

Composing Interaction within Sound and Image in Digital Technologies

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Declaration

I declare that this thesis is my own work and has not been submitted in substantially the same form for the award of a higher degree elsewhere.

Abstract

This thesis investigates the entwined relationship between the creative process of composition and the development of technological frameworks, specifically software development, as parallel practices in digital-interactive contexts. Drawing on the tenets of intermediality, notably the writing of Elleström, Nelson, Bay-Cheng, and Kattenbelt, this work aims to explore and analyse the resonances and possibilities for renegotiating our perceptions of temporality, authorship and the construction of experience. This interrogation of digital-intermedial composition consists of three practical research projects and a three-chapter written thesis that addresses the theoretical and practical concerns of a creative process exploring the notion of ‘composing experience.’ The reflexive relationship between composition and digital technologies the focus of this research yet further theoretical concepts arise from the central inquiry later in the thesis.

A key methodology in my research has been the finding the balance between writing, analysis and practical engagement with the work. This is a Practice-as-Research PhD and as such a complex interaction between theoretical and practical elements define my inquiry, something reflected in the writing of this thesis. Chapter One seeks to locate the core aspects and processes of my own work within the field of contemporary practice looking notably at the work of artists involved in digital interactive work and composing with sound and image. The chapter looks specifically at the validity of creating interactive works from single data stream input devices – such as gaming controllers and the notion of how these interfaces should be ‘mapped’ (Elleström) to effective points of interaction in the context of the audiences experience. Chapter Two charts the linear journey of my practical projects beginning with *Comrade Coffee* (Donovan 2010) and my exploration of interdisciplinarity. My second research project, *Inter-activity* (Donovan 2011), details the shift in my research focus from interdisciplinarity to intermedial process in constructing work in digital-interactive contexts. The basis of my final work, *Digital Spaces* (Donovan 2012), is set up, for its exploration in Chapter Three, through analysing the system’s early development and the exploration of different methodological approaches including gamification. Chapter Three is split into four sections and focuses on the conceptual development and analysis of my research primarily through *Digital Spaces* and the theoretical issues emerging from these contexts. The thesis concludes by exploring the validity and functionality of a meta-compositional process and the composition of experience as being methodological and ideological focuses for creative arts practice in digital-interactive contexts.

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Preface

Through out this thesis I will often refer to my practice and, in particular, the three main research projects which foreground a great deal of my critical and analytical arguments. Often these critical territories overlap, interweave and share close dialogues. Each project leads on from another and shares processes, developments and conceptual frameworks such that discourse around, for example, compositional processes can jump from one research project to another. In the interest of clarity I will outline a brief account of each project in this preface for reference.

Comrade Coffee - Performed at the Greenroom – Manchester 26th March 2010



Fig i. The *Comrade Coffee* café

Comrade Coffee was a live art, interdisciplinary work, set in a constructed communist coffee house in an attempt to explore notions of

communism and capitalism. The audience was able to buy coffee for a price of their own choosing and engage with the conceptual framework via original literature. This literature detailed the work's concepts and ideologies such that a conceptual framework was provided for the viewing of original collage works, constructed objects and a musical performance at the end of the night by MMUle (Manchester Metropolitan University laptop ensemble). The musical performance was based around a communist ethic of community contribution and saw the laptop musicians taking found sounds from around the café – primarily the audience's tables - and manipulating them into an electroacoustic composition. I had also created two multi-directional speakers for the performance mirroring this utilitarian aesthetic – see fig...



Fig ii. The Utility Speakers, as used in the Comrade Coffee laptop ensemble performance.

Comrade Coffee was based around interdisciplinary representations (music, literature, performance, collage/visual art) of the same conceptual framework – one concerned with contemporary dislocations between communism and capitalism and human exchanges.

Predicating the conceptual focus of the work was Nicolas Bourriaud's

‘Relational Aesthetics’¹ – a concept used to describe the process and occurrences in works of ‘relational art’ in which the audience encounters social, economic or temporally unstable spaces within which human exchanges often form the basis of the work. Relational aesthetics concern,

...a set of artistic practices which take as their theoretical and practical point of departure the whole of human relations and their social context, rather than an independent and private space. (Bourriaud 1998:113)

Inter-activity - Exhibited at Open Space venue – Crewe 21st- 28th
January 2011



Fig iii. The globe interface of Inter-activity controlling both sound and projected image.

¹ A conceptual framework outlined in Bourriaud, N. (2002) *Relational Aesthetics*. Translated from the French, by Simon Pleasance, Fronza Woods and Mathieu Copeland. France: Les Presse Du Reel. (Originally published 1998).

Inspired by Brian Eno's ambient series, notably *Music For Airports* (1978)², and the conceptual theories of Marc Augé's 'Non-Places',³ *Inter-activity* sought to explore the 'inter' or liminal spaces between disciplinary and medial constructs through a unique multi-media interface (an antique globe) and custom software. Set within a large dark space, the user is faced with three large, hung, back-projected screens forming three sides of a square. In the centre of the open side of the arrangement, from which the user approaches the work, is an antique globe mounted in a gold stand for rotation.

Inter-activity allows the user-audience to control both sound and image simultaneously through moving the globe. The interface uses an internal accelerometer and mounted web cam to interpret the user's movements through sending a stream of data to the custom designed software. The resulting sounds are a homage to Brian Eno's work *Music For Airports*, specifically his piece *2/1* as the audio in the work consists of a synthesized choir vocal reminiscent of this piece in both timbre and scale. The visuals represented the concept of a digital 'non-place':⁴ the Internet browser/software environments and mediated representations of real spaces we occupy for so much of our day-to-day lives.

Inter-activity was the first instance in my practice of moving away from an interdisciplinarity conceptual framework and beginning work in intermedial areas through composing digital interconnections between sound and image.

² Eno, B. (1978) *Music For Airports*. [CD] US: Astralwerks. B0002PZVH0.

³ Found in Augé, M. (2009) *Non-Places: Introduction to an Anthropology of Supermodernity*. Translated by John Howe (1995) New edition (1 Jan). France: Verso Books. (Originally published in 1995)

⁴ As described in Augé, M. (2009) *Non-Places: Introduction to an Anthropology of Supermodernity*. Translated by John Howe (1995) New edition (1 Jan). France: Verso Books. (Originally published in 1995)



Fig iv *Inter-activity*: The user stands enveloped by three screens while controlling the interface

Digital Spaces - Exhibited at Manchester Metropolitan University –
Cheshire Campus 16th December 2012

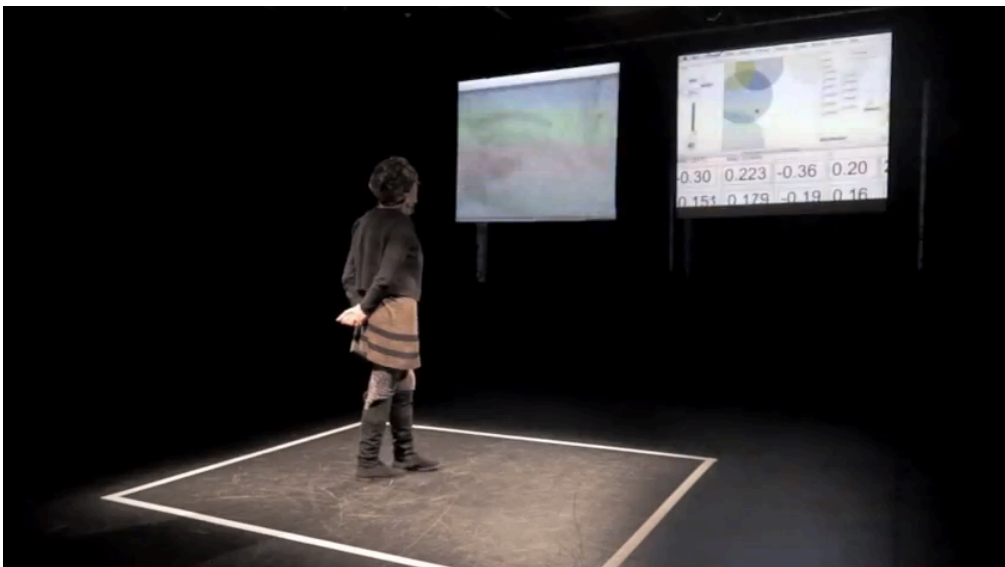


Fig v. *Digital Spaces* – the user explore both virtual (on screen) and actual (within the white square) space simultaneously.

Digital Spaces, my final research project, consists, materially, of a lit, white square in the centre of a large dark space and two back-projected screens hung on the far side of the space – the left showing various video media, predominantly material sourced from the internet, and the right showing a user interface containing information on the user's and

video's location in the virtual environment.

The work uses overhead tracking cameras to place the user between actual and virtual space – a conceptual focus for the work. The user's movements are interpreted into the software 'mediascape' by the camera through identifying their location within the exhibition space – which is turned into scaled numeric data – such that the audience can explore the bare, real space of the installation and the cacophonous, vibrant digital space simultaneously. The user is able to wander into various mediazones⁵ and experience/blend between different video media while constantly progressing along their own individual path. The system keeps track of the choices each user makes and what spaces they visit to provide many possible 'routes' through the work - all different depending solely on the user's choices and what is available in the space.

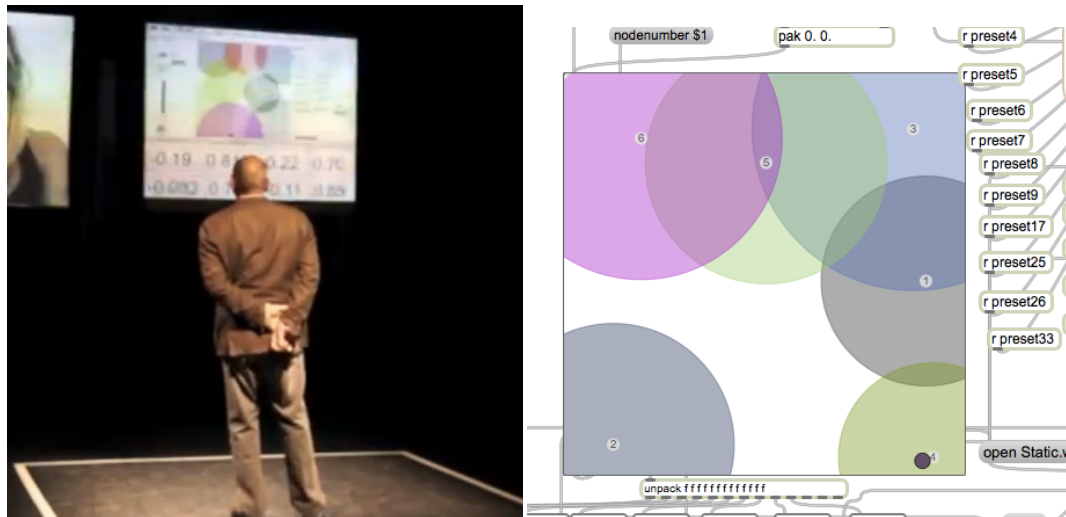


Fig vi. *Digital Spaces*: the Mediazones' circles show the location of a different video in relation to the demarcated white square in the real space

⁵ See fig vi – the mediazones are mapped as circles and the user is located as the dark dot at the bottom right of the same image.

Reading The Thesis

The thesis is primarily organised around my practice. There are, as mentioned in the introduction many areas that could warrant full investigations and chapters in themselves, something well beyond the scope of this thesis e.g. interactivity, participation, intermediality, experience. However, in placing the practice at the centre of my critical reflection and written inquiry these associated critical areas, when discussed, can be at all times considered to be related to/discussed under the progression and linear development of my own creative journey. For example, the first chapter deals with the work of other artists and their practice in relation to the work I was developing at that specific point in my journey. While Chapter One may not directly address my practice in a literal account of my progress each area or concept identified in the work of the given artist exemplifies a focus or methodological approach I myself have undertaken. So too in Chapters Two and Three, despite being based in accounting for my own journey and practice, the conceptual framework and critical insights (mainly drawn out in Chapter Three) share the same space and knit tightly with my documentation of practice. I aim to minimise any repetition and define clear divisions wherever possible. It is worth bearing in mind, however, the interbraided state of critical reflection and practice-based research – something I'll outline in the introduction.

Introduction

Introduction

I began this PhD, primarily, as a musician. I had previously completed a Bachelors degree in Music and Popular Music in 2008 and a Masters degree in Contemporary Art in 2009 for which I composed an opera for a performance-as-installation and scored a ballet piece with live electronics.

A trip to Madrid, after leaving university at the end of my BA, introduced me, through pure chance, to an exhibition on digital and technology-based art at the Reine Sofia gallery (2008). Two encounters from this trip sewed the seeds for the development of my creative practice and approach to composition - a paradigmatic shift in my thinking which would impact my creative methodologies and ideologies. The first of these encounters was with an interactive, digital piece by Daniel Rozin: the Reine Sofia had curated a number of his 'mirror' works together for the exhibit, all of which work on the simple principle of 'reflecting', or representing, the audience's image through the materials of which the mirror is constructed. The first mirror I encountered was titled *Circles Mirror* (2005) and consisted of small circles of black and white patterned card, each detailed in increasing density through their rotation - thus possessing a dark and light area on each disc. This would, its final form, collectively create the impression of a user stood in-front of the object through the oscillation of each circle to either light or dark thus creating dynamic shadow 'reflections'. I also encountered other mirror works including the *Trash Mirror* (2001), the *Peg Mirror* (2007), and, years later, the *Snow Mirror* (2006). The impact these works would have on my own practice was not yet known to me, yet how their interactivity translated so simply and instantly into the joyous experience of discovering one's self within the art work, with no expectation or context

beforehand, was something that would grow within my subconscious for years to come.

Rozin's mirror works managed to instil in me the appreciation for both an instant renegotiation of my position in experiencing an artwork, in that I became both content and co-author of the work, and how such an experience was composed through conceptual and compositional choices. Such choices included considerations of the expectations/affordance languages (what I expected of the work and how to use it vs. the actual outcome) and the specific *kind* of experience the audience would have despite such an open and simplistic framework.

My perception of the first work I encountered, *Circles Mirror*, changed dramatically when I navigated myself around the 'mirror' object and was able to catch a narrow glimpse of the back of the unit. There hung hundreds of independently controlled small motors, fed by the image input of a hidden camera on the front of the unit, to be interpreted through custom software designed by the artist – an unfathomably complex mechanical system hidden behind a simple façade. As the famous sentiment goes, one often attributed to Apple's Steve Jobs and his vision for intuitive and desirable technology, '*Simplicity is the ultimate sophistication*'.⁶ In viewing each motor and the cavalcade of wiring connecting each autonomous part of the machine, it struck me that in being able to capture such a powerful, yet simple idea the process of creating/building this experience and was one that *far* outweighed the comparative instant it took to experience.

The mirror was not simply reflecting back one's image to oneself but

⁶ Written by Zisman, A. (2006) *Hiding Complexity Behind Elegant Simplicity*. in *Low End Mac*. (Originally published August 28, 2006).

mediating one's engagement through numerous processes, technologies and media into an experience that became both personal and meaningful, yet was *designed* or 'composed', all within an open, interactive framework.

The second significant encounter of this trip was within the gallery's bookstore, located next to the Reine Sofia's reading rooms. In browsing the mostly Spanish and French titles I came across a book on Merce Cunningham (Copeland 2004)⁷ - whose practice I had a vague awareness of through my studies of John Cage's work during my degree study.⁸ This was my first encounter with postmodernism as realised as a set of visual aesthetics, as ideologies made manifest in physical and semiotic sensibilities, and with interdisciplinarity removed from a holistic, gesamtkunstwerk-like synthesis of forms.⁹ I will go on to explain this in further detail later in the thesis when I recount my journey from experimenting within interdisciplinary contexts to intermedial ones early in Chapter Two.

Seeing disparate media, and disciplines composed in this open, resonate, and associative framework united through a conceptual conceit and aesthetic sensibility had a similarly profound effect on my ideas of how art could/should be composed - and how art forms could be interconnected,

⁷ Copeland, R. (2004) *Merce Cunningham: The Modernizing Of Modern Dance*. London: Routledge

⁸ I had studied Cage's *Five Stone Wind* (1988) and *Cartridge Music* (1960) – Cage, J. (1991) *Five Stone Wind + Cartridge Music*. [CD] USA: Mode.

⁹ Gesamtkunstwerk – total art work; an artistic creation, as the music dramas of Richard Wagner, that synthesizes the elements of music, dance, spectacle, drama, etc ("gestamtkusntwerk". Oxford Dictionaries. March 2014. Oxford University Press. 22 March 2014 <<http://oxforddictionaries.com/definition/english/experience>>. The term was originally coined by Karl Friedrich Eusebius Trahndorff (1827)

(Cunningham's work is)... indeed the very antithesis of Gesamtkunstwerk. And even though collage is a practice we tend to associate primarily with the visual arts (where it originated), its modus operandi is readily observable in the performing arts as well.
(Copeland 2004:166)

My intention at the time was to return to academia and pursue a Master's degree in contemporary art – accepted on the condition that I could continue writing music.¹⁰ Fortunately, my encounters with interactive technologies and postmodern contexts diverted my envisioned creative journey into richer critical areas and a greater awareness of interdisciplinary practices in art.

In reflecting on these events it is only now clear how experiencing those interactive works by Rozin that the notion of composition within both interactive and digital frameworks made me question how an 'experience' such as his could be *composed* – not as an authorial 'meaning', text or a *pre-determined*, specific experience, but an open, intertextual experience.

Research questions, contexts and terms.

This PhD has been undertaken in a practice-as-research framework, specifically Nelson's model¹¹, whereby the practice and creative process has led the formation of critical and conceptual ideas. Forming research questions might imply the fixity of answers, an objective not always appropriate in processual contexts. Much of this inquiry had

¹⁰ Manchester Metropolitan did not offer a Master's degree in music at that time.

¹¹ For a comprehensive overview of practice-as-research and the act of creating knowledge through practice/doing see Nelson, R. (2006) *Practice as Research and the Problem of Knowledge in Performance Research*, 11: 4, 105-116.

been based on a number of developing methodologies and practices including book based research, the practice itself (the *doing*, as it were) and the critical analysis of practice this thesis serves to articulate. In beginning to try and define the specifics of my practice, the focus and specificity of the inquiry emerged to be these four questions:

- How does (digital media) composition impact the development of technological frameworks/systems, and vice versa, in a singular creative practice?
- How does this techno-compositional dialogic (my practice) provide new perspectives on contemporary critical and theoretical frameworks?
- In what way do digital-intermedial frameworks mobilise dislocations in authorial and audience roles in interactive contexts?
- In what way, and to what degree, can (composition in) digital interactive frameworks facilitate the composition of ‘experience’?

In answering these questions, this thesis will propose that the practice of developing technology (software) and composing with digital media in interactive contexts engenders a highly reflexive, dialogic compositional process between content and form. Furthermore, this process constructs, not a specific ‘work’ or meaning but of a *kind* of ‘experience’.

Additionally, it has become clear that my practice is centred around these four areas in a way that is densely interrelated:

- Composition
- Digital Technologies
- Interactivity
- Experience

My thesis is concerned with the way each of the first three elements are interrelated and functioning as a creative practice in order to articulate the functionality and nuances of the fourth in a way that is not simply reducible to subjectivity or a broad concept of ‘experience’.

These four terms, ‘experience’, ‘technology’, ‘composition’, and ‘interactivity’ appear frequently in this thesis. They are, of course, very broad terms, terms that to be described and unpacked seriously require research and scope far beyond that offered in this thesis. Fortunately, it is arguable that to understand my arguments and analysis this is not necessary, especially as they are often introduced and explored within the guiding context of my practice, in which methodological and critical frameworks are specifically detailed. I do feel, however, it is important to outline *how* I’ll be using these terms in this thesis.

Experience

I talk much of experience in this thesis and how it is constructed through my practice. However, it is important to state at this early stage that I in no way attempt to quantify or qualify this experience within either a scientific or social context. My research is in arts and my practice emerges from exploring composition, at first musically, and later broadening out to composing with technology, digital media (sound and image primarily) and interactive frameworks simultaneously. In the later stages of my PhD, composition pertains not exclusively to any particular practice or discipline, rather, it comes to define an over-arching methodology that had been present in all my research projects – that is how I have come to use the term ‘composing *experience*’: as a sum of

my approach to those multiple disciplinary, methodological and contextual areas.¹²

I will talk in Chapter One about a number of artists, and their specific works, which have instigated experience in a very similar way to my own work, among them are Ryo Ikeshiro (*Contructions in Zhuangzi* 2012), Sarah Rubidge (*Sensuous Geographies* 2006), but also Nam June Paik, an artist who was very early influence on my practice. His work, *TV Garden* (1977)¹³ partly inspired my interested in technology and composition (in addition to Daniel Rozin's *Mirror* works – See Chapter One, page 40).

The arts research context of my broader practice allows me to approach the critical reflection of experience in the works I create as personal and unscientific. The inquiry of which is the functionality and construction of compositional elements and how they are arranged to dispose specific kinds of experience or meaning – how they close and open a work to an audience/ author.

As a practice-as-research PhD, the inquiry documented here has been one that has emerged from both the experience of creating the work by myself and what I have learned from the experiences I have disposed to audiences through that practice (the artworks).

The Oxford English Dictionary defines experience as,

¹² I will detail this fully in chapter 3, section 4 (pg 145).

¹³ Nam June Paik *TV Garden* (1974) now exists in its '2000 version' at the Guggenheim: Museum. *TV Garden set a new standard for immersive, site-specific video installations. Restaged for the artist's exhibition at the Guggenheim Museum in 2000, its influence can be seen decades later in ambient, room-sized installations by such artists as Gary Hill and Bill Viola.* 22 March 2014, <<http://www.guggenheim.org/new-york/collections/collection-online/artwork/9537>>

noun¹⁴

- 1 [*mass noun*] practical contact with and observation of facts or events: *he had learned his lesson by painful experience she spoke from experience*
- the knowledge or skill acquired by a period of practical experience of something, especially that gained in a particular profession: *you should have the necessary experience in health management*
- 2. an event or occurrence which leaves an impression on someone: *audition day is an enjoyable experience for any seven-year old*

verb

[*with object*]

- encounter or undergo (an event or occurrence): *the company is experiencing difficulties*
- feel (an emotion or sensation): *an opportunity to experience the excitement of New York*

I use the term most often in the sense of the verb, as an *occurrence* or ‘event’ – in that the ‘outcomes’ of my practice manifest as such: as occurrences, events or encounters – locating the work primarily *within* the audience. Additionally, the ‘emotion or sensation’ –is resonant with my practice too, yet this description is a somewhat more problematic aspect of the term to write about as all such ‘feelings’ are of course subjective and subject to many external and internal cognitive factors outside of the author’s, or artwork’s, ‘control’/influence.

In his 1988 text, *Keywords: A vocabulary of culture and society*, Raymond Williams explores experience etymologically and defines such personal subjectivity as an integral element and functioning as state of being experience is,

¹⁴ "experience". Oxford Dictionaries. April 2010. Oxford Dictionaries. April 2010. Oxford University Press. 13 March 2013
<<http://oxforddictionaries.com/definition/english/experience>>.

*...a particular kind of consciousness, which can in some contexts be distinguished from 'reason' or 'knowledge'...Experience, in this major tendency, is then the fullest, most open, most active kind of consciousness, and it includes feeling as well as thought.*¹⁵

(Williams 1988:126 – 127)

Composition

In sticking with the textbook definitions a moment longer, Oxford Dictionaries defines composition as,

noun¹⁶

- 1. *[mass noun]* the nature of something's ingredients or constituents; the way in which a whole or mixture is made up:*the social composition of villages*
- the action of putting things together; formation or construction:*the composition of a new government was announced in November*
- *[count noun]* a thing composed of various elements:*a theory is a composition of interrelated facts*
- 2. a creative work, especially a poem or piece of music:*Chopin's most romantic compositions*
- *[mass noun]* the action or art of producing a creative work such as a poem or piece of music:*the technical aspects of composition*
- an essay, especially one written by a school or college student:*we had a class composition, 'My Best Friend'*
- the artistic arrangement of the parts of a picture:*none of the other photographs shared this particular composition*

Both the mass noun, the notion of something's constituents, and the 'action of construction' are appropriate in describing how this term functions within the context of my practice, but notable is the distinction

¹⁵ Williams, R. (1988), *Keywords: A vocabulary of culture and society*. London: HarperCollins Publishing

¹⁶ "composition". Oxford Dictionaries. April 2010. Oxford Dictionaries. April 2010. Oxford University Press. 13 March 2013
<<http://oxforddictionaries.com/definition/english/composition>>.

made between that of ‘constructing’ and of ‘producing’ (second point in the second set) that OED outlines, the latter seemingly more pertaining to arts/music and the former to everything else. The last point in the second set draws our focus to the way in which elements are composed *in relation* to other elements – the ‘artistic arrangement of parts’.

