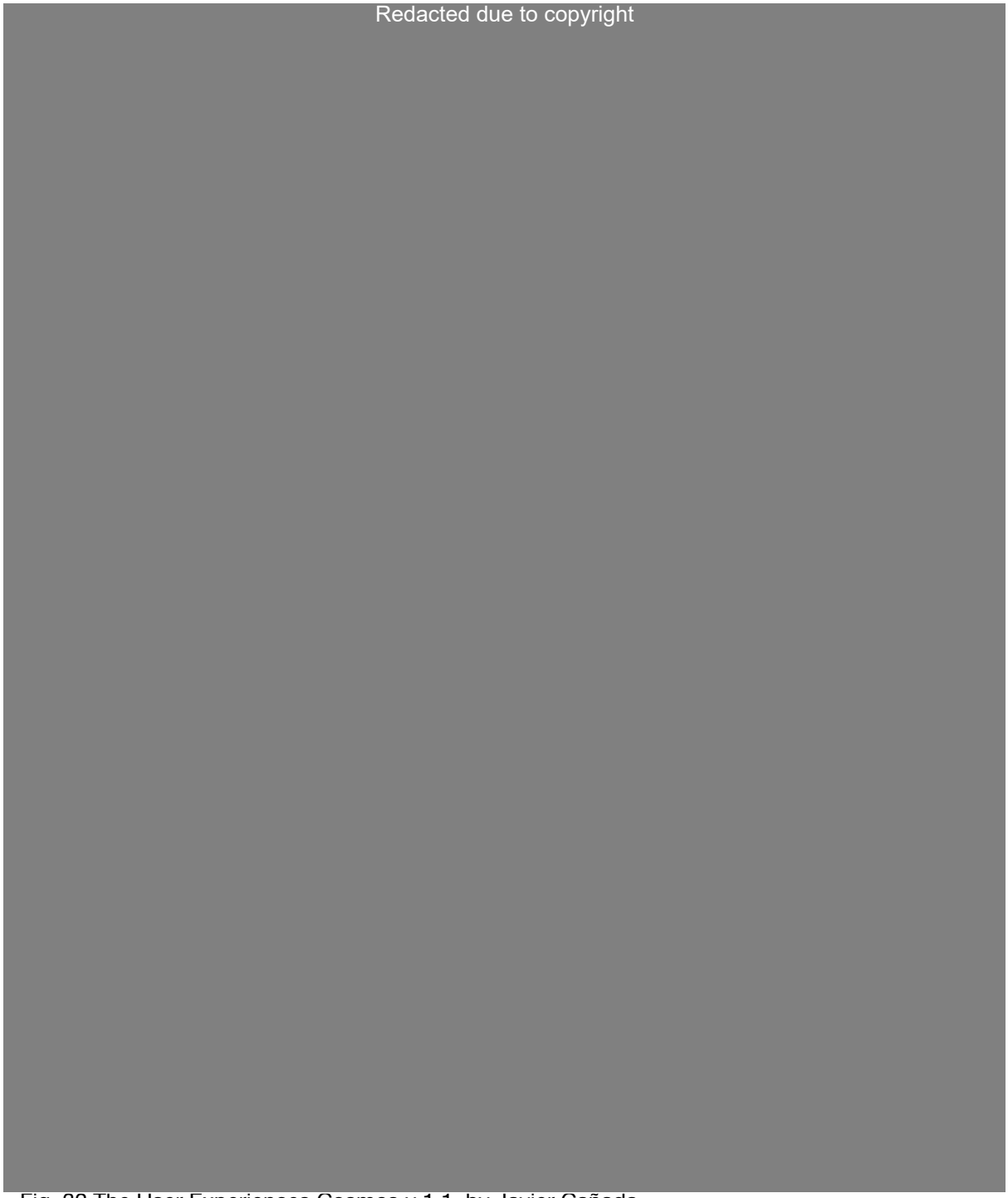


Fig. 32 The User Experiences Cosmos v 1.1, by Javier Cañada