In relation to constructing a framework in which I juxtapose ‘composition’ against ‘technology’ or the action of ‘technological development’ I use the term in the sense of ‘*producing* a creative work: the technical aspects of composition’ – one seemingly differentiated from the ‘*construction*’ of materials, frameworks, non-creative practices. However, it is notable that the use and meaning of this term evolves over the course of my thesis and that the distinction made above breaks down later in my research. In my last project, *Digital Spaces* (2012) I acknowledge that my practice becomes defined by the ‘composition’ of those previously distinct areas – technological, arts/creative media, interactivity frameworks - as a whole: which is more a focus, in my practice at least, on how elements are interrelated with each other and to an audience.

This sense of the term shares a strong connection with the way in which I speak of ‘experience’ as my practice locates the work primarily within the audience and the *moment* of experiencing the composed elements at play. This ‘moment’ of experience as the artwork is disposed and reflected as form by the compositional methodologies and structures. ‘Moment form’¹⁷ is a compositional style which uses a number of distinct ‘moments’ or sections to create a whole work. A ‘moment’, as defined by Stockhausen, is a ‘*something individual*,

¹⁷ Also known as mobile form, openform and aleatoric form or ‘polyvalent’ form in music composition practices – discussed in Chapter Three, Section 3 pg 147

independent and centered in itself, capable of existing on its own'.¹⁸ The compositional methodology, or 'moment *forming*' is one that is deliberately non-linear and avoids creating a through-line or narrative cohesion throughout the work. Such form is articulated in Stockhausen's *Kontakte* (1958-60), *Momente* (1962-69) and *Mixtur* (1964) among others. This compositional principle has been present in all my PhD works in one way or another, either through its treatment of media, disciplines or technological frameworks.¹⁹ Stockhausen differentiates moment form from aleatoric or mobile (polyvalent) forms, yet his emphasis appears to be on the temporal qualities of how the form is conceived/perceived and, ultimately, I see this as equivalent to indeterminate styles where many separate sections are composed for performance in a chance-based order. With regards to the temporal aspects of Stockhausen's definition, this is something I will come to address with respect to compositional practice, digital technologies, and experience of temporality in the final chapter.

Technology

...a systemic study of the arts...or the terminology of a particular art...The root is tekhnē, Gk – an art or craft
(Williams 1988: 315)²⁰

From the Greek, 'tekhné', the etymology of the term connotes a craft-like knowledge yet in common contemporary usage the definition refers to "Machinery and equipment developed from such scientific

¹⁸ Stockhausen *Texte I*, p. 99, trans. Seppo Heikinheimo in his book *The Electronic Music of Karlheinz Stockhausen* (Helsinki, 1972), pp 120-21. Found in Kramer, J (1978) *Moment Form in Twentieth Century Music* in *The Musical Quarterly*, Vol. 64, No. 2 177-194. Oxford University Press

¹⁹ Conversing modular software systems as created in my final work, *Digital Spaces*.

²⁰ Williams, R (1988), *Keywords: A vocabulary of culture and society*. HarperCollins Publishing, London pp. 315

knowledge”.²¹ Such converging territories of art and/as technology serves to locate my research interests, yet, within this thesis I will be using the term technology in mostly digital and intermedial contexts, thus as machinery and devices that manipulate, mediate, and augment the interactions between other media and the human body. Additionally, the democratisation of digital technology has been an important aspect of delineating this territory in terms of what kinds of digital technologies I work with. The transition from the privatised to domestic operability and ownership of digital technologies, specifically personal computer devices (including smartphones and commercial gaming hardware) has afforded many of us to develop casual, familiar relationships with technology from which, perhaps unknowingly, we have developed an understanding and expectation of the abilities, modes of interactivity, and general affordance precedents. Technology is part of my creative practice as whole, that is, creating technology *with* technology, and as part of a larger compositional dialogue, specifically programming customisable software - the main point of reference for my usage of the term ‘digital technologies’.

As an extension of this context, intermediality serves to provide a technologically founded framework for my discussions and critical exploration of the sound and image ‘media’ content I create. This is something I will come to outline more specifically later in the thesis²² as part of recounting my research journey but, as introduced by Nelson (eds.) in *Mapping Intermediality in Performance* (2010), the work of Lars Elleström, and his ‘both-and’ conception of intermediality serves to outline the concept at this stage,

²¹ "technology". Oxford Dictionaries. Oxford University Press, n.d. Web. 12 August 2013. [<http://oxforddictionaries.com/definition/english/technology>].

²² Described in Chapter One – Mapping and Media Modalities in Digital Contexts pg. 43

[i]f all media were fundamentally different, it would be hard to find any inter-relations at all; if they were fundamentally similar, it would be hard to find something that is not already interrelated. Media, however, are both different and similar, and intermediality must be understood as a bridge between medial differences that is founded on medial similarities (Elleström 2010: 12)

Interactivity

A flexible, non-linear, interactive system or structure, one designed and coded within linking capabilities which allow the viewer to make choices in moving along different paths through the work. With interactivity, readers, viewers, listeners can pass through the boundaries of the work to enter it. This puts them in a position to gain direct access to an aspect of authoring and shaping the final outcome of work in a way that has never existed before the advent of the computer." (Lovejoy 1997:165)²³

Whilst I feel no need to further expound on the term via a dictionary definition there are still a number of contentious issues in the contemporary usage of ‘interactivity’, notably in the creative arts. In so far as how such ‘interactive’ works are different from other multimedia, multi-sensory combinations I feel Lovejoy’s definition, with respect to ‘passing through the boundaries of the work’ and affording the audience access to an ‘aspect of authoring’, are suitably clear. Such structures problematise clear conceptions of author, audience, process and product in addition to opening up the structuring, interrelating and manipulation of media to the audience-user. The context of digital technology is also implicit in the reading of this term in my thesis.

It is also worth acknowledging the issue of reading and authoring in relation to the text/work. Roland Barthes wrote many highly influential

²³ Lovejoy, M (1997) *Postmodern Currents: Art and Artists in the Age of Electronic Media*, 2nd edn New Jersey: Prentice Hall, p. 165

words on this topic, and, in navigating the complex relationships between these concepts, it is this quote from his essay *The Death of The Author* that serves to articulate how I perceive my works functionality, and reading/authoring roles. Furthermore, I believe it highlights the performative, instant and ephemeral nature of all these concepts in the context of my work.

The fact is (or, it follows) that writing (composition) can longer designate an operation of recording, notation, representation, 'depiction' (as the Classics would say); rather, it designates exactly what linguists, referring to Oxford philosophy, call a performative, a rare verbal form, (exclusively given in the first person and present tense) (Barthes 1977:145)²⁴

With regard to the previously mentioned contentions in terminology, many scholars (Rowe, Chadabe, Paine, Winkler, Drummond) make a distinction between what can constitute an interactive *system* and what may be a *reactive* system. Paine, drawing on Winkler, proffers a model for interactivity,

...human conversation, like any good interaction is a 'two way street..two people sharing words and thoughts, both parties engaged. Ideas seem to fly. One thought spontaneously affects another. (Winkler 1995:3 in Paine, G. 2002:297)²⁵

While marking this distinction between 'interactive' and 'responsive', Paine puts much emphasis on the notion of evolution in the interactive system. While this work was written some time ago (2002) and speaks in the context of creating *musical* instruments I feel this work is largely applicable to my practice and exploring his delineations will help me illustrate my own usage of the term.

²⁴ Originally published Barthes, R (1967) *The Death of The Author* in *Manteia*, no. 5 magazine. France.

²⁵ . Winkler 1995:3 in Paine, G. 2002. *Interactivity, where from here?* Organised Sound 7(3): 295-304 Cambridge University Press. UK p 297

If interactivity is predicated on the ability of both parties to change in a way that reflects the developing relationship or discourse between them...we have to accept that multimedia systems that do not evolve their behaviour in relation to accumulated patterns of input (as described in the human conversation model above) are therefore not interactive, but simply responsive. (Paine, G. 2002:298)²⁶

While I feel there are similarities in the way in which Paine and myself use the term the differences help underline the move *away* from music-based, 'instrument' design in my practice into an area of more mixed-media and experiential, rather than 'performance'-driven contexts – something I will detail in the first chapter of this thesis. I would offer that the notion of interactivity does not necessitate the incorporation of 'evolution' or 'organic' system attributes, without which, according to Paine et al, a system can be marked as only 'responsive'.²⁷ I proffer that the lines here are blurry and it is worth remembering again that Paine is working in a different context to that of my own, however, within this notion of evolution Paine often refers to the notion of a conversation and that of system mirroring cybernetic/artificial intelligence.

This then poses a problem - those systems who are truly 'interactive' by the standards of these authors would be those that are less reactive and as such are less 'composed' by an author to determine a certain kind of experience, and that true interactivity, taken to its extreme complies with Paine and Winkler's comparison to a human conversation. However, any system must be composed/programmed by a creator, a system cannot ever be truly intelligent, or self aware in the way an organic being is. As such this interactive-reactive (human-system) model and that of the (really) interactive conversation analogy, I believe is not something that is so clearly a divided. The degree to

²⁶ Paine, G. (2002) *Interactivity, where from here?* Organised Sound 7(3): Cambridge University Press. UK p298

²⁷ Described in pg. 56 – Chapter One - Moving Away From Instrument Paradigms.

which a system is interactive or reactive varies, and to some degree lies in the mind of the perceiver, after all, AI as we know it is only a composed *simulation* of our own intelligence.

I will explore the degree to which my own work, and that of others work within these boundaries and what implications this has for my other critical territories in the first chapter.

The Chapters

Chapter One serves to articulate my conceptual development. Through placing my work in the lineage and context of existing works and practice of other artists I am able to define the context of my research inquiry and predicate the development of my own practice. In working in a practice-as-research methodology, the ‘doing’ and analysis of my own work foregrounds and leads my research inquiry. It is difficult, at times, to objectively distance oneself from the process and in looking at my own practice in comparison/the context of other artists and similar conceptual frameworks I hope to exercise a critical distance and address the theoretical and conceptual issues in and around my practice. I suggest in this chapter that there is an interbraided and dialogic relationship between the development of technological and compositional practice elements in creating digital intermedial-interactive works in which content (of composed media) and form (of ‘designed’/developed technology i.e. software) influence one another in a tightly-knit, recursive relationship during development stages. The specific nature of digital intermediality, the actual-virtual divide in experiencing media and the composition process within these contexts, and that of interactivity, serve to demonstrate/compliment this idea.

Case studies include Ryo Ikeshiro's digital sound and image work *Construction in Zhuangzi* (2012) and Bernd Lintermann and Torsten Belschner's *SonoMorphis* (2000), an interactive 'composed instrument', to provide a supporting framework for these inquiries.

Chapter Two re-focuses on the specific documentation of my practice and aims to give a linear, but conceptually and methodologically focused, account of the shifts and significant developments in my research journey. In progressing through my research journey I identify a shift from working in interdisciplinary contexts to digital intermedial frameworks and expand on the discourses outlined in Chapter One regarding levels of interactivity. I open discourse into audience-author roles in digital interactive and compositional contexts through my works *Interactivity* (Donovan 2011) and *Digital Spaces* (Donovan 2012) to suggest the possibility that, in addition to considering levels of interactivity, such contexts and practice engender the 'composition of experience', as opposed to an 'artwork'.

Chapter Three addresses the specific issues that both Chapter One and Two have raised in my practice journey to answer the four main research questions outlined above in this introduction. I suggest that:

1. technological and compositional elements exist in closely reflexive dialogue throughout the process of creating digital interactive works.
2. That this 'interbraided' process, and the context of digital technologies, renegotiate established, or general, understandings of temporality, space and 'becoming' (Deleuze) and how these conceptual and theoretical territories contribute towards the experience of such works.
3. Digital-intermedial works – specifically interactive works – mobilise dislocations between author-audience roles and how many works in this

context offer a pre-disposed experience rather than a pre-determined artwork/meaning.

4. A 'composition of experience', as meta-practice, is engendered in digital-interactive contexts via the democratisation of temporal and authorial aspects of the work.

As a practice-as-research PhD my arguments have arisen from an active engagement with doing. All chapters in this thesis are constructed around the framework of my practice and reflections on the process of my journey. By its very nature my work is iterative, reflexive and characterised by doing then re-doing. Thus my methodology is articulated: one of mixed-mode research through practice, books, analysis and the critical evaluation of these elements in further reflection.

Through analysing my practice and exploring the theoretical and conceptual issues arising from my research I am at times raising more questions than I am answering. Yet it is my aim these questions might suggest new ways of conceiving how technological and compositional processes relate to one another in creative arts practice and how an audience-user's experience can affect and be affected by their interconnectedness.

Chapter 1: Conceptual Development and Location In A Lineage

Introduction

Providing different viewpoints on a practice one is so close to can be difficult. In this chapter I will attempt to evidence my research inquiry through adopting an insider and outsider perspective. It is worth reiterating that the PaR model is one of ideas in action and the research is conducted, primarily, through a praxis of 'doing' and critical research in writing. This secondary writing enables me to articulate and evidence my research in areas where it might be tacit or experiential, and to further reflect on the practical experiences and findings one encounters during the creative process. Writing about your own work affords an unparalleled access to specific perspectives on those insights and the possibility to exemplify and critique ideas in explicit ways. Yet, writing from an outside, objective point of view is, in many ways, disentangled from the inevitable biases and distortions that arise from being 'too close' to the work – something one can achieve more easily through looking at the work of others. This critical distance is something I hope to exercise in this chapter. By exploring the work of others working within the same field I aim to identify how their work is both similar and different to my own and address the theoretical and conceptual issues in and around my own research journey. I have explored the work of a number of practitioners and researchers in the field of intermedial, digital and interactive arts and in examining their processes and compositional decisions I attempt to foreground my own research concepts and methodology. I explore the work of these practitioners either through reflecting on first-hand experiences and at other times through analysing critical writing by the authors themselves.

A significant characteristic of working with digital technologies is its ability to elicit links and interrelationships between many media, augmenting the possibility for multiple arts to interact. I became very

drawn to the idea that I could explore, and compose within, multiple forms and media in a context that was not based around the notion of ‘interdisciplinarity’. Such links and interrelationships were to become the focus of my first digital work *Inter-activity* (2011) – the specifics of which I will detail in the next chapter – one that finds its lineage within a field of artists’ practice and a number of theoretical conceits (which I will detail shortly). In beginning work in the area of digital technologies and interactivity, I wanted the interaction and engagement with my work to be immediate, direct and re-address the power relationships between author and audience.²⁸ In many of the works of artists using digital technologies I perceived the possibility to provide frameworks for creative and interactive experiences, distributing collaborative input more equally between the author and audience-experiencer. For a number of years I had been performing with MMUle - Manchester Metropolitan University laptop ensemble – a group of musicians composing only for laptop using customisable software. The ensemble’s research is concerned with exploring both notions of ‘live’ performance and composition within the context of computer music and programming. I was unaware at the beginning of this journey how complex, disconcerting, and genuinely difficult this shift from interdisciplinary frameworks to intermedial practice would be. I undertook the learning of many new skill sets and numerous methodological shifts during the journey. Ultimately, this methodological shift was predicated on my desire not to make work *about* my ideas, but to look at the form through which these ideas might be embodied and employ my conceptual and theoretical frameworks as technical/material forms.

²⁸ See chapter Two for a full account of my journey up to and beyond the point and composing with digital technologies.

Inter-activity: early influences

At this early stage in my research I was becoming extremely interested in a number of digital-interactive works I had encountered or read about after returning from an exhibit on Daniel Rozin's work at Manchester's Whitworth Art Gallery – two years after my first encounter with his works in Madrid's Reine Sofia gallery. Rozin's *Snow Mirror* (2006), see fig vii drew me to explore an exhibit on works using different media, technologies and digital contexts titled *Dark Matters* (2011)²⁹, Rozin's *Peg Mirror* (2007) was also on display. The exhibit featured other artists including Pascal Grandmaison and Ja Yung Ku, however, as in Madrid at the Reine Sofia, it was Rozin's work that captured my interest the most. Watching people interacting with the work was just as interesting as experiencing it for myself and clarified for me the direction I wanted to take in my own research.

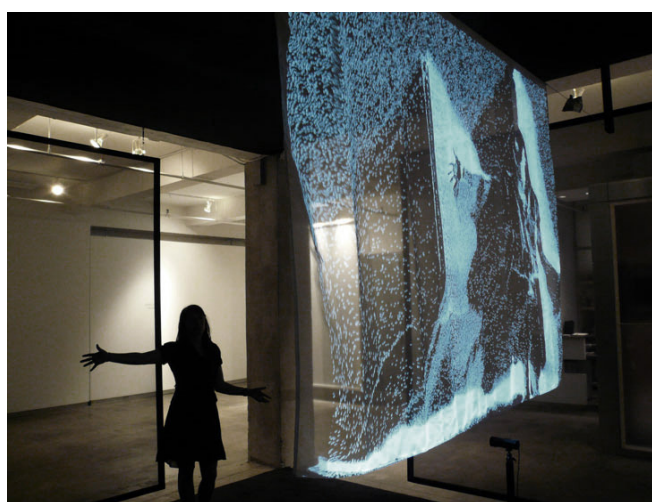


Fig vii. *Snow Mirror* (2006) Daniel Rozin.

²⁹ Rozin, D (2006) *Snow Mirror* at: Whitworth Art Gallery 24th September – 15th Jan 2012 (<http://darkmattersart.com/>)

I had been listening to a lot of ambient music during that period and it was Brian Eno's ambient works³⁰, most notably *Music for Airports* (1978) that had the greatest impact on me. In exploring his work further I came across his mobile application *Air* (2009) developed by software engineer Peter Chilvers and Irish vocalist Sandra O'Neill as an extension of his ambient music series in which users are able to construct/perform their own piece of music, within Eno's framework.

Air assembles vocal and piano samples into a beautiful, still and ever changing composition, which is always familiar, but never the same. Air features four 'Conduct' modes, which let the user control the composition by tapping different areas on the display, and three 'Listen' modes, which provide a choice of arrangement. "Air is like 'Music for Airports' made endless - which is how I always wanted it to be" - Brian Eno³¹ 2009

A previous application, *Bloom* (2008), the first interactive mobile work Eno was involved in, was similar in construction and functionality and described as, 'Part instrument, part composition and part artwork'³², see Fig viii I realised creating such applications would allow me to draw upon my strong musical background but in an open, interdisciplinary and possibly aleatoric, way.

³⁰ *An ambience is defined as an atmosphere, or a surrounding influence: a tint. Ambient Music must be able to accommodate many levels of listening attention without enforcing one in particular; it must be as ignorable as it is interesting* - Sleeve notes from Brian Eno's *Music for Airports* (1978)

³¹ Eno, B (2009) URL [<https://itunes.apple.com/us/app/air/id312163985?mt=8>]

³² Eno, B (2008) URL [<https://itunes.apple.com/app/bloom/id292792586?mt=8>]

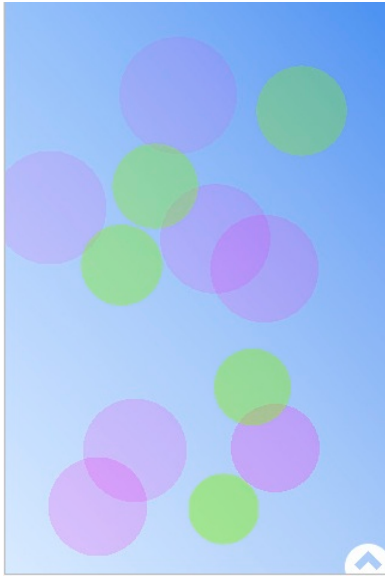


Fig viii. The interface for *Bloom* (Eno and Chilvers 2008)

The applications function as open-ended compositions with which the user can interact via a simple touch screen interface loaded with geometric shapes. Touching each segment/shape on the GUI³³ triggers a note or drawn-out texture, all of which can be triggered simultaneously, courtesy of sharing the same minor key, with semitone intervals avoided to prevent dissonances. The effect is an ethereal, ambient soundscape, rising and falling as the user chooses to play or rest the sounds. These works, in concept and functionality, mobilized the beginnings of my exploration into digital, interactive composition.

It was at this point that I began composing with digital technologies myself by programming software experiments in MaxMSP – a graphical programming environment in which users can construct infinitely variable systems through mapping objects together using ‘patch cords’ – similar to wires. Most of these experiments focused on using physical interfaces – gaming controllers - to send information, controlled by the user, to the custom software. This incoming stream of data could then

³³ A GUI, or ‘goeey’, is a Graphical User Interface that facilitates the interaction with digital devices via images as opposed to text-based commands.

be mapped expressively to any media or meta-control object. These experiments focused on bridging the gap between the actual and digital world through the physical interface to control or manipulate sound and/or (moving) image. I explain the specifics of these experiments in detail in Chapter Two – ‘Working With Digital Technologies’, however, it is important to note at this point that the gaming controllers, most notably the Nintendo Wii controller³⁴, allowed me to map a user’s input to both sound and visual media. The Wii remote is able to use/interpret gestures or movements by the user into a single data stream – an ongoing list of numbers – which the software can interpret as the user moves the controller around. As mentioned, my experiments were concerned with interactions between sound and image and it was through using the Wii controller that I attempted to unite both visual and aural media through the gestural control of the user – via the single data stream.

I later became aware that this approach, though new to me in my investigations, was not in itself unprecedented. There are a number of works specifically exploring this notion of interactivity and audio-visual pairings (audiovisualisation) via similar, shared (single) data processes. For example, Ryo Ikeshiro’s Max/MSP work, *Constructions in Zhuangzi* (2012) explores,

... ‘audio visualising’ the same source of data and its validation, and its possibilities as an artistic practice... The objective behind the representation of the same source of data in the audio and visual domains is the integration of the two in the same work. (Ikeshiro 2012:148)³⁵

³⁴ The Nintendo Wii ‘remote’ facilitates gesture-based interaction through the user’s physical movement of the controller rather than simply the pressing of buttons which is common to most other gaming controllers. Nintendo market this device as a much more user friendly option than other gaming controllers to be used by anyone – as opposed to ‘expert’ gamers.

³⁵ Ikeshiro, R. (2012) *Audiovisual Harmony: The realtime audiovisualisation of a single data source in Construction in Zhuangzi*. Organised Sound 17(2): 148-155. UK: Cambridge University Press 2012.

Construction in Zhuangzi is a sound and computer graphics work in which small movements of lines and dot shapes mirror short popping, mid-frequency, textured sounds. The visuals resemble a view of outerspace and small bright objects travel around the screen relative to the sound's morphology. Similar to my own experiment, Ikeshiro uses a single data source as a means to establish a relationship between sound and visuals: exploring, in this instance, if and how they can be integrated successfully in a single work. Ikeshiro draws on Lev Manovich's highly influential text, *The Language of New Media* (2001) in his article, *The realtime audiovisualisation of a single data source in Construction in Zhuangzi* (2012) to comment on the implications of such a process within contemporary media practices,

Digital technology has further developed the audiovisual medium through the numerical representation of data as digital code resulting in its separation from the algorithm for its representation, as audio or video (Manovich 2001:60)

This 'neutral' territory – one of pure data, disposed to no one media more than another, is a rich area for the exploration of media interrelationships and the basis for constructing interactive experiences. Such a data source can be composed to create, effect and manipulate media in many ways – a process which the user can initiate in any number of forms, e.g. via sensor input which could include video tracking, tactile interfaces such as buttons or pressure-sensitive areas, laser beams, and, as in my work, accelerometer data. Ikeshiro identifies Manovich's proposition of 'transcoding' as emerging from these processes, a concept that would later come to define the unique possibilities provided by digital technologies regarding media,

...this enables 'transcoding' – that is, the translation of something into a different format such as mathematical data into audio, video or any other medium, and in all other permutations (Manovich 2001:64)... and thus increases the potential for more control over the integration of the audio and the visual domains video³⁶(Manovich 2001:56) (ibid: 148)

Mapping and Media Modalities in Digital Contexts

The development of software and more broadly, digital technologies in general, provides an environment for exploring the reduction, leveling and explicit mapping of media and its modalities in ways not previously possible. The 'mapping', or 'transcoding' (Manovich), of media is an important issue in interactive system design and digital composition generally. The process of deciding on functionality, affordances³⁷ and how media pairings function frequently emerge in the creative development of interactive systems. A full account of the detail of media pairings and their specific, inherent interrelationships is beyond the scope of this thesis but the process of 'mapping' is central to my creative approach.³⁸ Ikeshiro analogises this process with reference to his own work,

Homophony of the audio and the visual produces more besides redundant representation of data. Whereas audio-to-visuals following, the visuals can only contain data already present in the audio (and vice versa for the visuals-to-audio following), in audiovisualising a single source, the audio and visuals can both potentially contain information

³⁶ From Manovich, L. 2001. *The Language of New Media*. Cambridge. MA: The MIT Press pp 56-64 - All found in Ikeshiro, R. 2012. *Audiovisual Harmony: The realtime audiovisualisation of a single data source in Construction in Zhuangzi*. Organised Sound 17(2): 148-155. Cambridge University Press 2012. UK. p148

³⁷ To be discussed in full in Chapter Three, Section 4 'Composing Experience: Composing Affordances'.

³⁸ See Coulter, J. 2008 *Electroacoustic Music with Moving Images: the art of media pairing*. Organised Sound 15(1):26-34 Cambridge University Press for a close examination of specific audio and visual media interrelationships.

*not present in the other due to technical or perceptual limitations in the number of possible parameter mappings in each medium.*³⁹ (Ikeshiro 2012:149)

Ikeshiro defines homophony as,

...a melody and its harmonisation where each part by itself would merely be a line whilst its combination would create new depth by producing or implying a chordal structure (ibid)

In positing this metaphor and via the concept of mapping, Ikeshiro draws attention to the differing modalities, or ‘parameters’ as he puts it, afforded by individual media and exploited by the use of a single data source.

Though similar to Ikeshiro’s, my work is most notably different from his in that it is interactive for an audience/public; it is not a performance such as *Constructions in Zhuangzi*. The data source in my work is triggered from the user’s interaction: moving the globe to trigger the stream of data from the accelerometer, and as such requires a different kind of mapping, one that would make plain the connections and interrelationships between the sonic and visual media. The complexity lies in mapping this one data source to two different media while making the relationship between the media apparent to an audience but avoiding a ‘doubling’ of the represented data. Avoiding generalised abstraction and formalism (e.g. using changing colours to represent different sounds) and developing content for each media in this process articulated my first challenges in composing both content and form in interactive contexts. The modalities of the media and the capabilities of the technology dictate what kinds of relationships are possible, where

³⁹ Ikeshiro, R. (2012) *Audiovisual Harmony: The realtime audiovisualisation of a single data source in Construction in Zhuangzi*. Organised Sound 17(2): 148-155. UK: Cambridge University Press 2012. .

modalities can be ‘connected’ (or seemingly connected via a third, common origin: the data source).

<i>Modality</i>	<i>What the modality is</i>	<i>The most important modes of the modality</i>
Material modality	The latent corporeal interface of the medium; where the senses meet the material impact	<input type="checkbox"/> human bodies <input type="checkbox"/> other demarcated materiality <input type="checkbox"/> not demarcated materiality
Sensorial modality	The physical and mental acts of perceiving the interface of the medium through the sense faculties	<input type="checkbox"/> seeing <input type="checkbox"/> hearing <input type="checkbox"/> feeling <input type="checkbox"/> tasting <input type="checkbox"/> smelling
Spatiotemporal modality	The structuring of the sensorial perception of the material interface into experiences and conceptions of space and time	<input type="checkbox"/> space manifested in the material interface <input type="checkbox"/> cognitive space (always present) <input type="checkbox"/> virtual space <input type="checkbox"/> time manifested in the material interface <input type="checkbox"/> perceptual time (always present) <input type="checkbox"/> virtual time
Semiotic modality	The creation of meaning in the spatiotemporally conceived medium by way of different sorts of thinking and sign interpretation	<input type="checkbox"/> convention (symbolic signs) <input type="checkbox"/> resemblance (iconic signs) <input type="checkbox"/> contiguity (indexical signs)

Figure 1 The modalities and modes of media

Fig ix Elleström’s ‘table of ‘the modalities and modes of media’,⁴⁰ see Elleström *Media Borders, Multimodality and Intermediality* (2010:36)

Elleström’s seminal table details some of the more common and important media and modality components. In digital media, the material modalities are diminished, yet the spatiotemporal, sensorial and semiotic modalities remain unaltered. The sensorial modalities of film and audio – that of seeing and hearing are of course those by which we engage with the medium, yet the spatiotemporal and semiotic modalities are possible to manipulate in new ways due their digital contexts. Film and audio are both temporal forms, a modality they share and one in which common mappings can be forged to manipulate both forms simultaneously as perceptual time and virtual time. Yet the sensorial modalities of both media are manifested differently – visually and aurally, as such mappings become less straightforward. This in turn

⁴⁰ Elleström, L. (ed.) (2010) *Media Borders, Multimodality and Intermediality*, Palgrave Macmillan p 36)

affects Elleström's semiotic modality – the symbolic and general meanings communicated as a result of such modal alterations can blur media forms – often this is desired, but it can pose problems for those digitally mapping between media, especially through a single data source method and interactive contexts.

This may be a problem which both my own and Ikeshiro's work share, but in different contexts and for different reasons i.e. that of interactivity and that of performance. Additionally, such differences in processes and application draw our attention to distinctions between system architectures and later the types of systems themselves. Drummond, drawing on Hunt and Kirk (2000),⁴¹ expands on this idea and defines and describes the kinds of mappings employed in programming interactive systems,

Mappings can be described with respect to the way in which connections are routed, interconnected and interrelated. Mapping relationships commonly employed in the context of digital musical instruments and interactive systems are (Hunt and Kirk 2000; Miranda and Wanderly 2006:17):

- (1) one-to-one*
 - (2) one-to-many*
 - (3) many-to-one*
 - (4) many-to-many*
- (Drummond 2009:149)⁴²*

Hunt and Kirk's 'one-to-many' mapping (point two) was applied in the construction of my work *Inter-activity* (2012) – described fully in the next chapter - whereby the single data source was mapped to different media and their different modalities.

⁴¹ Hunt, A. Kirk, R. (2000) *Mapping Strategies For Musical Performance*. In M Wanderly and M. Battier (eds.) *Trends in Gestural Control of Music*. Paris IRCAM, Pompidou Centre

⁴²[Drummond, J. 2009. *Understanding Interactive Systems*. Organised Sound 17(2): 148-155. Cambridge University Press 2012. UK.]

One-to-many mappings can solve many of the performance interface problems created by multiple one-to-one mappings.
(ibid:132)

However, despite the great possibilities and convenience this process afforded, my second research project, *Inter-activity*, the first to explore digital technologies as the basis for composition, faced a number of challenges *because* of this mapping type. I will fully address the specific processes and problems of *Inter-activity* in the next chapter, however it became clear that working within and between media borders and their modalities was a considerably more complex area than I had anticipated. My objective of uniting both visual and aural media through digital data became complex beyond point of connection. Specifically, the composition process, the act of uniting each media type to the same input source didn't unite the media, or convey a clear relationship. The validity and success of the interconnection between the media became clearer in experiential contexts – when the audience would use/encounter the piece.

Intermediality

In mapping media *modalities* in this way, and developing inter-relationships from pure numeric data, it occurred to me that I was no longer creating work primarily in interdisciplinary contexts but *intermedially*: a framework operating outside/analogously to disciplinary contexts. My process had become such that I was creating/developing digital-interactive frameworks *for* the subsequent application/composition of media – sound and image, typically. My work began and centered around composing the specific interrelationships

and digital connections that would unite, effect, manipulate and re-configure how sound and image would be combined/experienced. Previously, my work had begun conceptually with ‘music’ in mind, and how that could be framed along side installation-based visual work, or the shared aesthetics of a dance piece.

The focus of my work up until this point was developing closely around an interdisciplinary arts framework and how different borders and distinct notions of specific arts practices resonated and interacted with, and permeated through each other’s borders— specifically, music/sound and other disciplines. It is notable that music was still a base component here to which other ideas were built around and/or connected. It was at this juncture that the framing of my practice into interdisciplinary frameworks became less than helpful. As such, I began experimenting outside of what I perceived as disciplinary spaces – those best characterised as being intermedial in composition and practice.

During the early stages of my research in this area I found intermediality and interdisciplinarity shared similarities, converging territories and that often they can be different ways of looking at the same thing. However much of my exploration of this area was predicated, unwittingly on a Greenbergian notion of distinct disciplines.⁴³ I spent a substantial amount of time attempting to reduce disciplines to their media constituents and then exploring their modalities – as outlined by Lars Elleström in his *Media Borders, Multimediality, and Intermediality* (2010)⁴⁴. Eventually, I found this methodology to be flawed at the

⁴³ Clement Greenberg’s modernist influential theorising on the topic of disciplinarity outlines their form as distinct areas of knowledge.

⁴⁴ Elleström outlines distinctions between media types and their modalities, I approached a dissection of disciplinary forms based on similar principles and using this information. See Fig. ix above.

conceptual level and that the difference between media and disciplinary forms is one that must be acknowledged.

Bruhn Jenson outlines what I consider to be a suitable definition of media; he says,

Intermediality refers to the interconnectedness of modern media of communication (Jenson in Donsbach 2008).

Jenson indicates that media is communicative, it is channel-like or a conduit for information and stimuli. The discipline, however, is a more conceptual entity securing and furnishing its media in socio-historic paradigms - specifically, as the subjects constructed by universities. As Stichweh notes,

There exists a long semantic prehistory of disciplina (sic) as a term for the ordering of knowledge for the purposes of instruction in schools and universities. (Stichweh 2001)⁴⁵

The interconnectedness and convergent territory of these terms is inherently dense and separating the medium from the discipline is unnecessary in launching a practice-based inquiry as long as one acknowledges the complex, interwoven architectures of these forms. I return to Elleström to clarify the specific area I refer to when detailing the area of my own intermedial practice: the links and interconnections between media,

...intermediality must be understood as a bridge between medial differences that is founded on medial similarities (Elleström 2010: 12)

⁴⁵ Stichweh, R. (2001). Scientific Disciplines, History of. IN: Smelser, N. J. & Baltes, P. B. (eds.). International Encyclopedia of the Social and Behavioral Sciences. Oxford: Elsevier Science (pp. 13727-13731).

Robin Nelson, drawing on the work of Elleström, Boenisch and Chapple and Kattenbelt 's (eds.) *Intermediality in Theatre and Performance* (2006), further articulates the distinct live, experiential resonances that intermediality effects in the audience and, echoing Jenson, its basis in interconnectivity between the composed media elements and an audience,

..the relations between different media in a multi-tracked text are ultimately a matter of perception and interpretation, namely Boenisch's sense that intermediality is an "effect of performance ... created in the perception of observers" (2006, 113) because the relational aspect between thing and sign is a matter of experiencing. Ellerström nevertheless contends that, "it is crucial to discriminate theoretically between the material and the perception of the material if one wants to understand how media can be related to each other" (Nelson 2010:13)⁴⁶

I discuss the specific, practical application of these concepts in the process of composing my own work in greater detail later – see chapter Three, Section 2 - 'Becoming and Differential Presence' for how multimodality and intermediality impacted my creative process.

In returning to compare Ikeshiro's work to my own practice, it is apparent that, while both are created through similar conceptual and methodological processes (uniting media through single data sources), my work diverges from Ikeshiro's at the point of audience encounter. My work has always been presented, exhibited, or offered for encounter in installation formats, or as live-art in which the viewer/audience, or, to be more specific, the experiencer, can negotiate and experience the work freely. In a more staged performance context composed media

⁴⁶Nelson, R (2010) *Introduction: Prospective Mapping and Network of Terms* in Bay-Cheng, S. Kattenbelt, C. Lavender, A. Nelson, R. (eds.) (2010) *Mapping Intermediality in Performance*. Amsterdam University Press. p 13.

mappings and interrelationships between form and content can be more subtle and the effectiveness of these relationships is subject to the skillful performance of the informed author-performer. Ikeshiro performs his work himself and can demonstrate such connections and framework in a communicative way to an audience. Within an interactive framework, there are no such luxuries - the user must at some point understand the process and possibilities in the work in order to develop a relationship with it. This issue is best discussed further in light of another work, and the concomitant issue of classifying systems/levels of interactivity.

Interactive System Types: Instrument Playing vs. Open Forms and Experiencing

SonoMorphis (1998) by Bernd Lintermann and Torsten Belschner is a work similarly aligned with my interests in audio-visual relationships and interactive systems. This work also articulates a divergence in my practice from the works/system types I had found interesting in the beginning of my research with digital technologies. The authors describe the work as an 'audiovisual instrument' that can be played'.⁴⁷ The work is also, like my own early experiments and Ikeshiro's work, based on sonifying and visualising the same data source where neither visuals or audio effect/dictate the other, rather, "both elements trace back to a third, common origin."⁴⁸ (*Götz Dipper 2009:290*). Lintermann and Belschner,

⁴⁷ Belschner, T (2000) Digitale 'virtuelle' Welten. In Josef Kloppenburg (ed.) *Musik multimedial* Vol. 11 of Handbuch der Musik im 20. Jahrhundert. Laaber: Laaber, 320-46.

⁴⁸ *Dipper, G. (2009) Interactive Interfaces: Installations produced at the ZKM/HfM. Organised Sound 14(3): 286-298 Cambridge University Press. p 290*

...refer to 'visualisation' and 'sonification' of the same 'data structure' (Lintermann and Belschner)... SonoMorphis successfully manages the balancing act by which 'the sonic and visual representations of the installation's structure [are put] into as close a relationship as possible (Lintermann n.d.-b), while avoiding a 'mere doubling of that which is being represented' (Belschner) 2003:341) (Ibid).

SonoMorphis is interesting on a number of levels with respect to my own work. My first interactive piece, *Inter-activity*, was devised via the construction of a number of preliminary software experiments and smaller systems based around the notion of musical performance with visual accompaniment.⁴⁹ *Inter-activity* was my first large project which employed the union of sound and visual media via a single data source, as discussed above, via the Wii remote. The notion of the 'instrument', with respect to composing an interactive system, recalls Eno's mobile applications, advertised as 'Part instrument, part composition and part artwork'.⁵⁰ Whilst moving away from musical territories, my compositional methodologies were still, in retrospect, predicated on musical traditions and frameworks. Creating an instrument which one could 'play' was the entry point for me in developing open, interactive work. *Inter-activity* was an installation work not a performance piece: however the notion of a 'composed instrument', one that resides in performance contexts, serves to describe *Inter-activity* well.

Interactive systems blur...traditional distinctions between composing, instrument building, systems design and performance. This concept is far from new. Mumma (1967), in developing his works for live electronics and French horn, considered both composing and instrument building as part of the same process.

⁴⁹ Outlined in Chapter Two – 'Working with Digital Technologies' pg. 79. Alternatively refer to the preface for a brief description of the work.

⁵⁰ Eno, B (2008) URL [<https://itunes.apple.com/app/bloom/id292792586?mt=8>]

(Drummond 2009:124)⁵¹

The notion of creating a ‘composed instrument’, as a ‘system’ or object which is both an expressive ‘device’ and an artwork, highlights the issue of *levels* of interactivity within different interactive systems. Where does the distinction between ‘instrument’, ‘composition’ and ‘artwork’ lie?

Drummond notes how classifying a system as interactive can often be located with respect to the experience afforded by the work. Drawing on Bongers 2000:128⁵², he highlights an empirically-based categorisation system:

- (1) performer with system;*
 - (2) audience with system; and a*
 - (3) performer with system and audience.*
- (Drummond 2009: 126).⁵³

While my work is best reflected by category two, Drummond explores the work of Rowe (1993:6-7) to further classify such interactive system types beyond empirical, physical observations and identifies a further three experience types,

- (1) score-driven vs. performance-driven systems;*
- (2) transformative, generative or sequenced response methods;*
- and*
- (3) Instrument vs. player paradigms.*

(ibid)

Inter-activity seems to most closely match Rowe’s third category of instrument vs. player paradigms.⁵⁴ While the player vs. instrument

⁵¹ Drummond, J. 2009. *Understanding Interactive Systems*. Organised Sound 17(2): 148-155. Cambridge University Press 2012. UK. p 124

⁵² Bongers, B 2000. *Physical Interfaces in the Electronic Arts – Interaction Theory and Interfacing Techniques for Real-Time Performance*. In M. M. Wanderley and M. Battier (eds.) *Trends In Gestural Control of Music*. Paris: IRCAM-Centre Pompidou

⁵³ In Drummond, J. 2009. *Understanding Interactive Systems*. Organised Sound 17(2): 148-155. Cambridge University Press 2012. UK. p126

paradigm is familiar to most audiences and functions “*in the same way that a traditional acoustic instrument would, albeit an extended or enhanced instrument*” (ibid) complexity can arise attempting both to use the single data source as agency for interaction and to create balance between designing a ‘composed instrument’ with repeatability *and* depth (on either a conceptual level or through ‘playable’ functionality) for development. Garth Paine highlights the benefits and challenges of this situation. He offers that interactivity is,

...best represented by a system based on streamed data techniques rather than triggered, pre-defined events. The mapping of sensed input data to processing algorithms is the most complex and subjective aspect of system design. (Paine 2002:298)⁵⁵

However, he exposes the weakness of mapping streamed data inputs as one subject to general compositional pitfalls: if the work cannot use these methods to generate meaning for an audience they become redundant in any context:

The mappings must be such that there is extensive scope for exploration and the discovery of new outcomes, but where the outcomes prove repeatable to the extent that they confirm the cognitive map that the interactor is developing as their relationship with the interactive system deepens. (ibid)

Matching complexity and depth with repeatability and control is the primary challenge in constructing interactive artworks. There was a problematic inability to reliably repeat actions and ‘control’ the experience of my work *Inter-activity*. While the work possessed a dense conceptual framework and fitted within a larger conceit (covered in the

⁵⁴ It is notable that my later work moves away from this model and is better defined by category two.

⁵⁵ Paine, G. 2002. *Interactivity, where from here?* Organised Sound 7(3): Cambridge University Press. UK

next chapter), the unreliability of the work derailed the experience due to the particular expectations of the technology and the context of interactivity. In returning to Lintermann and Belschner's work *SonoMorphis*, Dipper speaks of his perceptions of the aural and visual relationship, or lack thereof, in this work. While this may only be one experience's perception, it demonstrates how important a sense of theme, apparent relationships between the media, or guiding conceptual framework. Without this, users can often feel alienated and that the work may be without meaning.

The visual component consists of a stereoscopic projection... It arouses recollections of leaves or blossoms, insects, arms, tentacles or the like... The acoustic part seems abstract in comparison, hardly any concrete associations come to mind. (Dipper 2009:290)⁵⁶

Where there are few apparent connections between media or content in an instrument context, or a lack of a guiding conceptual presence, this can be highly detrimental to the experience of a work. Thus, the overall focus of the work and experience for the audience became one of trying to figure out how to 'play' the instrument-object. Drummond echoes this view,

The challenge facing the designers of interactive instruments and sound installations is to create convincing mapping metaphors, balancing responsiveness, control and repeatability with variability, complexity and the serendipitous. (Drummond 2009:132)⁵⁷

This difficult balance became apparent during a work-in-progress showing of *Inter-activity* when the interaction itself became the focus of

⁵⁶ Dipper, G. (2009) *Interactive Interfaces: Installations produced at the ZKM/HfM*. Organised Sound 14(3): 286-298 Cambridge University Press. p 290

⁵⁷ Drummond, J. 2009. *Understanding Interactive Systems*. Organised Sound 17(2): 148-155. Cambridge University Press 2012. UK. p132

the work instead of the results of the interaction.⁵⁸ This was due to lack of perceivable relationships between the interface, the media and what the user had control over; thus the experience was considerably diminished. Ultimately, I learned that interaction, as far as my practice is concerned, should be thought of as merely a *means* to experience, not a focus for the experience itself. As such, the mappings, levels of interaction, and the form the experience is framed within all contribute to the communication of a ‘meaningful’ art work – meaning that is derived from a structure that allows frictions, problematisation, elements to rub up against one another and create interesting resonances between the conceptual, interactive and content elements.

... where there is no perceptible correlation between the input gesture and the resulting sonic outcome, the feel of the system being interactive can be lost, as the relationship between input and response is unclear. It is a balancing act to maintain a sense of connectedness between input and response while also maintaining a sense of independence, freedom and mystery (ibid:128)

Moving Away From Instrument Paradigms

How are ‘composed instruments’ different to other types of interactive forms? My work that most closely mirrors that of the instrument model, *Inter-activity*, and my final work, *Digital Spaces* (2012), a work more closely aligned with that of Drummond’s ‘audience and system’ paradigm, *are* notably different – the specifics of each system are outlined in Chapter Two. Such differences, I propose, are manifest at all stages of creating and executing the work: both in the composition and performance of the work.

⁵⁸ A full account and description of *Inter-activity* can be found in Chapter Two and images can be found in the Appendix.

The key to differentiating these forms lies in the way that instrument types are dependent on paradigms that are based in our understandings of repeatability and the role of the user-as-performer/player rather than experiencer. ‘Composed’ instruments generally charge the user with a responsibility to realise an author-disposed composition rather than have a user-generated experience – this can also be identified in the scope of the content and (resulting) conceptual richness of a work. For example, composed instruments are ‘composed’ due to their pre-composed sounds/material – as in Eno’s *Bloom* and *Air* applications. They can be performed freely but the effect is one tied to the specific compositional decisions and interactivity pre-determined by the author. The ‘audience and system’ type concerns the user less with what specifics the author has arranged but with the focus becoming the greater range of possibilities in experience that the work offers in that there is more focus on the user’s engagement, rather than the realisation of the composed elements) – this is often reflected in the content (be it longer, more complex, more conceptually resonant, or disposed to stir further intertextual meanings from the user) and how the mode(s) of interaction in the work can facilitate this.

In a synonymic sense, an instrument can be a tool⁵⁹ – something used to accomplish a task or purpose. Yet, the notion of a purpose or task, and as such the means to achieve it, becomes problematic in a situation where the act itself is the purpose, aim and result. Even if the models of ‘player vs. instrument’ and ‘audience and system’ are simply conceptual, the audience and system paradigm is *framed* in a way that accommodates a less loaded form of interaction, one that privileges the

⁵⁹ It’s worth noting I do not restrict the notion of an instrument to this definition, simply that the words share common functional operatives – disregarding the expressive, enriching potential of the instrument for a movement. I use the term specifically in this instance, for the sake of argument, as ‘a means of pursuing an aim’. Oxford English Dictionary 23 March 2014 <<http://www.oxforddictionaries.com/definition/english/instrument>>

experience of the user rather than the realisation of the ‘work’. In my own work *Digital Spaces* I found this distinction to be a legitimate one, if only on a conceptual level. The methodology for creating such ‘audience and system’ scenarios manifested as more disparately themed content and a more open, yet complex, system that developed depending on user decisions. Additionally, there was no interface; or rather, there was no tactile (instrument) object, such as the Wii remote, for physical manipulation. As with *Inter-activity*, much of the specifics of *Digital Spaces* will be addressed in the next chapter, yet I feel in continuing to focus on the conceptual development/framing of *Inter-activity* holds benefits for placing my work within the lineage of other practitioners and provides a frame in which to locate my praxis theoretically.

As I have noted, the biggest challenge in creating *Inter-activity* was developing a system that simultaneously offered the repeatability of instrumental paradigms and development and conceptual depth in an artwork context. I feel this was never fully realised due to competing ideological aims for the work in functional design and conceptual frameworks. Essentially, the work attempted to be both instrument and a concept piece – there was, however, no congruity between these two elements. After the completion of *Inter-activity*, I was certain that my next work needed to take into account concepts of modes and levels of interaction and how this could be framed in order to successfully create something that would have conceptual value and provide a cohesive and ‘satisfying’ interactive experience.

Shortly after my first exhibition for *Inter-activity* I attended a conference for MaxMSP users⁶⁰ with various papers on generative composition and programming methods, including a keynote from Cycling 74’s CEO

⁶⁰ M4_u conference 2011, held at Phoenix Square in Leicester.