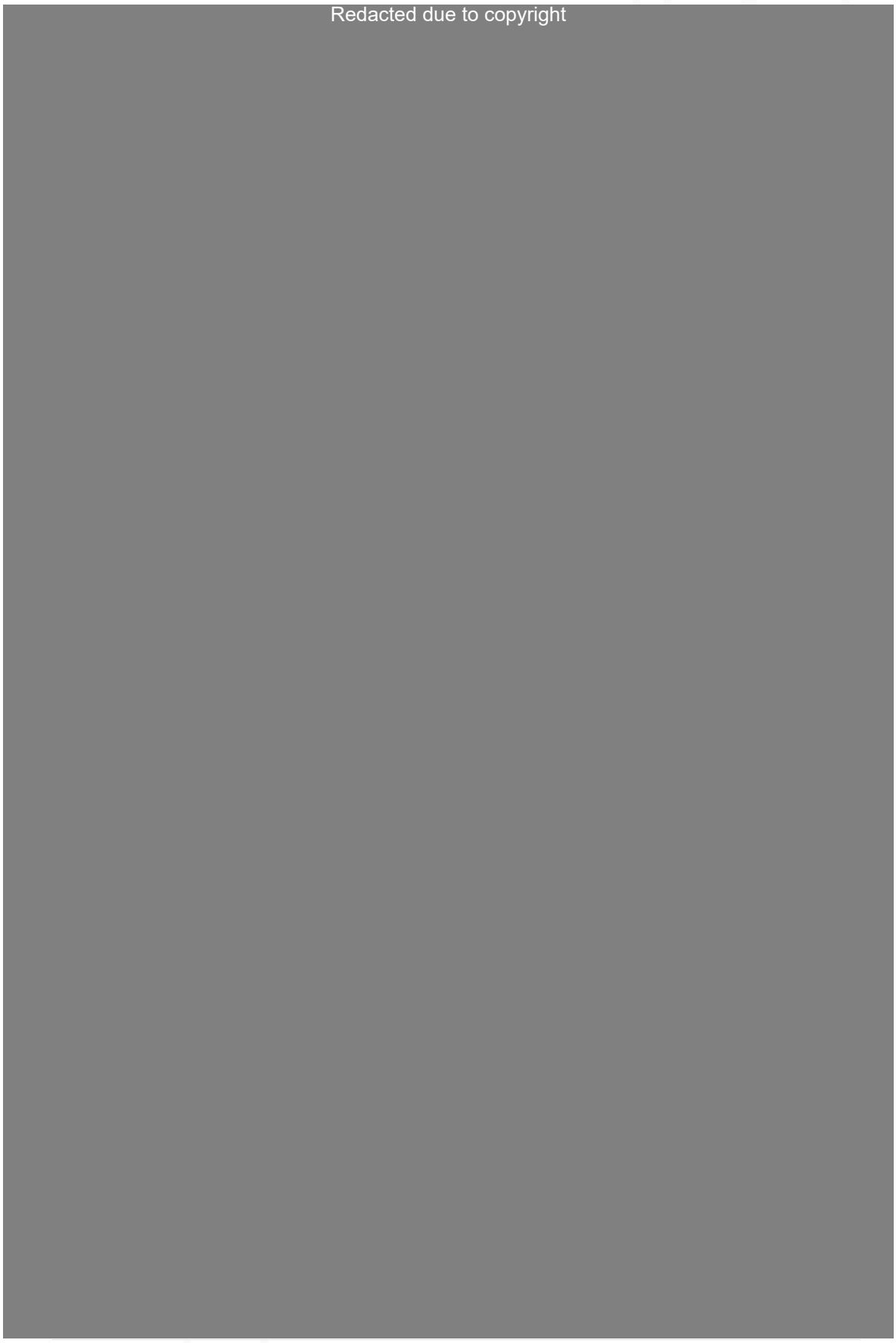


Fig. 33 Roger Caillois Table of classification of play