David Zicarelli. During this conference I encountered a work called *Versum* by audiovisual artist Tarik Barri.⁶¹ The work is an interactive ‘3D virtual world’, or rather universe, in which the user is given the ability to ‘fly’ around, via a ‘3D’ mouse/space navigation controller, and explore a variety of abstract ‘galactic’ objects resembling orbiting pairs of stars, throbbing super novae and stretched beams of light. Each object possessed a particular sonic character that would reveal itself as you approached it in virtual space, and realised aurally by a multi directional, surround speaker arrangement. The work was not dissimilar to the appearance of Ikeshiro’s *Constructions in Zhuangzi* but in three dimensions and interactive for an audience.

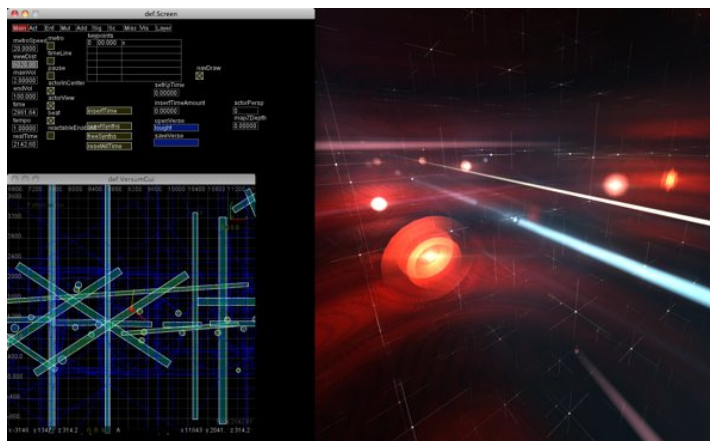


Fig 1.1 *Versum* (2009) by Tarik Barri.

This work was fascinating to me for a number of reasons. While the mode of interaction was ambiguous, as it sat between that of an audience-system and player-instrument category, the work offered both an openness in form and control in interactivity that I had not yet achieved in my own work. The experience of ‘controlling’ *Versum* was without a performance or musical imperative. The experience was to explore sounds as part of an open work in which one could ‘zone in’ on elements that attracted one’s attention at any time. Essentially, the

⁶¹ <http://tarikbarri.nl/projects/versum>

mode of interaction in *Versum* afforded the user perceptual freedom. Set aside from the concern of developing a sense of composing as you explored the work, this was also an exploration in digital media. The ability to 'wander' in virtual space and 'encounter' media appealed greatly to me, yet it fell short for me in the concept and experience – the three dimensional virtual space was an engaging interactive experience but delivered little else in a conceptual context. The work had little conceptual resonance for me, only the novel experience of interacting with the sound and visual environment.

I also became aware of a work by Sarah Rubidge and Alistair McDonald titled, *Sensuous Geographies*, that addressed and occupied a different stance on a number of problematic issues in terms of interface, levels of interaction, and composition and performance crossovers. Rubidge describes *Sensuous Geographies* as comprising,

...a large installation space hung with translucent banners, upon which abstract digital figures move. In the centre of this space is a 4m x 4m circular floor-cloth, which marks the boundaries of the interactive space. Above the space is a camera which captures the motion of those who enter the space using colour-tracking software. This allows a sound strand first to be initiated and then modulated by each individual player. The trajectories of the players' motion is the main parameter for the modulation and spatialisation of the individual sound strands in real time. Visitors to the installation can choose to enter the space wearing a full-length silk robe in red, yellow, green or blue through which they are individuated by the system. This allows them to interact individually with the installation.

(Rubidge in Broadhurst and Machon eds. 2008:119)⁶²

⁶² Rubidge, S (2011) *Sensuous Geographies and Other Installations in Performance and Technology: Practices of Virtual Embodiment and Interactivity* (2011) eds. Susan Broadhurst and Josephine Machon



Fig 1.2 Sensuous Geographies (2006) Sarah Rubidge and Alistair McDonald

In viewing video documentation of *Sensuous Geographies* and reading Rubidge's account of practice, the work seems to focus on a wide range of inter-personal (multiplayer) possibilities. Rubidge uses small fragments of audio material, which she calls 'sound strands' and affords the user the opportunity to modulate those strands, through what sounds like a number of digital filters, based on the trajectory of each player i.e. their movement affords the spatialisation and modulation of the sounds. In viewing the video documentation it was very difficult as an audience to understand which performer was making which sound and how they were 'modulating' them. The four players and their continuous movements, in addition to the randomness of the sounds, made it very difficult to ascertain the cause or 'rules of the game' - it appeared each player could trigger new sounds without assigned, or differentiated 'ranges' or performance parameters – the result was one of ambiguity but also freedom. Rubidge does, however, describe levels of interaction set as 'game modes' or levels of 'difficulty', from beginner to expert, dictated by how many users can experience the work at one time, for example,

...the simplest level (for the novice player) entails the spatialisation and sonic modulation of single sound strands through single-player behavior. (ibid)

I cannot comment on this (single player) level of interaction as there is no video documentation, and I must also allow that the documentation I have seen does not deliver an accurate account of the live experience. However, it is when the 'expert' mode is initiated, a mode of greater variability in manipulation/modulation of the audio forms and accommodating multiple players – I found it difficult to identify the interactive process,

The more complex (expert) levels entail modulation of the sound strands through 'group' interactivity, for example through variations in the proximities between two and four players. These latter levels of interactivity are sometimes impossible to 'read' consciously. However, when a user reaches this level they have become skilled at 'reading' the environment which is detected by the undermind rather than by a conscious understanding of the results of the their actions. (ibid)

Despite the different levels of interaction in *Sensuous Geographies* it was, at least in viewing this documentation, one of great depth but at times also difficult to perceive the interactive process. Exactly what is happening in terms of interactivity was, from the documentation, unclear and, in drawing on my experience from *Inter-activity*, I considered that it could be due to frictions between the system type (level/kind of interactivity) and the compositional aims. Building in multiple levels of interactivity, in which users can learn the recognisable and repeatable actions for (re)performance (a system more akin to the player vs. instrument paradigm), into an open, 'audience and system' setting for multiple 'players', can often result in highly complex interaction at the expense of experience. Building multiple levels of interaction can create frictions in the context of an architecture that is both open (non-

determinate) and for multiple players. Such a system architecture is often put to use in facilitating, often effective, surface-level public interaction. For example, multimedia collective Phase7's interactive public artwork, *Onskebronn* (2010), shown at the Hauptbahnhof in Berlin in October 2010, allowed multiple users to be tracked by overhead camera resulting in their footsteps eliciting trails of bright light reminiscent of shooting stars with accompanying sound. In *Onskebronn* the process of interaction and its results were made obvious, such that a passing audience could understand what was occurring in a matter of seconds. The system was designed to facilitate multiple users and give enough depth for audiences to stop and enjoy watching others interact. While there is no doubt *Sensuous Geographies* offers more development and possibilities than these works, I was conscious that I should be wary of constructing similar levels of complexity in the context of multiple player systems at the cost of the overall experience. I did not want to design my work to do and accommodate too many things. For an audience, the interactions and relationships can become very difficult to perceive in systems which attempt to be *both* 'open system' (audience with system) and 'composed system' (instrument vs. player) architectures. At the very least, greater complexity dictates that more time must be spent with a system, or object, in order to perceive relationships and system capabilities – something not always concordant with intuitive technological experiences.

Conceptually, a work can be interesting but the accommodation of both these ideas can undermine the overall functionality of a work – something that occurred in *Inter-activity*. There were, however, a number of extremely useful and interesting aspects to *Sensuous Geographies*, such as removing the physical interface and exploring levels of interaction and system architecture. However, the issue of

accommodating both system form and conceptual frameworks into a cohesive experience, one that succeeded simultaneously in functional and conceptual contexts (to find the right ‘balance’), was still something I was no more comfortable with. In the next chapter I document my research journey in greater detail in preparation for my (final) critical-theoretical chapter – Chapter Three - and outline how, in *Digital Spaces*, I was able to address this issue of balancing both conceptual and interactive elements. It would be useful at this stage, before I launch into the specifics of unpacking my process, to explore works that influenced the construction of *Digital Spaces* on a conceptual level and how this ultimately shaped the beginnings of the composition process, in the content of the work.

Digital Spaces and Forms: Open-Ended Experiences

Through my research in intermediality I had become aware of a number of artists’ work using digital technologies to create experiences addressing a number of contemporary conceptual ideas. I was most taken with the notion of glocality,⁶³ user generated content/interactive initiatives and live data from the internet. In this section I’ll look specifically at artists exploring conceptual frameworks resonant with my own research in digital technologies and our daily experience of the digital and actual. Works such as Blast Theory’s *Rider Spoke* (2007) which uses gaming and social media culture to explore how theatre and

⁶³ The glocal is defined as referring to a state in which something or someone is at once both local and global – often with reference to digital communication technology such as skype, where a user is able to talk live and face-to-face with another user on the other side of the world – related to the notion of ‘telepresence’.

sense of community can be displaced,⁶⁴ Chris Kondek's *Dead Cat Bounce* (described in more detail below) and Richard Foreman's exploration of telepresence in a performative setting with his work *The Gods Are Pounding my Head! (Aka Lumberjack Messiah)* (2005),⁶⁵ were all influences in the beginning of this work's development, all of which commonly use data, either live or scraped from the internet on 'live', up to the second information, generated often by the public from social media or via intermediary data sites. *I'd Hide You* (2012) by Blast Theory was a live-streamed⁶⁶ 'multi-player' work in which three performers took to the streets of Manchester equipped with camera units, mounted as 'guns', with their own wireless router and smartphone for broadcasting and communicating with the online audience (see Fig...). The online viewers would direct the performers to each other using a map showing their real-time location in order to photograph them, via mouse clicks, and score points: a sort of real life, multiplayer shoot-em-up.

⁶⁴ *The piece continues our fascination with how games and new communication technologies are creating new hybrid social spaces in which the private and the public are intertwined.* – Quote taken from Blast Theory Official Website 23 March 2014
<<http://www.blasttheory.co.uk/projects/rider-spoke/>>

⁶⁵ Foreman, R. (2005) *The Gods Are Pounding my Head! (Aka Lumberjack Messiah)*. Premiered at The Public Theatre, New York City

⁶⁶ Live-streaming refers to the process of broadcasting over the internet live, as the action happens, typically via video.



Fig 1.3 The camera, router and smartphone units carried in Blast Theory's *I'd Hide You* (2012)



Fig 1.4 The online HUD (heads up display) and audience perspective of *I'd Hide You* (2012) by Blast Theory

Glocality and telepresence have become a popular theme for intermedial artworks. The use of live-streaming, skypeing, and live data from information services, such as weather or social media, and combining, integrating and the interweaving of those technologies with real world/ physical 'media' has come to define an emerging practice in intermedial art and performance. Chris Kondek's *dead cat bounce* (2009) uses the setting of live theatre performance to stage a real-time stock market experience in which the company uses a percentage of the audience's ticket price to buy real shares. The real stock market,

projected live with share statistics, determines whether the audience gets a profit back at the end of the show. CREW, a performance group and multidisciplinary team of artists and researchers based in Brussels, work, *W (Double U)* (2009) echoes similar methodologies to Blast Theory in using telepresence as the basis for exploring disjunctions in virtual-real world experiences.

The fields of view of two users at different geographical locations were swapped by satellite, one being in a theatre in Mons (Belgium), the other strolling in the shadow of the Agbar tower in Barcelona under the auspices of 20203DMedia, a large scale European media development project.

(Kurt Vanhoutte and Nele Wynants 2010)⁶⁷

Rimini Protokol, a multidisciplinary German trio who together studied at the Institut für Angewandte Theaterwissenschaft in Giessen, make similarly complex works across real and digital space. Their work *Call Cutta* (2008) assumes the guise of a call centre, placing the user in the seat of a phone operator, connected to another call centre in Calcutta, India. Despite being 10,000km away, the voice on the end of the phone begins to describe the room the audience are sitting in with great familiarity and so emerges a transcontinental, real time, intermedial performance set in glocal space,

*By now, you are standing at the window and your transcontinental conversation partner is pointing some curious people in the opposite building out to you. On the notebook desktop in your room images and videos are opening up out of nowhere. A story is about to develop and you realize that the call centre agent and you and your city are the very first protagonists of the plot*⁶⁸ (Rimini Protokol Official Website)

⁶⁷Kurt Vanhoutte and Nele Wynants (2010) in Bay-Cheng, S. Kattenbelt, C. Lavender, A. Nelson, R. (eds.) (2010) *Mapping Intermediality in Performance*. Amsterdam University Press..

⁶⁸ Rimini Protokol website: http://www.rimini-protokoll.de/website/en/project_2766.html accessed on 10/04/13

I will document further influences relating to the digital technological frameworks that dispose the circumstances for the meeting of both actual and virtual realities in the next section of this chapter. However, it is both the intersection of the physical and digital intermedial composition and the conceptual framework such contexts offer in contemporary culture that comes to define my work from this point.

Curating Digital Content: Composing with the Composed

...the endlessly disposable, rapidly mutable ephemera of the virtual age and its impact on our consumption of relationships, images, and communication; each articulates something of the troubling oscillation between intimacy and distance that characterizes our new technological regime, and proposes an incommensurability between our doggedly physiological lives and the screens to which we are glued. (Bishop 2012:1.)⁶⁹

The final section of this chapter is devoted to critically exploring the use of content in my work and how this a). relates to a broader field of practice by other artists and b). articulates the beginnings of the compositional and conceptual choices I made in creating my work. It also serves as a gateway to the next chapter of this thesis where I focus on further documenting the process of my research journey through compositional choices as the basis for predicating my research inquiry, which I will detail in the final chapter.

Through the majority of my research I have been creating content in digital circumstances – creating video and sound material in computer

⁶⁹ Bishop, C. 2012. *Digital Divide* in *Art Forum* 17(2): Accessed via [http://hybridge.files.wordpress.com/2011/02/bishop-digital-divide-artforum-sep-2012.pdf] accessed 17/12/12.

editing software and developing computer generated graphics and sounds in my programming work. However, it was only at the beginning of second major project *Inter-activity* that I began 'creating' content through the re-appropriation of existing digital media. The video material in this project was developed to echo Marc Auge's theories on 'non-places'.⁷⁰ The 'non-place' refers to 'places of transience that do not hold enough significance to be regarded as "places"'.⁷¹ Examples of a non-place could be a motorway, a hotel room, an airport or a supermarket. This idea interested me for a number of reasons: the first being that significance of place or space is a social, even subjective construct, so the boundaries between transience and significance in this context seemed uncommonly fragile. The second reason was that this transient, liminal space seemed a fitting conceptual framework for my practice which often worked within such areas with respect to disciplines or media. The digital, temporally-barren images from Google's Maps service, by extension, seemed like an appropriate fit for this concept. The imagery was one depicting space and place, at once representative of their real-world counterparts but, in their digitalization, devoid of either quality. I took 'screengrab'⁷² videos of a selection of places from around the world, mainly airports, highways and major cities – in their photographic stillness, these seemed similarly like 'non-places', compounding the notion through their intangible digital contexts. However, this content was not composed or created by me – the images were taken by a large cooperation and offered as a free service for navigation and information to internet users. In the broadest sense, the material was not 'original' to me. In depicting the world we inhabit

⁷⁰ Augé, M (2009) *Non-Places: Introduction to an Anthropology of Supermodernity*. Verso Books; New edition edition (1 Jan)

⁷¹ Nencini Francesco & Pirovano, Stefano; *I Non Luoghi* ("The Non Places"), Silvana Editoriale, Milan, 2005

⁷² Litterally, the process of recording what is on screen at the present moment as video.

the imagery was naturally representative of public, private, and unoccupied space: it was from a public service and, in a sense, represented a 'non-place' of authorship. Aside from Google's claim to owning copyright on the satellite photography, the process was without author, or at the very least, 'authorially liminal' in the new context of my installation. This was the first time I had decided to explore the use of digital, web-based content in my work and focus on the re-contextualisation and re-appropriation of this material, diverting a compositional focus from content to concept. My decision to do this was based on the fact that the process of constructing my work's form was becoming more digitally-focused and the software I was developing had, in some sense, disposed the work towards drawing out technical and digital structures. It seemed right that the content would be of an identifiably digital origin - to draw the user's attention to this quality of the work the content was 'pulled' from an 'everyday'/domestic⁷³ digital experience.

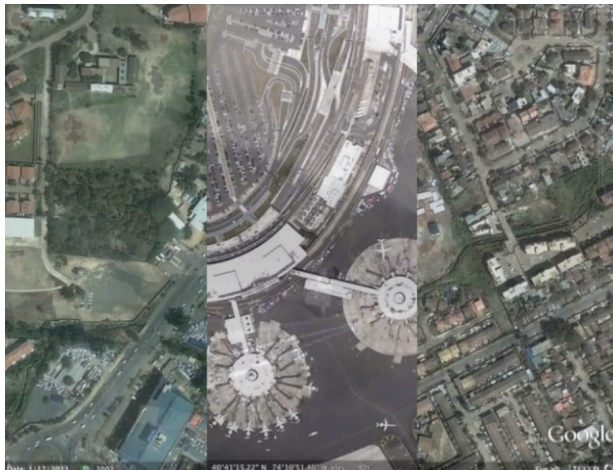


Fig 1.5 Manipulated imagery from *Inter-activity* - pulled from Google Maps

...the digital is, on a deep level, the shaping condition—even the structuring paradox—that determines artistic decisions to work with

⁷³ In the sense that Google's services are considered a 'domestic technology'.

certain formats and media. Its subterranean presence is comparable to the rise of television as the backdrop to art of the 1960s. (ibid)

The ever-present and growing digital influence in our lives is hard to ignore. Every other moment it seems we are distracted by, relying upon, communicating through, and disrupted by digital technology and its accompanying media. My work *Digital Spaces* elaborates on this idea considerably. The content explores a mix of live web data feeds from social media sites⁷⁴, recorded and ‘scraped’⁷⁵ web material such as Youtube videos, random video chat encounters, further Google map material, this time from their ‘Street View’ service, and audio blogs.

There are many artists that use existing digital content in order to explore concepts of digitality. The following artists were of great influence in developing my content for *Digital Spaces*. The processes and conceptual framing of their work allowed me to develop/curate a collection of content from numerous digital platforms in order to articulate the conceptual shift my work had undergone – in a sense, using technology to talk about technology.

Similar approaches can be seen in Beijing artist Cao Fei’s work, *RMB City* (2008), and the performance work of Marloeke van der Vlugt, *Aki Anne II* (2007), who both explore the online role-playing game world of Second Life (SL). SL is an online, virtual world where users create avatars or characters and proceed to build their own houses, interact with others in the SL universe and, essentially, live another existence, digitally. Each of these works take a different approach and explores opposite aspects of the SL platform, however, they both share a

⁷⁴ Rich site summary, or dubbed really simple syndication, a web feed utility which allows the transfer of simple text from websites

⁷⁵ A software process for collecting web data and media.

common conceptual focus in exploring the boundaries and resonances between the virtual and actual realities. Fei's *RMB City* is a project in virtual architecture and avant-garde urban planning. It is a virtual city in the SL universe used as a platform for exploring boundaries between virtual and actual existence and to provide further creative experimentation. Fei's creation of the city creates a virtual and real world link between China and SL. The city itself uses a collage-like aesthetic in its construction and there are many references to China in its architecture including a giant panda hanging above the city next to a Chinese flag, a number of jumping golden carp in the city's waterfalls, the People's Palace (Beijing), Rem Koolhaas's CCTV building (Beijing) and the "Bird's Nest" stadium from the 2008 Beijing Summer Olympics. However, it is the precariousness of the city's construction that defines it. Each element is balanced on top of another with little consideration given to representing real-world physics.⁷⁶ This precariousness and fragility is representative of the delicate relationship between virtual and actual space. This concept is also explored by Marloeke van der Vlugt's in *Aki Anne II*, but from the position of the user and avatar, as opposed to a virtual environment or place. *Aki Anne II* is a performance work concerned with 'the interaction between the world on stage and the world on screen, and the dispersed identities the two-world situation evokes' (Koski 2010: 49).⁷⁷ The differences between these works and my own are extensive, in terms of presentation, format and execution, but the use of the SL universe as a medium to communicate a common conceptual framework, that of exploring the liminal space and complex relationship between the virtual and actual, naturally links the works in

⁷⁶ The unveiling of the work was documented in Art Forum here:

<http://artforum.com/video/mode=large&id=21841> - Accessed 17/04/13

⁷⁷ Kaisu Koski (2010) *Performing an Avatar: Second Life Onstage* in Bay-Cheng, S. Kattenbelt, C. Lavender, A. Nelson, R. (eds.) (2010) *Mapping Intermediality in Performance*. Amsterdam University Press. p 49.

an aesthetic territory too. An environment like that of Second Life, and the further critical evaluation I will go on to later in this thesis, are concordant with Jean Baudrillard's *Simulacra and Simulation* (1988).⁷⁸ Within the context of *Simulacra and Simulation*, *RMB City*, *Aki Anne II*, and Second Life in general become less like referents, or representatives of our real-world (reality) and more of

*...it is the reflection of a profound reality;
it masks and denatures a profound reality; it masks the absence of a profound reality; it has no relation to any reality whatsoever; it is its own pure simulacrum. In the first case, the image is a good appearance - representation is of the sacramental order. In the second, it is an evil appearance - it is of the order of maleficence. In the third, it plays at being an appearance - it is of the order of sorcery. In the fourth, it is no longer of the order of appearances, but of simulation.*
(Baudrillard 1994:06)

The use of SL as a tool for exploring these ideas is apt: the virtual representation of real world environments in virtual circumstances runs as a conceptual analogy to that of using pre-existing and original digital content in an art context.

Digital Spaces explores the *interspace*, the liminal middle, of both these territories. Compositionally, the work walks a blurred line shifting between authorial message and aleatoric selections of existing, re-appropriated material and open potential for audience co-authorship and contribution through interactivity. Experientially, the work situates the user in, and thus draws their attention to, the complex, interwoven, and apparently disjunctive space between the digital-virtual and real-world actual. SL's aesthetic is, in itself, perfectly disposed to articulate this complex relationship. While 'real-worldness' serves as a foundation

⁷⁸ Baudrillard, J (1981) *Simulacres et Simulation*. Originally published in French by Editions Galilee.

for the game in as much as users often create avatars in the form of 'versions' of themselves - the game brashly draws our attention to gap between the virtual and actual. In SL, while people often represent themselves as humans, perhaps with the same colour eyes or hair, the avatars are typically 'improved' images of the users they represent. The women are faultless, tall, creatures with long legs and cascading hair, unblemished by skin defects or asymmetric features. The men, similarly, are tall, well-built, caricatures of Hollywood hero archetypes. This look borders on homogeny in the SL universe; it is seemingly impossible to be ugly.

Digital Spaces uses a number of videos based in SL taken from a selection of anonymous users. Their explorations and interactions in its universe articulate the severe disjunctions, convincing channels and connections and confusing liminal states between the virtual and actual worlds. I chose material carefully and settled on a number of arguments between different users documented on Youtube as 'trolling' experiments. Trolling is a recent cultural phenomenon in which online users purposefully aggravate other users on virtual platforms. This can take place in any online arena: forums, social media, video chat, but most commonly it is in games. I found the emotional reactions the 'troll' players had evoked from their victims in these videos powerful, if somewhat distressing. Observing two people shouting at each other from opposite sides of the world via the medium of a virtually rendered physicality articulated the disparity between emotion felt and expressed vocally by the real user and the lack of 'physical' expression their avatars – and ultimately the human-actual and virtual. The interaction, while predicated on virtual fantasy and utopian paradigms, was distorted by the raw, darker side of human traits behind the SL avatars – the virtual and actual gap seemed to expand and contract rapidly throughout these exchanges. It was these kinds of frictions between the

‘real’ and digital that informed my choices of all the content in *Digital Spaces*, notably, from digital platforms that articulated online or virtual ‘spaces’ many of us frequent everyday in addition to our habitual physical space – domestic media services. As a concept, such frictions and distortions between realities has not existed only within the recent advent of the digital. The provocative semiotic and symbolic elements of both works, with reference to ‘reality’ and simulation (as notable in SL’s avatars, buildings, extra-human abilities like flying, for example) call to mind one of Baudrillard’s most famous passages from *Simulacra and Simulation* (1988);

Disneyland is presented as imaginary in order to make us believe that the rest is real, when in fact all of Los Angeles and the America surrounding it are no longer real, but of the order of the hyperreal and of simulation.

(Baudrillard 1994:12)

Drawing upon this idea, the main conceptual aspect I want to explore, and felt the chosen videos of SL and video game footage communicated, was that the relationship between actual and virtual reality was a complex state, not simply a ‘divide’. I included video games, video messaging, video chat/recording platforms (such as Chatroultette, Youtube, Skype), social media, information services such as Google and their Maps tools within this category. Artists such as Miltos Manetas, Cory Arcangel, Amy Silman, Envis Precisely, Sean Hathaway and Francis Stark have made work using many of these elements, however, much of these artist’s works explore one or perhaps two of these areas at any one time and typically exploit the media as the main focus of the work, as in *Aki Anne II* for example. This can also be seen in Sean Hathaway’s work *T, E. D. transformations, emotional*

deconstruction: an interactive installation using eighty teddy bears streaming emotional content from the Internet. Feelings are categorised into one of twenty-four emotions. Each emotion lasts for one minute. They cycle randomly and indefinitely, effectively taking the emotional 'temperature' of the Internet. The audience are observers to this transcoding of information becoming manifest in the real world as audio and emotional expression – the divide is humorous and an obvious component of the work, however, in this instance, it is not the user's experience, it is one they witness but do not generate.

My work *Digital Spaces* collages many of these elements as content from a distanced position as a means to address an experiential conceit – one in which the user can actually experience the gap between the virtual and actual such that it holds the possibility to draw their attention to the connection and divide between these realities. Returning to van der Vlugt's *Aki Anne II*, *Digital Spaces* distinguishes itself through not offering any kind of (semi) immersion or control of a virtual avatar in virtual space: *Digital Spaces* is based in three dimensional actual space augmented by a parallel virtual exploration. I am self consciously providing the audience with a *window* into the digital/virtual environment in an attempt to mark the dichotomy and complex relationship between the actual and the virtual. I am doing this, not through parallel analogies or similarities and representations, as in *Aki Anne II*, but through their differences, frictions and our awareness/encounters with those equally interesting spaces. The user walks within a demarcated square in the real space, confined to a specific *place* of interaction (see fig...). The effects of walking the real space – the exploration in virtual space - are represented on screens on the far wall of the space. The physical gap/divide between the user and the virtual 'world' is very apparent.

Additionally, the *Digital Spaces* virtual 'world' is, as mentioned, an assemblage (it is a-spatial) of media, it has no corresponding spatial quality analogous to the real-world space the user treads.

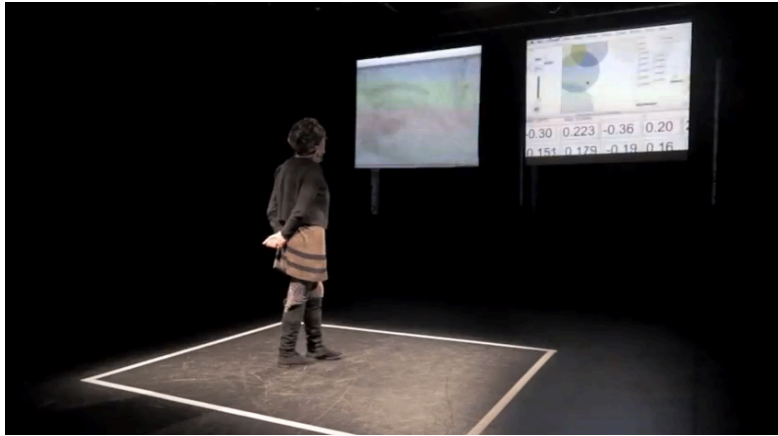


Fig 1.6 The *Digital Spaces* actual (the white square) and virtual spaces (on screen)

Compositionally, the choices I have made in both content and interactivity contexts throughout my research journey have frequently been in a mutual state of development and dialogue, feeding back on, and informing each other. As I will describe in greater detail in the coming chapter, the length, and number of different videos in *Digital Spaces* was impacted by the system capabilities: quite literally, how much could the computer handle and still run. This in-turn affected the kind of material I would choose – decision on small-scale narratives, abstract novelty, or simply beautiful imagery worked the best due to the kind of interaction they were subject to i.e. how they could be experienced. The digital content, as detailed above, had a direct impact on the interactive/technological frameworks that would dispose the experience to the user. The re-appropriated, re-contextualised and collage-like use of online video and live social media data in *Digital Spaces* thematically disposed itself towards the notions of *using* and inhabiting both virtual and actual reality. As such, the experience of interacting with *Digital Spaces* became one to comment on this

conceptual framework: to situate the user between both virtual and actual space in their interactive experience.⁷⁹

The artists' work I have explored in parallel with my own work has allowed me to demarcate my research focus in line with, and as distinct from, an existing field of practice – one that is digital intermedial, technologically-focused, and intertwined with more traditional, non-digital practices.

The development of compositional practices and technological frameworks is something I will detail further in the coming chapters and I will continue to be guided by the relationship between both these elements. In the Chapter Two I will document and analyse my research journey and the processes that have come to define my methodology.

⁷⁹ Discussed fully in Chapter Three, 'The Actual-Virtual Divide (pg 141)

Chapter Two: Documentation of Practice

Introduction

This chapter aims to give a linear, but conceptually and methodologically focused, account of my practice and map the many shifts and developments of my research focus. I will detail the beginnings of my experiments in digital technologies and subsequent move away from interdisciplinarity into intermedial frameworks to refining a methodology in both compositional and technological contexts as the focus of my praxis. My point of departure in this journey is my first PhD research project, *Comrade Coffee* (2010) - a live art piece that explored the conceptual and theoretical frameworks of communism, capitalism, 'relational aesthetics' (Bourriaud 1998)⁸⁰ and utilitarian/constructivist art production through an interdisciplinary collage of forms and live personal exchanges. The work was 'staged'/installed as a communist coffee house⁸¹ in which the audience could buy coffee (stipulating their own price), interact with various artworks, read original publications and hear musical performances. Practically speaking, the work ran as I envisaged, yet many aspects failed to live up to my expectations. The great number of forms, discourses and interlocking frameworks I had composed were not in dialogue as I had foreseen, their intertextual resonances between these elements often became confused and out of focus and the result was a dislocated sense of experience and agenda. A final seated musical performance at the end of the evening by MMUle – Manchester Metropolitan University laptop ensemble – in which the performers took ambient sounds from around the space using microphones and transformed that material into an improvised sound work, 'involved' the

⁸⁰ A conceptual framework outlined by Nicolas Bourriaud – *Relational Aesthetics* (1998) Les Presse Du Reel.

⁸¹ It was located in the café-bar area of the Greenroom arts venue in Manchester - 26th March 2010.

audience but functioned awkwardly in an installation setting. While the audience were, for the majority of the work, able to move freely about the installation and create their own resonances and meanings between each discipline, the work became convoluted through conflicting frameworks for *how* the audience would engage with the work – were they observers, participants, performers? My interest in Nicolas Bourriaud's concept of 'relational aesthetics' – a conceptual framework whereby the experience of the user, through 'relational', personal encounters, manifests as a locus for the artwork itself – was motivated by wanting to construct work based in open, yet highly personal, experiences. This conceptual framework draws from a number of well-established participatory art forms and practitioners, most notably the early work of the Situationists International and the writing of Guy Debord,

*Our central idea is the construction of situations, that is to say, the concrete construction of momentary ambiances of life and their transformation into a superior passional quality. We must develop a systematic intervention based on the complex factors of two components in perpetual interaction: the material environment of life and the behaviors which it gives rise to and which radically transform it.*⁸²

(Debord 1957)

While the Situationists were primarily concerned with the art work as the 'spectacle',⁸³ and Relational Aesthetics being born from 'a materialistic tradition',⁸⁴ the focus of both traditions is human experience and the

⁸² Debord, G (1967) *Report on the Construction of Situations and on the International Situationist Tendency's Conditions of Organization and Action* Translated from the French, by Ken Knabb (Originally published in 1967). Full text in *Guy Debord and the Situationist International: Texts and Documents*. Ed. Tom McDonough 2002 MIT Press

⁸³ *The spectacle is not a collection of images; it is a social relation between people that is mediated by images* – Debord, G (1967) *The Society of The Spectacle*. Trans Ken Knabb – Published by Bureau Of Public Secrets, 2013

⁸⁴ Bourriaud, N (1998) *Relational Aesthetics* Les Presse Du Reel. p18

quotidian, daily interactions between people outside of the art gallery within often intimate exchanges.

However, *Comrade Coffee* managed to distance the audience-experencer and disperse the artwork's focus across multiple disciplines and practice dialogues in a detrimental way. I wanted the interaction and engagement with my work to be more immediate and direct, I wanted the basis of my work to exist *within* and arise *from* the audience's experience. In performing and composing with MMUle and developing digital technology frameworks for performance in the ensemble I knew the area had great potential in terms of realising the personal, experience-based artworks I had attempted to construct in *Comrade Coffee*.

Working with Digital Technologies

I began my research of constructing digital-interactive work, as mentioned, through revisiting the programming work I had already done with MMUle. Many of these existing programs were concerned with performance and the development of systems for disposing/creating/manipulating (audio) media. I explored, in depth, work privileging both technical form and process. I spent a lot of time developing ideas in max/MSP⁸⁵ (the chosen software for programming, composing and performing work/instruments/systems in MMUle) in adding to, erasing and deconstructing the older MMUle programmers until I was consistently developing original work. I developed this new work over a period of around six months and the result was a collection of small software projects that could be performed/interacted with

⁸⁵ A visual, object-oriented programming language for music and multimedia see www.cycling74.com

physically, either through movement gestures and/or the operation of buttons to create music and visuals.⁸⁶ My experience as a programmer was limited and at this early stage the trials and errors became the real staple and characteristics of my practice in this new context. The process became one of mapping connections between data and media and testing their results, situating me as an explorer of sorts within the space of mapping relationships and drawing connections before finally discovering their results.

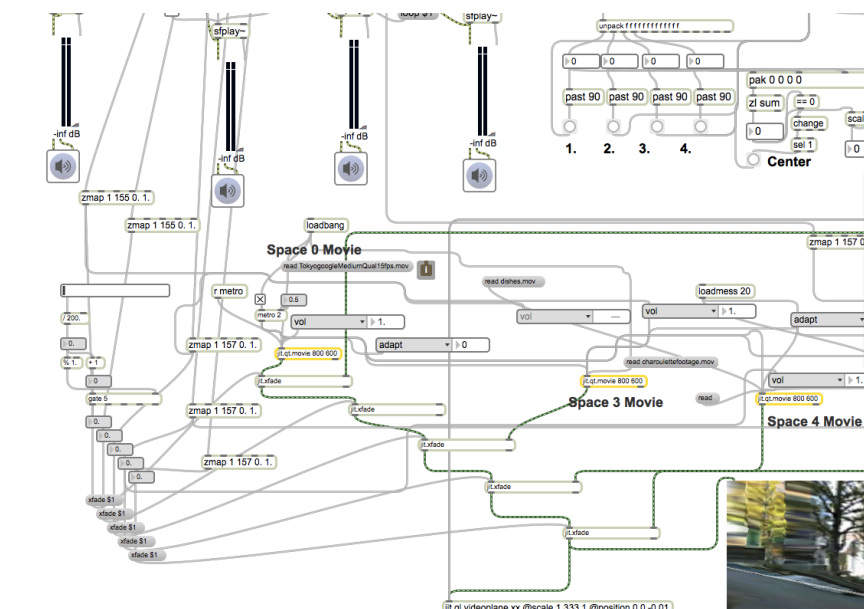


Fig 2.1 The MaxMSP environment literally sees the user draw or 'map' connections between different objects and thus creating relationships with a seemingly infinite number of possible outcomes - affording a model for interconnectivity and variability.

In these early stages of my work with digital technologies (creating software), this process, while often long-winded and frequently frustrating, liberated me from making specific compositional choices and abstracted my methodology to that of basic experimentation. In laboring my way through a dense knowledge barrier to discover new perspectives on my intended, original concepts my work was constantly

⁸⁶ The main outputs of which can be seen in the supporting documentation

re-shaped and re-imagined throughout each new discovery and tangent exploration. For example, I began working on a small project to build a virtual instrument that would allow me to assign a number of samples to the buttons on a hardware (gaming) controller for the purpose of being able to trigger the sounds in rapid succession. However, through the process of development I found that I could use the interface to control a great number of other things – such as video and digitally-generated musical notes via midi⁸⁷ (rather than only pre-recorded sound). I could also assign the controller to manipulate the material/assigned media in ways beyond that of simply triggering its appearance – I found the expressive potential of working in this medium to be greater than I had expected. The process was such that I began, at first unwittingly, working on a number of different software elements that would allow a central, theoretical, and aesthetic idea to unite all the elements in my work - the way in which the work could be interacted with and, as such, define not only form but the experience as a whole. This process became one of developing a framework concerned with the relationships between media forms, for example, how they respond to one another's presence, intensity and development over time. Additionally how those relationships could be manipulated by an audience/user provided creative possibilities existing beyond 'set' media combinations as we know them, e.g. film. The environment of MaxMSP, and of software development in general, I felt disposed itself towards creating open, 'playful' spaces for interactive experiences due to the infinite variability and interconnectivity that defines the composition process of the medium.

⁸⁷ Musical Instrument Digital Interface – a protocol for passing information and controlling digital instruments and software.

The notion of 'transcoding', noted on by Ikeshiro with reference to his own work (and applicable to my own early experiments) in Chapter One, became a common principle in my methodology⁸⁸ and the possibility for further manipulation and interconnection is thus made possible. As touched upon in the previous chapter, such a process afforded the possibility to programme and unite one media type with another in ways not possible outside of digital technologies, however, this raised a number of challenges. Many of the compositional decisions I was making were happening within the framework of the digital technologies I was constructing and as a consequence of the medium. Much of my process was now embroiled in creating technological structures and programming. The early software 'experiments' that I touched upon in Chapter One, which I'll detail shortly in this chapter, explored varying degrees and types of interrelationships between sound and visuals that broached the concept of interconnecting or transcoding media as data. Although some of these projects' attributes were outlined in brief in Chapter One I feel it would be useful to detail their *specific* functions in predicating my research journey.

One of my earliest applications, the *Wiiانو* (Donovan 2010), measured a number of different gestural expressions/actions and explored the viability and experimental potential of performing piano chords, 'melodic' gestures and textural elements using only a Wii remote game controller – an extension of the work I had done previously in the area for MMUle exploring performance. The 'piano' sounds, as it were, were simulated from within the software and 'performed' via the specific gestural initiative they had been mapped to. For example, certain movements of the Wii remote would 'explore' a scale⁸⁹ or specific buttons could trigger

⁸⁸ For reference, transcoding is a process where 'computerization turns media into computer data' (Manovich 2001:63)

⁸⁹ I use the word explore due to the precision of the technology not being as great as to ensure specific notes with dependable accuracy.

textural and pre-chosen chords, again all responsive to further gesture-controlled modulation. While I don't want to go over this territory too much again, I developed this idea into a free to download sound design app for use in schools or workshops as part of a public engagement project funded by CERN⁹⁰ titled, the *Large Hadron Sound Collider* (Donovan 2010). The app developed the idea of physical gesture-based interaction producing sounds into a multi-sensory experience using a GUI⁹¹ depicting colliding particles responsive to the same physical input. Additionally, the *LHSC* used real data from the Large Hadron Collider in Switzerland and sonified further numeric code, in collaboration with the LHCsound Project⁹², via a number of built-in synthesis modules and pre-recorded sound to add a greater depth to the experience. Such experiments informed my first major interactive work, *Inter-activity* through the pooling of techniques, skills and resources developed over time, but also in exploring how sound and visuals could be combined and inter-related.

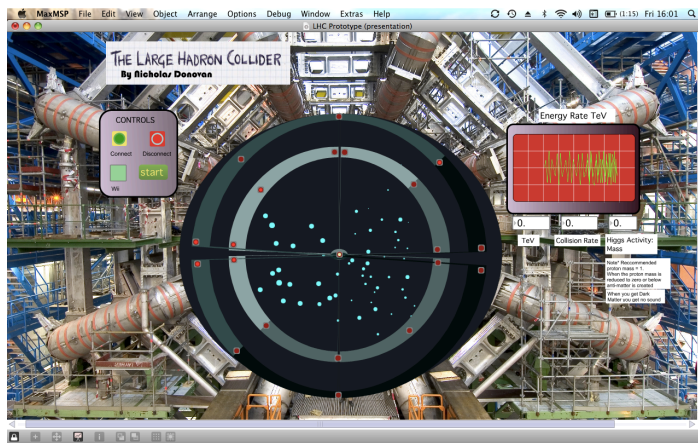


Fig 2.2 The Large Hadron Sound Collider application GUI.

⁹⁰ CERN is the European Organisation for Nuclear Research. Founded in 1954, the CERN Laboratory sits astride the Franco–Swiss border near Geneva and conducts fundamental particle physics research.

⁹¹ A GUI, or 'goosey', is a Graphical User Interface that facilitates the interaction with digital devices via images as opposed to text-based commands.

⁹² LHCsound Project is a collection of physicists, musicians and software developers aiming to attract people to the results of the LHC experiments in a way that is novel, exciting and accessible: <http://lhcsound.hep.ucl.ac.uk/>

Before I move onto detailing the specific make-up of *Inter-activity* it would be useful to preface this with an insight into my critical, theoretical contexts. Predicating my conceptual framework for *Inter-activity* was an aspect, or symptom, of a theory by French anthropologist Marc Augé described in his *Non-Places: Introduction to an Anthropology of Supermodernity* (1995) – as detailed in Chapter One.⁹³ Conceptually, such ideas complimented the frameworks of Brian Eno's ambient music and the interactive systems I was interested in exploring, in that the liminal character of the non-place mirrored that of the directionless, ambience of Eno's music. Additionally, the experience of being situated between composed and open forms in interactive artworks articulated a further liminality in *experiencing* the artwork. The notion of the non-place as one *in-between* distinct areas was a concept I felt was appropriate to explore on a number of levels or spaces pertaining to my developing digital, interactive work: the *interrelationships* between sound and image, author, audience and system, composition and programming.

Thus began the construction of *Inter-activity*: a sound and image-based interactive installation in which the user could manipulate both visual and aural media using the physical interface of a digitally modified antique atlas globe. The user is presented with three back-projected screens in a large dark space arranged as three sides of a square – the user enters at the open side. In the centre of the screens, towards to the open side of the square, sits the globe. In turning and spinning the globe the user can create music, generating 'cold', ambient choral tones, reminiscent of Eno's ambient work, and mix images on the three

⁹³ See Francesco & Pirovano's description -: *I Non Luoghi* ("The Non Places"), Silvana Editoriale, Milan, 2005

screens featuring airports, super-highways, dock yards: manifestations of Auge's '*non-places*', see Fig....



Fig 2.3 The Inter-activity installation set-up featuring three screens and the globe interface.

The work was based on the concept of situating a user in an interactive setting *between* music and moving image where the relationship between each medium is one generated/united by the same digital input. The user may manipulate this relationship, but is never able to develop it beyond a '*non-place*' of experience and form. The work, experientially, is constantly in a state of *process* or 'in-between-ness', non-teleologic, and essentially not 'goal-oriented'.



Fig 2.4 *Inter-activity* – the globe interface and the imagery of non-places.

Sharing Digital Origins: media and the data stream

In this section I will attempt to fully detail the specific composition and composite elements of *Inter-activity* in both functional and, later, conceptual contexts. I began constructing *Inter-activity* by thinking of the position, role and type of interaction the audience/user would assume and drew upon the research I had carried out in my early programming experiments involving accelerometers⁹⁴ to track gestures and movement-based engagement with hardware, measured in custom-built software. In terms of a creative process, this principle was not unusual – choosing the material media is often the first consideration of any composer, be it musical instruments, human bodies, paper etc. Yet, the expressive output, or the limitations/designated or demarcated materials and facets of digital technology are not set to the degree that most 'physical/material' media are. The ability to append, augment, level, re-compose and construct further complexes of modes and modalities⁹⁵ of

⁹⁴ In digital and domestic technologies, an accelerometer is a component device that can measure changes in speed and direction – yet not position, only *changes* in position.

⁹⁵ The specific composition and inter-relationships of which are outlined by Lars Elleström in his edition of *Media Borders, Multimodality and Intermediality* (2010:36)

media (as outlined in Chapter One with reference to Elleström's work) within software environments holds an unparalleled wealth of possibilities for a single medial practice. Music composition, traditionally, affords the setting of composed material for the media of musical instruments or sound producing devices - whether it be an open, aleatoric composition or a fully notated score. The composition process is realised, and ends, with the setting of the text, or the performance of the work in the case of indeterminate pieces. However, digital technologies compound and expand the compositional process through affording greater interconnectivity between media and the possibility for meta-processes where further composition can occur through generative and networked structures/systems. As such, I was able to construct a relationship between the aural and visual media that could be open to reconfiguration and dynamic structural shifts – by the user, if desired. As such, this process best exemplifies the digital-intermedial composition my practice is now concerned with – interdisciplinary frameworks became unhelpful and less relevant from this point on. Simply, I felt there was too much in my practice process that was not covered or represented in the conceptual framework of interdisciplinary. Inaugurated from purely digital contexts and to be controlled by the accelerometer's data (and thus gestural control), this relationship was a union of both media (sound and image) through the data stream, controlled by the user. To be explicit, when the user moves the globe the accelerometer sends a stream of data (a list of numbers) to the software to say it is now in a different position than it was previously. The data is mapped to the modalities of each media for simultaneous manipulation - for example, as the data stream is fed in, and is manipulated by the user, the tonal range of the music and/or intensity of image layering and blending increases, or decreases depending on the user's movements.

The notion of using (single) data sources for creating audiovisual artworks, and how this functions as a valid artistic practice,⁹⁶ inadvertently became a focus for my work in the process of developing *Inter-activity*. My intention was to create a situation where the user would be in control of both visual and sonic media simultaneously through using one interface with limited affordances – intended to aid intuitive usage. I learned from the *Wiiano* and *LHSC* experiments that gaming controllers and complex interfaces with numerous buttons, often alienated audiences and made them feel as though they had to commit a serious amount of time ‘mastering’ the object in order to experience the work, as in a video game. This was a sentiment expressed during responses collected from the January 2011 showing of *Inter-activity* with reference to the lack of complexity of the globe interface. Mixed mode research has been a key methodological approach and interviewing user-experiencer’s after each work has been integral in my research design.⁹⁷ The implications of focusing, initially, on the design of the interface was that the ‘material’ or content came second to the arrangement of relationships between the forms and the processes in which they would acquire their form. To be specific about the process, the accelerometer tracks gestures and movement from the user and sends the stream of data in the form of floating point numbers, between -0.01 and 0.1, to the software. The mapping of these numbers into functions began with the scaling of ranges accordant to those of the harmonic scale. This enabled me to determine what pitch range I could work within and begin designing my harmonic language in a more traditional way. I used Eno’s *2/1* piece, from *Music for Airports* (1978), as a reference for the creation of scale, chordal modulation and timbral

⁹⁶ See Chapter One where I discuss the notion with reference to Ryo Ikeshiro’s *Constructions In Zhaungzi*

⁹⁷ See DVD Appendix recordings: Interview 1 *Inter-activity* Jan 2012.

quality - one that gave a complimentary sense of space, ambient quality⁹⁸ and a degree of liberty from tonal resolution. The scale affected was predominately B major, often oscillating to a flattened 5th or placed emphasis on the 6th. The textural character (the number of simultaneously played notes) would amass at certain points of constant use, creating a sense of chordal harmony. However, the object is free to be played in many ways and the intervals of the scale are the only musically set elements⁹⁹ allowing an “endless flow of pitch and cadence”¹⁰⁰ – a music that never settles.

This same stream of data is sent to an arrangement of visual processing tools that were programmed to read, mix (chop, re-orientate and blend) and insert new video files, again in direct response to the accelerometer's output. As such, both media were composed to be internally connected within the digital software environment, promulgated from one origin.

Despite the wealth of compositional possibilities offered in this area a number of problems arose in the employment of this process in my practice. I found there were a number of unexpected responses to the work during my first work-in-progress (showing at Axis Arts Centre, Crewe 2011) that re-shaped my understanding of how compositional elements were affecting the experiential outcomes, notably with reference to the work's interrelationships.

During post showing interviews, many of the user-experiencers commented on the relationship between the moving image and the

⁹⁸ In as much as these qualities were intended not to dominate the foreground of the work but find their place neatly among all other elements

⁹⁹ The duration, pitches and velocity of notes are all controlled by the user's interaction with the globe.

¹⁰⁰ Response collected from Open Space installation 2012 interviews. Included on DVD – Appendix Three files

sound, offering differing insights.¹⁰¹ The structural similarities in the 'openness' of both media was a common observation – in as much as both forms were connected through their 'lack of closure'¹⁰², yet the integration I had foreseen in the development process was far less apparent. In devising a way to 'knit' both media together in a digital environment for the benefit of the user's experience and ease of control, I anticipated that the experience of such 'interconnectedness'¹⁰³ would be a point of focus and notable experience in the work as a whole. In much of the feedback I received this was not so,¹⁰⁴ and despite the mapping of specific intermedial relationships through the programming and their coalescence through a single incoming stream of numbers, the *experience* of this connection was less than pronounced. The audio was produced from the incoming data stream of the accelerometer inside the globe object sending scaled numerical values, via the software, as midi to virtual instruments and samplers – it was digitally produced. The visual images, however, were a collection of pre-recorded video segments that were 'mixed', blended and arranged, again, by the mapping of the data stream.

In this sense the audio content was more 'purely' digital, in that it the material was wholly produced from digital software possessing and as such the audience commented on their heightened sense of control and ludic relationship to the sound in controlling the object (it could be played). The visual images however, as mentioned, were perceived as somewhat arbitrary by the user-experiencer as they were present at all times, even during non-interaction - the layering and blending of the

¹⁰¹ See DVD Appendix Three recordings for *Inter-activity*

¹⁰² Response collected from Open Space installation 2012 interviews.

¹⁰³ With reference to an idea Bruhn Jenson posits in relation to digital media as being defined by its 'interconnectedness' (in Donsbach 2008).

¹⁰⁴ See DVD Appendix Three recordings for *Inter-activity* – many users commented on their ability to control the sound but that the imagery seemed, at the most, slightly disturbed by their interaction and for some 'unconnected'.

images, which occurred during interaction, was also comparatively subtle in terms of initiating and controlling the sound.

The interaction with the globe interface would initiate sound which the user had relative control over but upon ceasing their interaction, the audio would stop while the mixing and layering (manipulation) of the images would cease this visual presence remained. Furthermore, the complexity of the visual forms (three screens each containing four layers of video) was in contrast to the simple, yet direct sounds of synthesised choir textures - again marking a notable distinction between the media, their interactive, functional potential and thus complicating their overall assimilation into a perceivably cohesive interactive entity.

A work-in-progress showing of this work allowed me to understand the importance of levels and kinds of interactivity: often it was not how elements were compositionally put together by the author that communicated meaning but how the elements set at play were manipulated and thus *perceived* by the audience-user. During the development process the ambiguity in control and lack of repeatability and thus structure of the work, did not immediately concern me as I believed it was a more accurate expression of my conceptual framework (Deleuze's notion of 'becoming' – a process which never reaches its destination and to some extent disregards linear structures). However, it became clear during this work in progress showing of the work that a structure, even one from which deviate and initiate 'free play' as Jacques Derrida puts it, is essential to cohesive experience of a work. A centre and a guiding structure is essential, even in free play. Derrida describes the principle of the centre or organising principle within a system,

The function of this center was not only to orient, balance, and organize the structure-one cannot in fact conceive of an unorganized structure-but above all to make sure that the organizing principle of the structure would limit what we might call the freeplay of the structure. No doubt that by orienting and organizing the coherence of the system, the center of a structure permits the freeplay of its elements inside the total form. And even today the notion of a structure lacking any center represents the unthinkable itself.
(Derrida 1980: 278)

Composing within digital technologies afforded me the opportunity to compose open, variable settings for experience. *Inter-activity* was the start of a process of navigating a transition from creating fully composed works to embracing new digital/intermedial contexts and methodologies. Parts of the transition were successful, in that elements functioned within the context of interactivity and intermediality, and other aspects remained, somewhat awkwardly, in the context of my previous, pre-digital works where most elements and meaning of the work were authorially set. This is something I would address in my next project, *Digital Spaces* (2012).

Digital Spaces: Open, Controllable Forms

Digital Spaces (Donovan 2012) developed the technological and compositional elements I had explored in *Inter-activity* in addition to addressing the problematic conceptual and methodological issues that arose in that work. The premise of *Digital Spaces* was that an audience would explore a blank, empty space, one-on-one (or 'one-on-system'), tracked by an overhead camera which, depending on where the user positioned themselves, would dispose/blend between different video media on a large screen projection. Each fragment, or clip, of media would be assigned to a specific zone in the real space, invisible to the

user-experiencer, and provide an interaction based on the contrasting experience of exploring real and digital space simultaneously. The development of *Digital Spaces* was by far the longest and most complex I have undertaken to date, a process which saw many iterations and drastic conceptual and functional overhauls throughout its development.

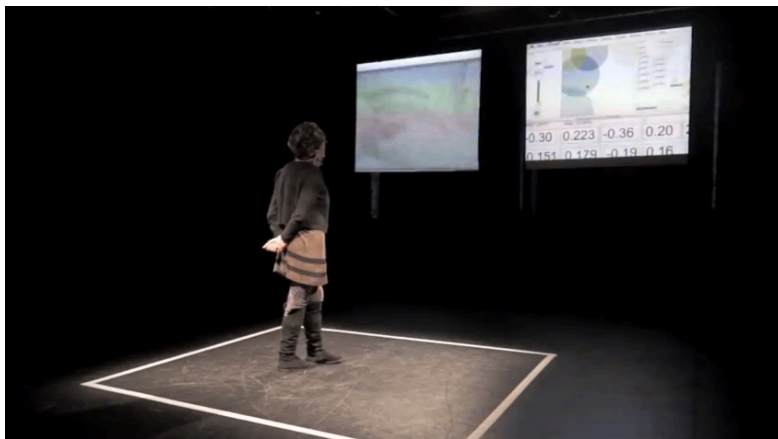


Fig 2.5 *Digital Spaces* installation set-up

As in the early development of *Inter-activity*, I created preliminary software experiments and applications for *Digital Spaces*, this time focused on the notion of live-streaming. I had become interested in the idea of live video content through my research into intermedial and digital technologically-based performance works such as those outlined in the final sections of Chapter One. Conceptually, I wanted to explore the relationship between digital and actual realities and how telepresence, in this instance live video calling, could provide interesting experiences in the context of interactivity. My initial plan was that I could use public live-streaming internet services¹⁰⁵ to create a work based on user-generated content from anyone who cared to use the webcams from anywhere in the world – the login details for various streaming

¹⁰⁵ Websites such as Ustream.tv or Livestream.com

functionality.¹⁰⁷ Conceptually, the work also had a number of flaws which seemed, in conjunction with the technical issues, to forego the idea of developing the work. In the main these were issues relating to the interactive possibilities being limited and complex to devise on top of the existing live-streaming architecture. In the process of developing ways for importing web APIs and data into MaxMSP during these experiments however, I had come across a number of other interesting ideas regarding using social media, capturing imagery from Google Street View (a street-level mapping service), Chatroulette (an online video chat service in which users are paired randomly with strangers) and social media info-graphics showing the most popular terms and talking points on social media at that very moment and mapped to their location across the world.

I began working with these materials within the context of placing interaction in the audience's hands - instead of allowing them to only observe (as in the original concept). Using an overhead camera *Digital Spaces* placed the exploration of virtual spaces and online environments, or 'spaces', into the setting of real space for an audience to explore. This again prompted questions into the level and type of interactive system, its relationship to what kind of experience was to be created and what context the work was to be framed within.

After a meeting with my PhD supervising team a number of questions we raised after explaining the proposal of my final project, (the proposal being the description of *Digital Spaces* at the beginning of this sub-chapter). The main issue raised was one concerning the placing of an

¹⁰⁷ The problem being web browsers typically have no specific audio and video output channels. I went as far as creating my own individual web browsers in Max for each channel which could then be grabbed by external virtual cameras and audio-routing software and communicate through UPD protocols – visible at the bottom right of the tool bar in – to no avail. Fig. 2.7

audience into a space in which their movements would trigger the experience and show new content. Considering *why* the audience would move/continue to explore the work was an issue I had, at this point, not considered – *what was the relationship between the interactivity and experience?* What motivation could there be to explore the space if there was no real-world potential for engagement, or progression/objective to the experience other than exploring the content I had framed/designed? This issue was raised shortly before I made a research trip the Pervasive Media Studio in Bristol,¹⁰⁸ a creative shared space for groups, organisations and individuals working in the arts and technical fields sharing desk space and ideas. During my stay I was able to meet a number of practitioners involved in developing creative strategies and projects, quite often predicated on interactive digital environments or virtual experiences. Technical Director of Thought Den¹⁰⁹, a commercial and industry leading application and digital experience development company, was good enough to spend some time explaining their current project and talk through some of my ideas for *Digital Spaces*. It was during this meeting that a number of similar questions to those raised in my PhD supervisory meeting were reiterated and bought into focus. In explaining my current ideas and showing some of my draft work I was asked what it was I was trying to convey, essentially, what was the piece about and how was this reflected through both content and interaction? The content was all based around a common theme – digital technologies – but articulating what the user could construct in terms of a meaningful experience from

¹⁰⁸ The Pervasive Media Studio is a creative technologies collaboration between Watershed, University of West of England and University of Bristol. Their projects include gaming, projections, location-based media, digital displays and new forms of performance. Some are commercial, some are cultural. We test our projects as early as possible and iterate. <http://www.pmstudio.co.uk/>

¹⁰⁹ Founding residents of the Pervasive Media Studio and creative technologies company creating interactive, engaging and timely experiences in the public realm, most notably 'Magic Tate Ball' for Tate Britain Gallery - <http://www.thoughtden.co.uk/>

this was difficult. The footage I was currently working with depicted a scene of navigating the streets of Shinjuku, Tokyo on Google Street View, a selection of Chatroulette encounters that I had edited together,¹¹⁰ and live info-graphics of twitter topics presently being discussed around the world which were read out by a robot narrator I had programmed.

The concept was to allude to the notion of the different social, emotional and virtually represented environments (or spaces) many of us occupy day to day, in contrast/addition to our 'actual' reality. The use of this content in different, overlapping spaces which the viewer could explore via real space, was aesthetically pleasing and interesting in a novel way, yet the experience was limited and lacking any great depth – the experience was 'novel' but not conceptually developed. The essence of the work was there but after the initial exploration of these different content 'areas' the work could become stale and simply seem like a cold showcase of web technologies, rather than the meaningful, conceptually rich, experience I aimed to dispose.¹¹¹

Additionally, I met with Play Nicely,¹¹² a group specialising in augmented reality and interactive experiences – notably they have worked with the Microsoft Kinect camera (an integral part of my *Digital Spaces* project) – which was also insightful and made me question the role of the technology in my work. Furthermore, it built upon the questions I had developed in the meeting with Thought Den and made me consider the notion of 'gamifying' my concept - constructing a game out of the work (or building one into its framework) to create further

¹¹⁰ Yet, due to the nature of chatroulette.com, these encounters were brief, random and meaningless in the context of shaping a narrative or relationship between the other content.

¹¹¹ Something testified to in collected responses from a work-in-progress *Digital Spaces* showing from a user who had experienced both the final and developing version of the work as described above. See DVD Appendix recordings – *Digital Spaces Interview 3*.

¹¹² <http://playnicely.co.uk/> - Play Nicely Ltd is a multidisciplinary design, technology and creation studio specialising in creating engaging 3D, interactive and AR experience in digital media.

depth and possibility for engagement via the interactive experience such that there are objectives and something other to attend to in experiencing the content of the work.

It seemed at this juncture a choice had to be made, one in favour of developing content or working with the content I had already and developing that into a meaningful experience via new interactive systems, with objectives i.e. 'gamifying' the piece.

Gamification was a mode of interaction I had previously not considered and, I thought, could offer me the potential to create a dynamic and 'rewarding' experience from the existing structure of *Digital Spaces*. Gamification, essentially, is the use of game thinking/mechanics in non-game contexts to engage users and solve problems.¹¹³ The exact process of trialing this framework is accounted for in my next chapter as it gives further insight into larger conceptual issues explored in my practice, however, at the end of this process I found 'gamification' was an ill-fit for my work. Gamification is a model used frequently in commercial/public engagement projects, it can be frequently seen in mobile applications and took my work to the other extreme of developing 'instrument vs. player' models, as seen in Eno's applications discussed earlier. This version of *Digital Spaces* offered sequential, incentive-based progression but the experience was reduced to a dull matter of progression. Yet, if the incentive to continue was eliminated or diminished from the experience, the user/experiencer would tire quickly as soon as the object-as-device paradigm failed for them. *Levels* of interaction have been a recurrent issue in my practice development and it became clear at this point that some medium *between* a reward-based, objective-oriented experience (gamification) and one that is free-

¹¹³ Zichermann, Gabe; Cunningham, Christopher (2011). *Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps* (1st ed.). Sebastopol, California: O'Reilly Media. Introduction P. xiv. ISBN 1449315399.

play and conceptually complex (something *Inter-activity* possessed albeit in an extreme sense) could better serve the exploration of digitally inter-related media as an experience in a contemporary art context. This awkward, yet liberating balance allows the subversion of focus from ‘*learning* the rules of game’ and ‘*knowing* how to play’ to experiencing the act of playing as the ‘game’ or concern of the work itself. Something I attempted in *Inter-activity* but failed to fully realise due to the media interconnectivity (mapping) issues and the resulting audience confusion as described earlier in this chapter. Contemporary art and commercial/public engagement value systems and contexts often overlap and I feel my work sits in both territories. My work aims to offer a conceptually rich experience but also function within traditional interactive system values and give the audience a ‘pay-off’ or reward for their engagement. At this point I was searching for the right balance between these elements and although total gamification didn’t deliver the right framework for my intended mode of experience it was useful to explore to perceive the importance of this balance in interactive frameworks.

In some sense, the form/mode of interaction had already manifested itself through my choice of content media. The randomness and disparity of the web-found video material, the incoming, unedited data from social media and user-generated content disposed an open, networked-like experience – one of the hyperlinked and rhizomatic – one characteristic of contemporary digital experience online.

The type of interactivity, had to be matched to the conceptual elements at play in using the disparate, user-generated and live data content. Instrument and gamification models were not appropriate and after testing resulted in dislocations between content and form – the processes of interaction did not seem appropriate to the material and for an audience the overall experience was a confusing and/or dull one. It is

interesting to note that I retained the idea of using a data stream (as used in *Inter-activity*) but did not divide the media in the way I had done previously. In *Digital Spaces*, both video and sound were one – one stream and one means of interaction controlling one media form. In using one process for one kind of interaction, *Digital Spaces*, creates clear possibilities in interactive engagement: how one can interact and what one can do, avoiding confusion in these areas was a main priority in developing this work.

At this stage of the development I was researching existing models of interactivity and exploring similar works by other artists to gather some perspective and contextual reference for the compositional decisions I was about to make.¹¹⁴ In Chapter One I briefly described Sarah Rubidge's and Alistair MacDonald's *Sensuous Geographies* (2001). This work became a useful point of reference for my research and I feel detailing the differences in these works in more explicit details will aid the articulation of my aims in refining a specific kind of interactive experience and development (and functionality) after *Inter-activity*. As discussed in previous chapter, *Sensuous Geographies* works on similar principles to *Digital Spaces* where overhead cameras track audience members/performers/interactors in a demarcated space and their movements trigger and manipulate sound. Immediate differences, however, can be identified in the possibility for multi-player experience in Rubidge's work from my own due to the use of both instrument vs. player (Drummond 2009) and gamification paradigms. *Digital Spaces* uses a similar interactive architecture to Rubidge's but is redesigned for a one-on-one, individual experience. This decision was down to a couple of considerations. Firstly, and most importantly, the content I

¹¹⁴ More details of the research of other artists' work can be found throughout Chapter One

was aiming to create was a mixture of live rss (streaming) text, pre-composed pieces of video and music, live webcams and the way in which the audience would experience these was designed to highlight a conceptual element of the work – that of a personal experience of contemporary open access and non-linear, but *connected* information. Secondly, the exploration of real and virtual space simultaneously: exploring a mostly bare gallery/installation space while a digitally created space, mapped via software and tracked by an overhead camera (translating the actual location data of the user into the virtual), I felt, would have been severely diminished, or had to be largely re-worked, if multiple users were in the space.¹¹⁵ As mentioned in the last chapter, I was not comfortable with the extent to which accommodating multiple users democratised the experience of the work for the individual.

As such, the content and mode of interaction in *Digital Spaces* is designed differently. Instead of multiple users exploring multiple, changing sounds, my work focuses on one user (at a time) exploring a number of set spaces. Having received feedback in my last work, *Interactivity* concerning a confusion in performance roles (and thus experience objectives), ambiguity in roles and ‘possible actions’¹¹⁶ for the audience was something I wanted to avoid. In *Digital Spaces* the user may explore an unseen virtual landscape of ‘digital spaces’ many of us frequently inhabit from day to day. The audience may perceive their virtual exploration visually and aurally by a projection on the far wall. As the user explores the real space the ‘digital spaces’ blend as many spaces overlap. The user may occupy these liminal spaces or continue on in search of the ‘sweet-spot’ where each space is

¹¹⁵ For further details and perspectives on the work of others in similar fields see Chapter One.

¹¹⁶ Or *affordances* – outlined in full in Chapter Three, Section 3 ‘Composing Experience: Composing Affordances pg.162

unblended and can be viewed individually – this indicates to the audience that there are varying degrees of their experience, but in an intuitive, simple way. I was extremely averse to creating an interactive work that required any degree of learning or possessed tiers of difficulty. I felt that in providing such an open framework, multi-tiered, multi-player, game/instrument forms did not complement the system and would result in counter intuitive engagement scenarios. Additionally, while some may argue that extra players and greater interactivity can broaden the scope of a work and creates the potential for greater depth, all too often I have seen such complexities diminish the experience of interacting with a work - not least in my own work *Inter-activity* and in the many previous versions of *Digital Spaces*. While there is clearly a complex issue concerning levels of interaction and gaming experience i.e. how to provide incentive and reward for developing an experience beyond that of first encounter, there are further differences that mark different approaches and compositional considerations between this my work and Rubidge's are also related to how the work is encountered by audience-experiencers, its setting and context. *Digital Spaces* has been designed as a walk-in installation that can continually run without any outside assistance, other than the monitored admission of one user-experiencer at a time. Rubidge's *Sensuous Geographies* is set up in a model more akin to a performance space than an installation per se¹¹⁷. The user's are dressed, in coloured, dramatic attire (of gowns and headwear) by helpers/staff before the work can be commenced, there is audience space and, in the documentation of its *New Territories* showing in Glasgow (February 2003), stage lighting.

¹¹⁷ The Guardian's coverage (Thursday February 6th, 2003) notes, "An installation-cum-performance, the piece invites us to be viewers and players." source viewable at www.sensuousgeographies.co.uk under 'reviews'.

I wanted *Digital Spaces* to be an immediate experience, reducing the amount of consideration and thought the user would need to understand their means of interaction as much as possible: simply providing a demarcated space on the floor to explore seemed like a promising way to do this. While such a premise may seem comparatively simple, greater depth can be located in the way the work functions in conjunction with the content, or 'virtual spaces' comprised of the infinitely changing live-streaming and pre-composed, all of which were designed relative to their neighboring spaces. *Digital Spaces* also shows the audience-user the relationship and interaction between themselves, the media, and the system via the node map (an on screen 'map' or GUI of sorts) that shows the user moving around the virtual space – mirroring the movements in real space – as a small dot within a square space. This is all contained in a second screen next to the virtual content the user is triggering and also displays the streaming numbers of the data source (their movement) which functions as a sort of HUD¹¹⁸, the sort commonly found in video games. This interface situated the experience between one that is immersive but conscious of its own constructed-ness. In collecting feedback from a work-in-progress showing one user-audience member commented,

My engagement with this work was constantly shifting from considering the experience as an artwork to allowing myself to become part of it – and then considering that in itself. (Digital Spaces showing – December 2013¹¹⁹)

¹¹⁸ Heads Up Display – common in video games to give the player additional information during play.

¹¹⁹ Collected responses from Digital Spaces work-in-progress showing December 2013 – see Appendix Three for responses.

co-authorship, and what kinds of experience can an audience can be disposed towards (in contrast to directly *given* by an authorial 'meaning'). Essentially, both works construct frameworks providing different modes of interactivity with fragmented content. It is these modes of interactivity and the impact their form and functionality has on content which contributes towards the kind of experience a user can construct.

In the next chapter I will fully detail the compositional and conceptual-theoretical aspects of my practice via the exploration of my work through and beyond the work-in-progress showing of *Digital Spaces*, my final work. I will also be able to unpack the terms and concepts I have thus far touched upon but not fully addressed.

Chapter Three: Conceptual Critical Framework

Introduction.

In this chapter I will address the four questions I outlined in my introduction to this thesis. This will be undertaken through consideration and analysis of the conceptual, critical and theoretical issues that arise from the account of my artistic process up to my final work *Digital Spaces*. For reference, these questions were:

- *How does (digital media) composition impact the development of technological frameworks/systems, and vice versa, in a singular creative practice?*
- *How does this techno-compositional dialogic (my practice) provide new perspectives on contemporary critical and theoretical concepts and frameworks?*
- *In what way do digital-intermedial frameworks mobilise dislocations in traditional authorial and audience roles in interactive contexts?*
- *In what way, and to what degree, can (composition in) digital interactive frameworks facilitate the composition of ‘experience’?*

This chapter will be broken into four main sections to answer each of these research questions and explore the critical and conceptual resonances of these topics. Each section will contain a series of sub-sections (in the same way the thesis has thus far) in the interest of dividing these large topics into manageable structured segments. In the first chapter I detailed the work of other artists and writers exhibiting various similarities and differences to my own praxis. The specific focus on the nuances, levels and functionality of interactivity in chapter one serves to predicate an understanding of the conceptual and practical context of my work in this chapter. Many of the issues I have

already brought forward, such as the Deleuzian notion of ‘becoming’, affordance theory, and the exploration of digital structures and specific compositional techniques in digital contexts, will be expanded upon here. As established in the last chapter the agency for drawing out and unpacking such concepts will be that of my practice. Primarily, it is composition, my choices and methods for creating my work, that will form the basis for exploring and introducing concepts and perspectives as, commonly, this was the site or stimulus for their emergence.

Section 1: How does (digital media) composition impact the development of technological frameworks/systems, and vice versa, in a singular creative practice?

Composition has always been a fundamental element of my practice. Over the course of my research journey the ways in which I have come to perceive compositional processes as being active in my work have changed and developed along with the conceptual and technical elements in each project. My background in music composition has greatly influenced this development and many compositional forms and methods that I used in my musical projects previous to my PhD research have continued to be relevant in the context of my current practice. My compositional work previous to my PhD research was heavily based in through-composed and song form (strophic) structures with occasional indeterminate experiments in my work with the laptop orchestra. However, while many compositional processes and methodologies learned and utilised in a purely musical context remain in my current work, there are those that became appropriated to function within my intermedial research or otherwise became invalid in this new context. However, the principles of compositional frameworks and the further possibilities for compositional openness, as found in indeterminate pieces for example, have all remained central to my work throughout my research.

Additionally, it is the dialogue between technological and compositional elements that I will focus on in this section in order to provide the best insight into my work. The relationship and reflexive dialogues between these two elements has become a significant focus and basis for my practice. The development of compositional and technological elements in parallel during the creative process, I offer, gives rise to what could be considered as a meta-process. This can be best thought of as a process in which compositional technique and technological construction (the content of composed media and programmed digital form or framework) evolve in a reflexive, interbraided meta-composition.

Harris and Bongers articulate the potentially insightful nature of this territory in reflecting upon their own creative process in developing interactive computer-based compositions through designing small modular technology units ('instrumentlets').

...(the composition) is not a linear process, the roles and actions influence each other in a continuous 'plaited' development over time...The design and development of these instrumentlets both influences and is influenced by the material, therefore becoming part of the artistic process. (Harris and Bongers 2002: 239)¹²⁰

Harris and Bongers' correlative identification of a dialogic process between composition and technology from the 'gathering of materials to the final presentation', and the 'plaited', or interwoven, relationship between compositional and technological development, is one that underlines this creative practice as both intrinsic to creative digital composition. The topic is, however, complex to articulate. It is possible to address these elements simply as part of a larger, singular compositional process – after all, technology, in a similarly broad sense, is part of all compositional work. However, this is a perspective I will come to in due course after, what I feel is, a legitimate inspection of the interplay between these two distinct areas. Furthermore, the context of interactivity within digital contexts, as outlined in the previous chapters, provides further scope for compositional practice to form new dialogues and relationships in author-audience contexts, digital-software frameworks and the malleability of digital media. In discussing Robert Rowe's 2001 *Machine Musicianship*, Curtis Bahn and Tomie Hahn note,

In Machine Musicianship, Rowe further states that (interactivity)... opens up 'new compositional domains', creating an

¹²⁰ [Harris, Y. and Bongers, B. 2002 *Approaches to creating interactivated space, from intimate to inhabited interfaces*. In *Organised Sound* 7(3) Cambridge University Press pp 239-240]

intriguing expansion of the craft of composition.' This expansion includes new paradigms for composition, performance, and other forms of participation...

(Hahn and Bahn 2002: 235)¹²¹

The level to which the development of technological structures and frameworks – software – affect the compositional elements of this dual-creative process are far reaching and manifest in form, content and methodological shifts, often at all stages of development in a reflexive, dialogic process. Programming and composition share many common methodologies and converging territories but also create frictions and awkward resonances with each other. Inherently, these frictions emerge from their divided disciplinary origins of arts and science, However, today such disciplinary divisions are problematic and not so clearly defined. Bown et al suggests that now,

...artist-programmers are common... It is now common for (those) ...working with code or development environments such as Max/MSP to publicly release programs that embody aspects of their own compositional and performance practice.

(Bown, Elderidge and McCorkmack 2009:192)¹²²

However, with regard to the perception of programming in artistic contexts, Bown et al touch upon the tendency of artists to cover up their process with regard to programming interactive works, or software-based compositions, due to the alienating complexity of the coding/programming languages. Shying away from examining my programming work was something, I too, was guilty of in my early practice. Yet, in omitting this side of my practice the true nature of the creative process was obscured.

¹²¹ Tomie Hahn and Curtis Bahn in *Organised Sound* 7(3): p 235 2002 Cambridge University Press, UK.]

¹²² Bown, O. Elderidge, A. and McCorkmack, J. 2009 *Understanding Interaction in Contemporary Digital Music: from instruments to behavioural objects* Organised Sound 14(2) Cambridge University Press p 192

Whilst it is reasonable to treat such internal interaction as operating inside a black box, the 'software component'... this clearly conceals those interactions. Yet in many cases the final...outcome may significantly depend upon interactions between software routines. (Bown, Elderidge and McCorkmack 2009:192)¹²³

The sound and image content of my works (the final media output) do not fully represent the sum of the compositional process: it is the composed media *and* the technological structures that account for a broader creative practice – one that manifests differently in development and outcome or performance stages. Additionally, the 'outcome' or composition also lies in the specific interactions between the software and the input of the user.

Unpacking the processes and dialogues that the compositional and technological elements of art works created in digital technologies, especially those based in interactivity, is one subject to the limitless specifics of all creative processes. However, there are a number of intrinsic and common ways in which digital technologies manifest shifts in methodology, form and content in compositional contexts. To best account for the balance between specificity and broadness I will launch these ideas from my own work: elements, components and dialogues from the creative process of developing *Digital Spaces* (2012) in order to articulate my experience of the reflexive dialogues between technological and compositional processes. Programming in creative contexts offers a reflexive, personal and implicitly social¹²⁴ dialogue between author, audience and system. Bown et al note,

¹²³ *Di Scipio 2003; Lewis 2006*). [Bown, O. Elderidge, A. and McCorkmack, J. 2009 *Understanding Interaction in Contemporary Digital Music: from instruments to behavioural objects* Organised Sound 14(2) Cambridge University Press p 193

¹²⁴ Something I will outline later in this chapter

...software acts as a new and distinct medium for interaction between people; software development in creative contexts involves a new and distinct cycle of interaction between the developer and the software. (Bown, O. Elderidge, A. and McCorkmack, J. 2009: 189)¹²⁵

I will now give some attention to the technological set up in *Digital Spaces*. In detailing the composition of the work I hope to articulate how composition and technology forged a close, reflexive and interbraided relationship in my own work. *Digital Spaces* is my final research project in which user's could explore both virtual and actual space simultaneously, triggering and blending videos via their location in the space - to give an understanding of the whole work with regard to functionality and system architecture. The piece is composed of two central technological elements – 1. motion tracking, by an overhead, depth sensitive camera, and 2. the possibility for media to be placed into mapped out zones (pictured), configured into a 'landscape', or "mediascape", and finally mapped on to real space via data links between the software and camera.

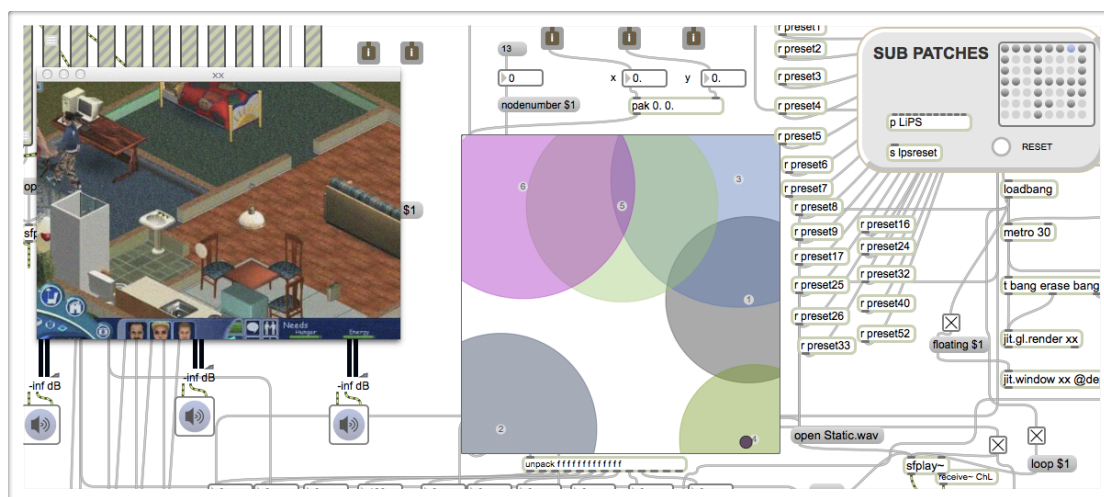


Fig 3.1 The circular nodes (mediazones) in the software represent areas in which various media can be placed or mapped and then configured in relation to real space by capturing the user's position via motion-tracking camera. The 'mediascape' is the square space encompassing the nodes.

¹²⁵ Bown, O. Elderidge, A. and McCorkmack, J. 2009 *Understanding Interaction in Contemporary Digital Music: from instruments to behavioural objects* Organised Sound 14(2) Cambridge University Press

The user's position, relative to that digitally mapped space, is determined by the camera. In addition to those core functions, I developed the work into a system responsive to decisions and thus the work had the possibility for progression and goals.¹²⁶ To reiterate on the functionality described in the previous chapter, the user-audience members enter one of the mapped zones in the space and see (and hear) new video media. The user-audience can explore each mediaspace by walking into and between each circular zone and when two or more overlap each video is blended/overlaid with the other(s). The initial concept of the tracking system and media zone-mapping was developed a great deal over a period of ten months. It became clear on a number of occasions when describing my work to others, and looking at my work in the context of similar works by other artists, that development was needed to capitalise on the interactive elements of the piece. At that time (early in the process when the piece had only the two elements mentioned above), the user could only explore a static space of four overlapping media zones/spaces. While this concept was somewhat engaging it became clear that I needed to give the audience 'something other' to attend to in the space as the effect was one of novelty and the user became quickly disengaged – see *Digital Spaces* Interview 3 (Appendix DVD recordings).

I conceived of a system that would keep track of the user's movements in the space and use this information to reactively dispose different content depending on their choices. Ultimately, this meant making the user aware of what their choices would mean and giving them instructions/options so that these choices could be informed. As such, I further appropriated the visuals to include numbered options (see Fig 3.2).

¹²⁶ These specific systems and their development is something I will detail shortly in this chapter



Fig 3.2 The visuals now detail the options the user has to interact with the work – each number represents an area in the space that user can move to trigger the chosen option

Each of these options would be tied into the decision tracking system, which I titled the Labyrinthian Pathways System (LPS) due to its incredibly complex architecture (Fig ?). With each movement to a different media zone/each decision the user was presented with a related set of new choices. There were, however, a number of problems in using this system as a basis for developing deeper levels of interaction. Firstly, the sheer size of the system and the amount of computer processing needed to run it was prohibitive, in addition to the rest of the project which included motion and depth tracking, live rss feeds, complex digital signal processing and image manipulation, this rendered the work prone to crashing and poor performance. The second problem was ultimately more serious and was the basis for abandoning the LPS and this particular interactive scenario. In trialling the work and testing the system the user-experencer commented on the action of moving from place-to-place in the room, directed by the on-screen instructions as being a prominent focus for their whole experience. The content, it was said, took something of a backseat and the main concern of the work became the user's interactivity. I was concerned

this element was not strong enough to be a focus for the entire project as the system had simply been grafted onto the work as a subordinate element with the intention that it would merely enhance the user's experience.

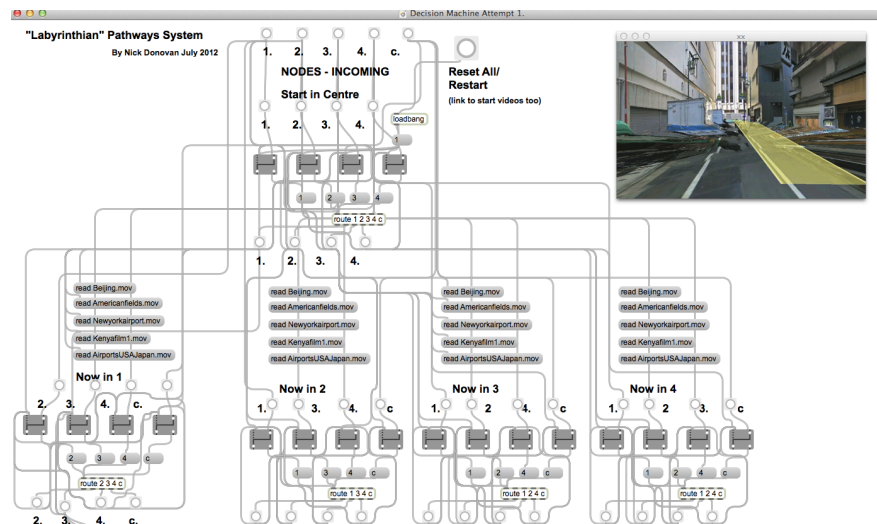


Fig 3.3 The beginnings of the decision-tracking, or Labyrinthian Pathways, system patch. Refer to Appendix for A4 sized image.

It became apparent that in experimenting with the development of the interactivity in this way and 'gamifying' the piece, as it were, provided more interaction at the expense of a 'fulfilling', immersive experience. The user had greater control, or awareness of control, upon the structure of the piece, yet the feedback for this mode of experience did not deliver in any superior way. I have always considered interaction as a useful vehicle for disposing particular experiences, one that would emphasise and invigorate that experience but I had not ever wanted it to become a distraction and occupy the user's attention more than the intended or composed elements of the experience itself. In creating the LPS for Digital Spaces, my trials revealed that audiences were often more focused on seeing what would happen when they got to another space and were almost ambivalent about the content after perceiving the initial change. The work, then, was limited by the foregrounding of

the somewhat uninspiring task of triggering sequential streams of media – go here to do this, go there to do that. Additionally, the ability to wander and explore spaces freely, to experience each digital zone blend into another, as it did in the first version, was lost. This equated to a type of interactivity Drummond outlined in exploring Rowe’s work noted in the Chapter Two: ‘transformative, generative or sequenced response methods’ (Drummond 2009:124). However, it became clear that merely giving the user the opportunity to sequence events was not the best interactive experience, it seemed *generative* best described the type of system, and experience, I wanted to dispose. The sequenced form of interaction became unrewarding and diminished the experience, despite the fact that the interactive potential had been expanded. Ultimately, this was a reminder that I had intended for interaction merely to be a means to experience, not the basis or focus for experience itself

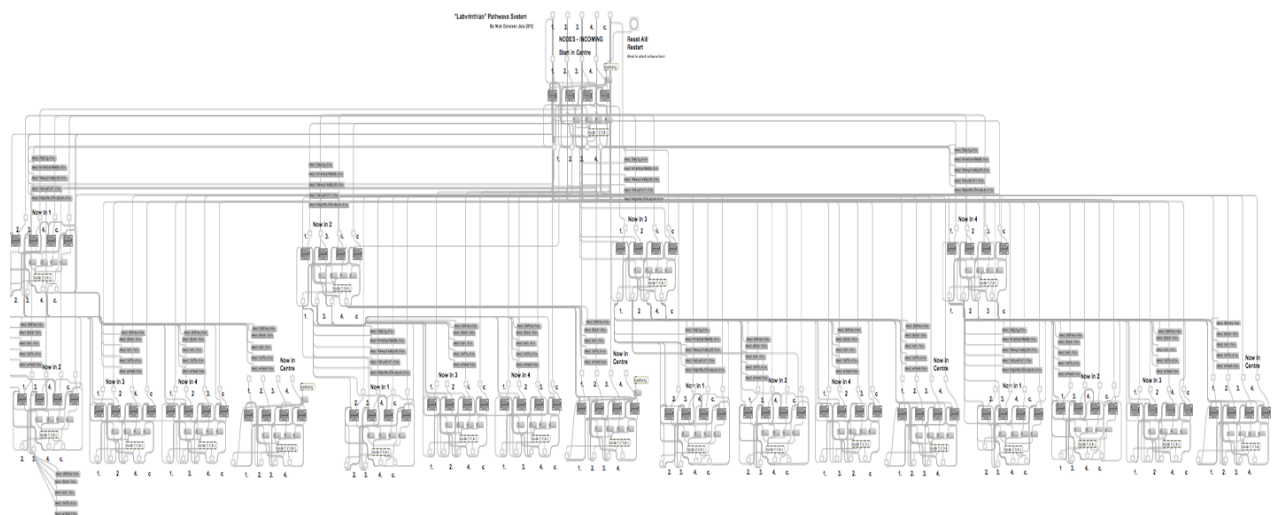


Fig 3.4 The LPS - later developments show the many tiers of the system tracking every decision of the user. Note that further 'levels' or 'tiers' are concealed in sub-patches - this visible structure is the 'tip of the iceberg'. Refer to Appendix for larger Image

In revising the structure of the LPS (the media disposing/decision tracking system) the notion of gamifying as such was not as strictly adhered to, but the work developed to explore a number of design concepts simultaneously such as game elements, non-linear

narrative/film experience, interactive media engagement, that provided a greater 'depth' to the work. Now titled LiPS, Linear Pathways System, the structure facilitates a more cohesive and interesting interactive experience (outlined in full below), which exceeded the novelty of basic control of the artwork and provided scope for a conceptual and structural richness that the LPS could not deliver in its simple, turn-based interaction. This provided the user with the richness and conceptual resonances that could offer a greater 'depth' to the experience than the previous versions. One experimenter noted,

The work was seductive in that I felt that I was actually constructing something – the possibilities/pathways were sufficiently extensive and variable not to become too predictable...
(Digital Spaces showing responses– December 2013)¹²⁷

This process exemplary of how composition can be affected and affect by the interactive construction and development of technological frameworks. The different evolutions of these software systems for disposing the media, and thus experience, affected the media form and content. In the first realisation of the work, the piece presented a fixed mediascape of five overlapped media zones which the user could explore freely but never change the media, or 'advance' the experience through their actions – the audience were more 'active observers' than participants. As such, the video content was composed as long fragments – around 10 minutes of video in each space – and included live, ever-changing data from social media. The content was broad, and characterised an overview of digital technologies and human interaction with them. As I mentioned previously, the effect was one that disposed little but a distanced, and somewhat shallow experience.

¹²⁷ Collected responses from Digital Spaces work-in-progress showing December 2013 – see Appendix for responses – Jane Linden. Additionally, see DVD Appendix Three recordings of Interviews for Digital Spaces as this sentiment is echoed by a number of users.

The next iteration of the work featured the first realisation of the media-disposing framework, the LPS, which created a dense, sequentially-based experience of media 'spaces' to follow on logically from one another as the user made choices based on the written instructions in each video. As such, each media 'space' had the possibility to develop narratives through the user's movement to a new space. This meant each video had to have a potential narrative relationship to those that came before and after. The video media's form became shorter (around three to four minutes each in length) and thematically based around a series of potential narrative pathways that the user could choose to explore. The amount of digitally constructed imagery and appropriated material from the web was, as a result, reduced considerably to include actors, dialogue, and scenes conceived as tableaux-like pieces. The amount of material needed for the realisation of the work, and the dull experience of stepping from one space to another based on written directives, put an early stop to the development of this work. The media in this system version was more narrative-based, sequential and linear but dull as a result – the content and form didn't come together as a cohesive experience.

The final version of the software system was titled the 'LiPS' (described in more detail below). In this version both kinds of functionality from the previous two versions manifest as a non-linear, non-narrative-based set of connected spaces. The user may explore and blend media freely, triggering key 'gateway' videos enabling them to progress through the work into new 'mediascape' areas and along numerous possible pathways. This software structure disposes both great freedom and the possibility for depth and progress with a prescribed author-determined narrative – the subject of which will be explored later in this chapter. The media is once more digitally themed – utilising a range of re-

appropriated web material, live data from social networks, and imagery of video games. However, the form of the media is very short and fragmentary, approximately one minute in length each. For the first time the media is similar in both form and content. The media in each space is also greater in number: each mediascape contains around six to seven media zones (six to seven videos mapped to real space). As such, there is richer density of content for the user to engage with, who would typically be subject to a great deal of action, noise and information during the space of each minute-long video. The relationship between the number of different media and their length is significant in other respects: the amount of processing power the application requires due to the use of the large and complex LiPS system determined that the video media must be of smaller size and lower quality if it was to run so many videos. The reason for the use of more videos, however, was related to their length – the experience of roaming a space with six to seven overlapping videos of one minute in length was a more interesting experience than three to four video spaces of the same duration. The amount of time that each person would spend in a space was considerably less if there was a larger number of other ‘spaces’ to explore, and, as such, the emphasis on the loop form of the content as notable experience of the work would be markedly less. In a less densely populated media space, with a lower number of videos, the form of the loop could come to dominate the work and draw user’s attention away from the content itself.

These observations from my creative process indicate that the technological structure/form can impact the media’s form and content in significant ways. In the final LiPS version of the system, the content and form both become intrinsically similar. Each element (content and form) articulate a fragmentary, module-based, networked structure – one that

is non-linear (despite the name of the system), but related through a shared context or framework. I feel this is why the resulting experience of the work was the most compelling and cohesive – both form and content are in dialogue and complementary in their functionality and form. The content's composed form and themes are represented and represent the structure and functionality of the technical system – examples and full details of which follow in the next sub sections of this chapter. As such, with both content and form assimilating digital characteristics, the experience of the work is one that is inherently digital, networked and representative of a digitally-based culture.

Digital Forms and Structures: Loops, Database Narratives

A common characteristic of the content's form in every realisation/version of the decision-tracking/media-disposing systems was the use of looped content. Loops are one of the most fundamental digital forms in any software or digital technology. When beginning to learn coding languages, aside from the ubiquitous 'hello, world' exercise,¹²⁸ creating a loop argument is a basic coding principle many coders engage with early on. There are many types of loop, sometimes specific to a particular language, but their presence in the most elementary levels of digital structures is telling with regard to their appearance and functionality in digitally constructed art works.

Digital Spaces uses looped video for all its media fragments to provide a system in which a non-linear, incidental and potentially continuous experience is possible in the form of a media 'landscape'. It has been interesting to work with loops and explore them as a common digital

¹²⁸ A first-time coding experiment designed to familiarize the user with the system's console and the basic process of writing programs

form. *Digital Spaces* self-consciously references the fact that the 'narratives' and structure of the media are based in a networked, fragmented and compartmentalised format. The aesthetic, while not so much focusing on the notion of the loop, is constructed in adherence to this prevalent (in digital media at least) organising principle (the loop) in both a temporal and spatial design. The whole LiPS structure (fig 3.5) - the framework designed to dispose all the media - is a loop itself. This allows the user to go back to the beginning of a journey – 'beginning' in the loosest sense of the word, or back to the first space they encountered and make different journeys via different, but connected, 'paths'. In terms of compositional practice, this form articulates the idea of repeating structures with variation yet in cell form, such that the individual fragments, or loops in this instance, do not change but their arrangement and internal relationships with one another are constantly shifting. The LiPS module, pictured below (Fig 3.5), is composed of connected media spaces or mediascapes mapped out by the node software module. Key zones, or the circular 'mediazones' as pictured in the interface above, access the connections, or 'paths', between each space. In some mediascapes there are multiple key zones which allow the user to take different journeys as though they were at a fork in the road. As such, the structure is one resembling a tiered, pyramid: a hierarchal model. However, these journeys have neither a fixed endpoint nor a determined beginning due to all 'final' mediascape zones: those eight nodes pictured at the lowest pyramid tier, connecting to the first, top, node, thus forming a loop.

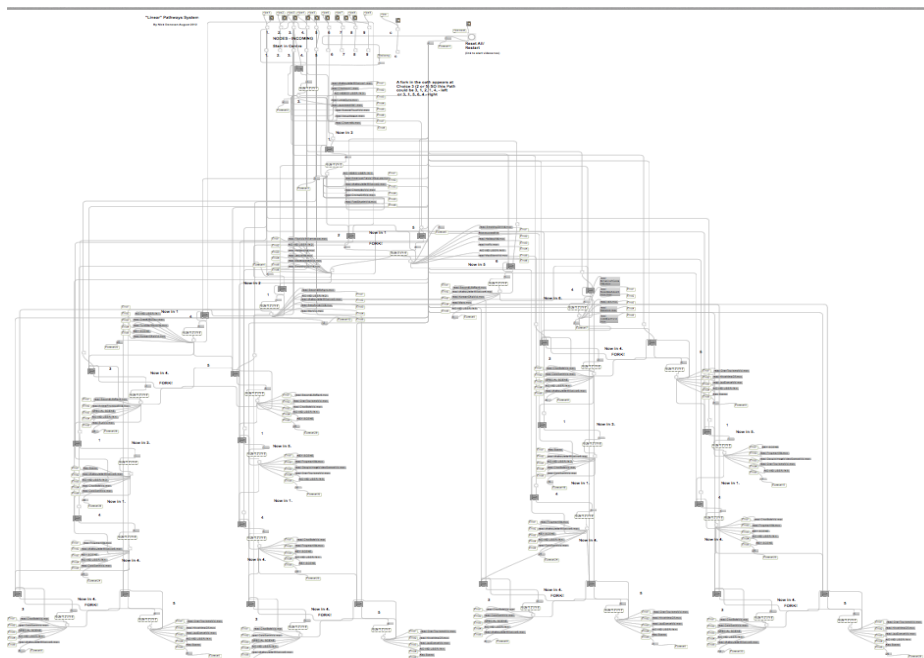


Fig 3.5 LiPS – The multi-tiered decision-tracking module of the *Digital Spaces* software that functions as a loop – reverting to the start position at the end of each ‘journey’. See Appendix for larger image.

This revised LiPS structure draws on the work of Lev Manovich’s ‘*The Language of New Media* (2001).¹²⁹ *Digital Spaces*, with reference to Manovich’s observations, can be analysed as using principles of RAM processing, and Manovich’s ideas of ‘database narrative’ and ‘spatial montage’. ‘Database narrative’¹³⁰ describes the way media is archived in database format, with each distinct, independent fragment called upon as needed, instead of as one sequential structure as in film. In explaining this process he observes that:

It is, in other words, a narrative which fully utilizes many features of database organization of data. It relies on our abilities to classify database records according to different dimensions, to sort through records, to quickly retrieve any record, as well as to “stream” a number of different records continuously one after another. (Manovich 2001:268)

¹²⁹ Manovich, L. 2001. *The Language of New Media*. Cambridge. MA: The MIT Press

¹³⁰ Manovich 2001: 267 -268

This principle runs parallel to the functionality of RAM, random access memory, a means through which computers allocate and process data – closely related to cpu power determining how fast a computer can perform tasks. Manovich further notes that:

Random Access Memory... implies the lack of hierarchy: any RAM location can be accessed as quickly as any other. In contrast to the older storage media of book, film, and magnetic tape, where data is organized sequentially and linearly, thus suggesting the presence of a narrative or a rhetorical trajectory, RAM "flattens" the data. (Manovich 2001:86)

This principle underscores a great deal of digital processes and has now translated into the way media is handled, organised and composed – as data might be.¹³¹ Manovich explores the work *Akvaario* (2000), an interactive cinema piece, designed by a number of graduate students at Helsinki's University of Art and Design¹³² which deploys and arranges media in a very similar way (as data) to that of *Digital Spaces*. Manovich considers the use of loops here as the basis for creating the material in a database narrative and their natural disposition in this digital re-contextualisation of narrative form,

In Akvaario the loop becomes the way to bridge linear narrative and interactive control... In Akvaario a narrative is born from a loop and it returns back to a loop. The historical birth of modern fictional cinema out of the loop returns as a condition of cinema's rebirth as an interactive form. (ibid)

It is worth noting that the LiPS system, while working on principles of RAM, does not organise and dispose the media *randomly* – it is random access, and therefore affords the possibility to dispose media in

¹³¹ This concept is related to, and based in, the notion of transcoding as mentioned in Chapter One with reference to mapping data to media in Ryo Ikeshiro's *Constructions* in Zhuangzi (2012)

¹³² Professor and Media Lab coordinator: Minna Tarrka. [URL: <http://www.mlab.uiah.fi/>]

limitless possible orders via the user's interaction. The *system* is linear in design but not in functionality interaction or experience, in as much as the user's choices progress, and are tracked, as a single path. This is complicated somewhat as the 'paths' or connections between databases of media (the mediascapes) fork out into multiple strands to characterise a multi-tiered loop rather than the typically singular form often conjured when talking of linearity. This articulates a combination of the linear and rhizomatic/networked in the system's form: indicative of the dialogue between traditional compositional technique and digital circumstances.

Despite the absence of more traditional sequential structures in these processes, Manovich, again with reference to Akvaario, describes how digital structures like that of the database narrative and the use of loops and the fragmented arrangement of media can still result in a meaningful experience,

Because of visual, spatial and referential discontinuity between shots typical of standard editing, the result is something which the viewer interprets as a conventional narrative. A film or television viewer does not expect that any two shots which follow one another have to display the same space or subsequent moments of time. Therefore in Akvaario a computer program can "weave" an endless narrative by choosing from a database of different shots. What gives the resulting "narrative (sic) a sufficient continuity is that almost all shots show the same character. (ibid)

My chosen, re-appropriated media was united thematically to address certain ideas, and the way they could be interrelated and experienced was determined mostly by the audience's engagement.

Each video mediazone is selected and placed next to another in a specific mediascape – such that each video is local to another as a result of authorially-considered *resonances*. There is no arrangement of the media that implies a narrative or specific 'meaning' but thematically

the work explores the notion of human experience in digital and actual spaces. An example of this arrangement would be that of a space containing overlapping videos from video chatrooms, news recordings, live digital material: there are no set possible narratives, only a thematic bonding from which the user is free to construct their own meanings from a specific *kind* of experience and not a pre-determined set of possible narratives or authorial message.¹³³

With this in mind, my work sits conceptually between the notion of montage, or perhaps more accurately collage, where certain shots are placed physically next to each other to create intentional resonances, and what Lev Manovic describes as ‘soft(ware) cinema’ – a combination of images, ordered by the author via an algorithm, allowing the viewer to create their own meanings.

Soft(ware) Cinema is a dynamic computer-driven media installation. The viewers are presented with an infinite series of narrative films constructed on the fly by the custom software. Using the systems of rules defined by the author, the software decides what appears on the screen, where, and in which sequence; it also chooses music tracks. The elements are chosen from a media database which at present contains 4 hours of video and animation, 3 hours of voice over narration, and 5 hours of music.
(Manovich 2013)¹³⁴

However, there are specific distinctions between *Digital Spaces* and Manovich’s soft cinema works. The media is not *set* as it is in traditional

¹³³ An example of this can be seen in the supporting material: Digital Spaces Promo video at 2 minutes 52 seconds where Robin Nelson blends back and forth between two videos. One video is a ‘shoot ‘em up’ video game with a voice over on acquiring a gun license and the other is mobile phone footage of a group conflict in the Middle East, an incident relating to the Arab Spring (2012). Co-incidentally the day before the showing (December 14, 2012), Adam Lanza fatally shot twenty children and six adult staff members in a mass murder at Sandy Hook Elementary School in Connecticut, USA. As such this imagery became extremely poignant to the audience at that showing – an intertextual occurrence exemplary of the open reading the work disposes itself to.

¹³⁴ (Manovich’s official website <http://www.manovich.net> - Accessed 04.02.13)

montage (temporally) and it is not purely random, or otherwise randomly reacting to the author's input (in algorithmic form as in soft cinema). It is composed for interaction – again, as Manovich notes “*the software decides what appears on the screen, where, and in which sequence*”. In *Digital Spaces*, it is the audience-user that can determine what appears ‘on-screen’ and in what order – sequential structure here becomes irrelevant. The ways in which the audience can experience the content, in what order, and consider the resulting resonances, will only emerge through the to-fro relationship between intellectual engagement and physical interaction with the work. In montage there is a set composed order of scenes and set means of experiencing it: in time. In soft(ware) cinema the randomly populated images which allow many random intertextual ideas to present themselves is decided by the author and disposed by the machine via an algorithm – the user has no part to play but that of spectator.

In my work the audience is presented with a set of specific content but also the possibility to create their own experience out of that framework through the affordances the interactive system offers: blending media into one another, experiencing the work a-temporally, in space.

Spatial Montage

As noted above, the experience of the media content as a result of the LiPS system became less linear. The system, however, was *more* linear in design. This relationship between disposed experience and design was the opposite of that disposed by the previous system: there were more ‘choices’ in the ‘LPS’ version but the encountered experience with the media content was one structured sequentially, in specific orders, creating specific narratives yet ultimately resulting in a dull end-user

experience.¹³⁵ Another notable effect of the LiPS system was that the structuring and experience of the media aligned closely with Manovich's notion of 'spatial montage', drawing on the work of Boissier: a state of multiple, simultaneous content running parallel to one another, described thus:

Instead of a traditional singular frame of cinema, Boissier uses two images at once, positioned side by side. This can be thought of a simplest case of a spatial montage. In general, spatial montage would involve a number of images, potentially of different sizes and proportions, appearing on the screen at the same time. This by itself of course does not result in montage; it up to the filmmaker to construct a logic which drives which images appear together, when they appear and what kind of relationships they enter with each other. (Manovich 2001: 270)

As Manovich posits, spatial montage is commonly realised as the breaking down of screen real estate into a number of smaller, 'mini' screens all containing different, but related content – like a media collage, disparate but united through their shared context. In *Digital Spaces*, the term comes to manifest in a more literal way: the media is mapped out on to physical space – subverted both from a sequential 'cinema time' experience of one scene following another consecutively and the leveling, one-dimensional quality of a single screen. The media is spatially arranged as a personal, digital geography which the user may freely explore, in which one zone of content bleeds into another and all videos are continuously playing – whether the user can see them or not. Significantly, *Digital Spaces* allows users to be *between* content – to sit on the edges of overlapping spaces and see their intertextual resonances as two images blending as one. The media are

¹³⁵ This is mainly due to the fact that audiences experience works aesthetically not through their technical composition – as such *Digital Spaces* was composed to communicate the networked and non-linear via its media, not the technical form.

at once in local space to one another and literally sharing space. The degree to which the user can see each video is dependant on their location within the mediazone, or circular node, each video is assigned to. The dead center is a perfect, crystal clear image, whilst wandering away from that point reduces the image's clarity as it blends with the interference of static – denoted by the white space between the circular mediazones.

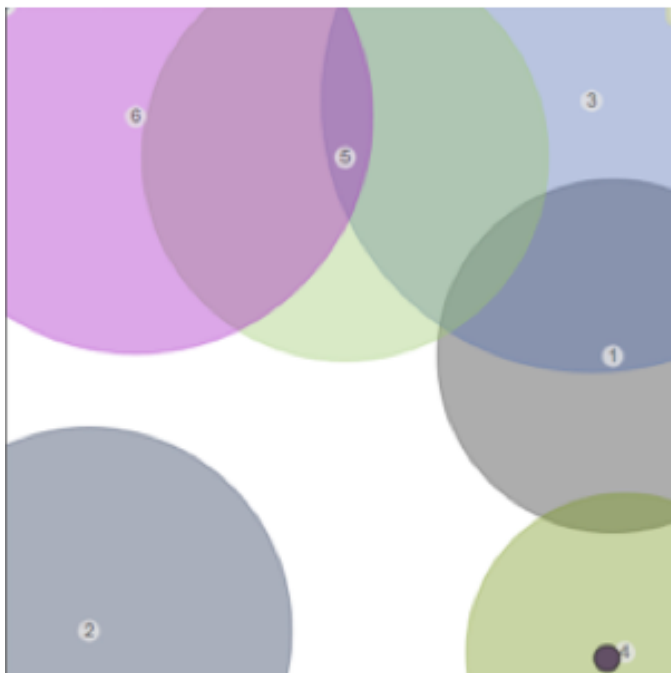


Fig 3.6 A mediascape showing the location of six mediazones (the coloured circles), each containing different videos, and the white 'static' space between them. The user's location is shown as the small dark circle in the bottom right.

This is significant as traditional montage and screen-based *spatial* montages are related, but even spatial montage content is isolated on screen in distinct areas, see Fig 3.7.

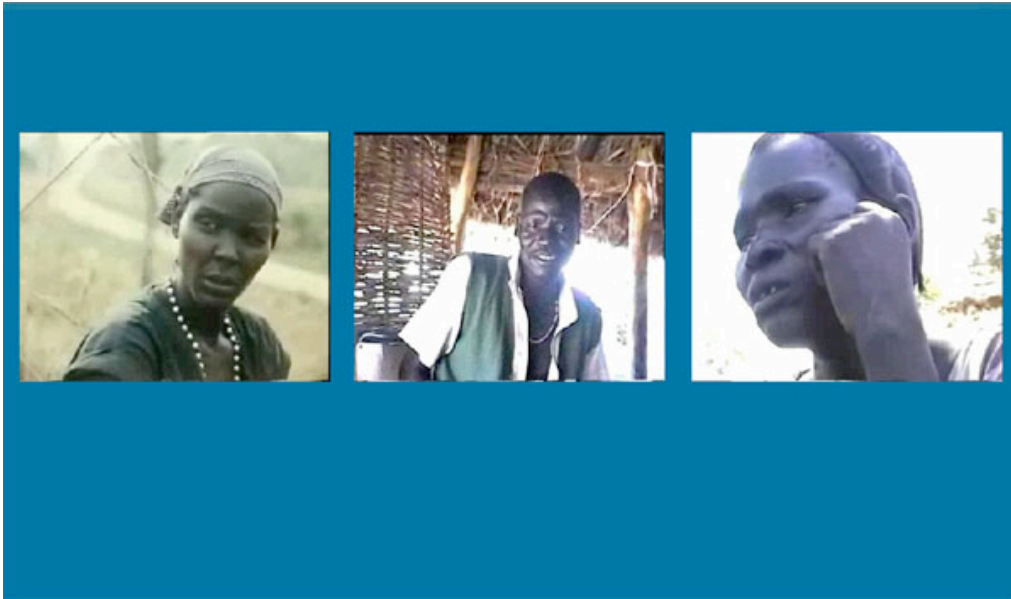


Fig 3.7 An example of spatial montage as it would commonly be seen on screen: three images side-by-side.¹³⁶

This allows the user to either view the mass of images as one great amalgam – overloading the senses – or individually, flitting from one image to the next. They are resonant only intertextually as *Digital Spaces* creates meanings through *overlaid* images as this creates the effect of combined spaces and times (within one single image).

From the development of this system we can identify that each element is in discourse with the other during development. In one version the content was experienced sequentially and dictated by the form of the system's structure. In the latest version, however, content can be blended and linked as a network – one form often mirroring, or creating friction with the other. Both compositional and programming practices impact one another in a closely reflexive dialogue throughout the process of creating interactive digital works. When both content and form (the composed media and programmed software) share similarities, the work seems to function more coherently. Composition

¹³⁶ Image from Qualitative Research 23 March 2014 <<http://www.qualitative-research.net/index.php/fqs/article/viewFile/1479/2982/5412>>

and technological development both invade each other's territory and demarcate their own space. Such is a practice where linear and rhizomatic processes operate side-by-side and digital circumstances provide further compositional possibilities. Yet those compositional decisions condition and re-inform the development of the work in an on-going creative process.

Section 2: How does this techno-compositional dialogic (my practice) provide new perspectives on contemporary critical and theoretical frameworks?

Conceptual, Critical Issues in Digital Composition Contexts

Temporality

At this juncture it is important to address some of the theoretical-conceptual ideas that have emerged during the creative process of developing this work. There were many occasions in my practice that new perspectives on critical issues emerged simply from working within digital contexts, or in unraveling the nuances of the techno-compositional dialogue outlined in the first main section of this chapter. In considering the ideas put forward by Manovich in relation to my compositional process, the functionality of my piece and the user-audience experience resonates with a number of existing complex theoretical-critical areas. As detailed in the last section, Manovich describes potential narratives and experiences from loops of media similar to the interactivity afforded in my own work - in which an audience initiates loops of video media. This is engineered or structured in such way as to not focus the user's attention or draw a notable aesthetic from the form itself - but was used "as a condition of cinema's rebirth as an interactive form" (Manovich 2001:268), to form "a new temporal aesthetics for computer-based cinema." (ibid)

The re-negotiations of space and time we experience, and have now become accustomed to as a result of digital technologies, their structures and use of media, became a prominent and re-occurring concept in developing *Digital Spaces*.

In considering the use of loops as a means to form concepts of time in the work, the displacements of forming continuity from an a-temporal structure drew my attention to the way an audience's experience of temporality can be manipulated through digital contexts. Although the

user/audience still experiences the content of the piece in the linearity of space-time, the potency of time as a factor in creating 'meaning' in experiencing the media is displaced through the framework of digital circumstances. In my work this manifests as being designed to reconfigure itself into a image of linearity or communicate the idea of a temporally rhizomatic space - a network of media where the perception of inter-connected nodes, as opposed to a fragmented linearity, is able to communicate meaning. This is demonstrated in the spatial montage of the video media in *Digital Spaces*: distinct pockets of multiple temporalities both separated and united in the same space/environment.

For many of us, this is commonly how we experience and consume digital media: as news, advertising, as 'glocal' conversations across video services and social networking – often with many of these sharing the same 'page' space on a website. Thus, Manovich's notion of database narrative and its organisation, re-configuration and manipulation of media as data is indicative of a broader digitisation of culture, including our experience of time. Sarah Bay-Cheng articulates these ideas thus:

“Lev Manovich draws clear parallels between cinematic, temporal montage (a composite of multiple images in a single moment in time) and digital compositing. Noting the pervasive shifts in modern conceptions of temporality, Manovich notes that digitization - the transformation of media into data - was part of a much larger project of “cultural transcoding” in which new media act as a precursor for a “more general process of cultural reconceptualization” (Manovich 2001, 47). – (Bay-Cheng 2010: 85 in Kattenbelt, C(ed.))¹³⁷

¹³⁷ In Kattenbelt, C , Bay-Cheng, S, Nelson, R, Levender, A (Eds.) 2010 *Mapping Intermediality In Performance*. Amsterdam University Press

Liesbeth Groot Nibbelink expands on this idea with reference to media in creative settings and refers to a 'sense of displacement' in temporality when life, or in this case theatre, meets digital media:

Digital technologies that reconfigure the ontologies of space and time add to a sense of displacement that increasingly characterizes intersections of media and theatre. (Nibbelink 2010: 97 in ibid)

Such displacements are prevalent in media 'intersections' beyond theatre settings, of course: all de-territorialisations and re-territorialisations of media/mediums through their interrelation, reconfiguration and translation in digital contexts serve to articulate such tensions. Drawing on the work Hansen, and in relation his own *Granular Synth* work Edward Scheer, aka Modell5, poses the question:

*...has the digital age, with its profound changes to machinic processes and technological systems, really (as Mark Hansen puts it) "altered the infrastructure of our contemporary lifeworld in ways that directly impact our embodied temporal experience?" (Hansen 2004, 235) (Scheer 2010: 115 in Kattenbelt, C).*¹³⁸

Scheer explores the act of challenging the perception of the spectator, and artist, through digital circumstances to engage with notions of temporality, specifically, perceptions of 'now' and the *flow* of time. Scheer aims to draw the audience's attention to the differences between 'experiential' (human), 'machine' and 'clock time'. He asks,

Has the now itself been altered in ways which leave performance art behind as a tactic for rendering the temporal substratum of lived experience? Intermedial performance provides perhaps the most

¹³⁸ Edward Scheer, Instance: Granular Synthesis, *Modell5* (2001) in Kattenbelt, C , Bay-Cheng, S, Nelson, R, Levender, A (Eds.) 2010). *Mapping Intermediality In Performance*. Amsterdam University Press

efficient means currently available of posing questions about the constitution of temporal experience. (Scheer: 2001:115)

Although my work does not attempt to engage with temporality in the same way as Scheer's – as a focus for performance there are similarities in the way in which intermediality and digital circumstances probe the “constitution of temporal experience” in media and interactive contexts in my work. Bay-Cheng similarly articulates the shift of focus from space to time in digitally-based/augmented performances that explore relationships between temporal states in digital contexts and their resonances and tensions in placing them in ‘real-life’ circumstances, when he says:

Perhaps most radically, performance theorist Alice Rayner describes the shift from material performance into cyberspace as one from the ontology of space to the performance of time...Rayner notes the ways “in which performance aligns with digital technologies to resist landscapes and geometric space, and to resituate space in the fugitive dimension of time” (Rayner 2002, 350-51). (Bay-Cheng 2010:86 in Kattenbelt, C)

With these instances and ideas in mind, it seems time becomes privileged and thus amplified in digital circumstances as space is levelled so completely, yet the attitude towards time and its relationships with space are reconsidered. As though to compensate for the recession of space, time takes on simultaneity and malleability as *form* in digital media - many eras, origins and geographies exist at once, perhaps on the same web page or in the exchange of data instantly across the globe. Bay-Cheng considers this idea well when he states that:

While the notion of time has always been a fluid one, in the “new temporality” of digital media (as Manovich calls it), theorists have positioned time in digital culture as many things simultaneously:

constructed (Lyotard), digital compressed (Dixon and Smith), regressive (Baudrillard), elongated (Virillo) and annihilated (Huyssen)." (ibid)

Bay Cheng notes in the same chapter that Alice Rayner, in her 2002 essay "*E-scapes: Performance in the Time of Cyberspace*" that she considers this to be true, that digital technologies do resist spatial dimensions,

In digital contexts, temporality...came to represent a displacement of material space. No longer based in linear progression, external measures and materiality, time in digital contexts evolved into a dynamic, dispersed, yet coherent network of temporal points - a time could encompass, as noted by Foucault, many different points simultaneously. (ibid)

This resonates strongly in relation to how *Digital Spaces* functions as a time-focused medium. Its structure too, is described here by Bay Cheng:

The experience of time, the new temporality, is one of many simultaneous experiences and memories capable of being stored and accessed in random order, just as a computer deploys RAM, or random access memory, as the essence of data cognition. It is this change in processing structures - random instead of linear; simultaneous instead of sequential - that thus reorders time in digital media and changes our perception of past, present, and future. (ibid)

Essentially, through the malleability of time and levelling of its qualities the relationship to space can be reconfigured and re-plotted as a temporally and geographically plural space¹³⁹ encompassing many different on-going, parallel times and spaces. *Digital Spaces* uses the notion of accessibility and simultaneity as its core experience, in its form, structure and content – the user may navigate through and past zones, on their own personal trajectory and their own personal

¹³⁹ In that they exist both in actual reality and also experienced in multiple virtual versions of themselves.

temporality through the multiplicity of cyber-temporalities, reformatted as a spatial arrangement - “a temporalisation of space and a spatialisation of time” (Kattenbelt 2006, 24 – in 2010:87).

In a sense, time almost becomes a compositional material or mouldable form as part of the creative process in this techno-compositional dialogue and digital environment. The composition of digital technology structures and their constituent media as an interwoven creative practice is disposed to disrupt and re-negotiate our perceptions of temporal experience. ‘The New Temporality’ (Manovich) ultimately suggests how such digital compositional tools and structures like database narrative, loops and spatial montage “*reorders time in digital media and changes our perception of past, present, and future.*” Our experience of media, disposed by, or as a consequence of, these forms provide new perspectives on how temporality, space and experience are constructed, re-ordered and problematised in our digitally-augmented world.

Becoming and Differential Presence

The dimensionalisation’ of space and time happens as a translation of successive points of displacement into sequenced numbers: ‘magnitudes can striate space [and spatialise time] only by reference to numbers, and conversely, numbers are used to express increasingly complex relations between magnitudes... (in Deleuze and Performance edited by Laura Cull, 2009 pg. 243)

Here, Stamatia Portanova draws on the work of Deleuze to articulate the potential of spatio-temporal relationships to be coded and defined through numbers, locating further conceptual approaches to temporal experience in the context of the digital. Laura Cull’s work into ‘differential presence’, a development of Deleuze’s becoming in live

performance contexts, and temporal states in performance settings – contextualised by intermedial processes – offers a different perspective of how the digital-virtual can establish new concepts of experiencing time. She notes:

Differential presence, here, is understood as an attention to the multiplicity of the present. (Cull, L. 2009:62)¹⁴⁰

Cull's exploration of 'differential presence' and the Deleuzian notions of time and temporality through 'becoming' are analogous with those that, intermedially, enable 'time-scapes'.¹⁴¹ *Digital Spaces* then, can be perceived to provide circumstances which offer multiple 'areas' or 'spaces' of time. The mediascapes in *Digital Spaces* present the audience with numerous discreet and continuous media in different areas of the installation that they continued to play/manipulate, whether the user was in that specific space to view them or not. The multiple temporalities of looped media which the user reshapes through their exploration of the physical space creates their own personal virtual geographies. Here, both the re-negotiation of time-space relationships and the embodied experience of an individual sense of temporality/differential presence are made manifest through the digital configuration of an intermedial framework. It is perhaps important to note that while the user/audience's actual experience of temporality may not be different in experiencing *Digital Spaces*, the claim here is that the frameworks I provide give potentially new perspectives on temporality in digital media contexts.

¹⁴⁰ Cull, L. 2009 *Differential Presence: Deleuze and Performance* - Thesis for University of Exeter – November 2009.

¹⁴¹ As in *Digital Spaces*' mediascapes - a landscape of multiple temporalities which essentially offer a re-negotiation of space-time relationships through digital circumstances.

Becoming is a notion with many concomitant and related concepts, however, in the interest of defining this idea, it seems appropriate to draw from Cull's edited collection of essays, as this shared perspective is where I take my point of departure – not, as one might expect, from Deleuze.

In contrast to the unchanging or eternal nature of being, becoming can be defined as 'that which is changing, what is contingent, in constant process and flux' (Smith in Protevi 2005: 60)
(Cull, L 2009:30)

Exploring the notion of 'becoming' through intermediality in digital contexts affords the possibility to constantly re-negotiate and redefine, in response to an individual interactive experience, the leveled and malleable state of media relationships in digital contexts - and as such a draw attention to what Laura Cull outlines as 'differential presence' in their temporality. Or, in the case of my second research project. *Interactivity*, the individual interactive experience is taken as the basis for creating, initiating and realising media interrelations as interactive discourse. It is the range of such interrelationships and interconnected elements that articulate the actual process of composing intermedially, Nelson offers,

We have come to see that detailed attention needs to be paid to the range of 'inters' in 'interrelationships', differentiating them in their various functions and effects as Elleström's nuanced model facilitates in detail.
(Nelson, R in *Mapping Intermediality in Performance* 2010:17)¹⁴²

¹⁴²Nelson, R (2010) *Introduction: Prospective Mapping and Network of Terms* in Bay-Cheng, S. Kattenbelt, C. Lavender, A. Nelson, R. (eds.) (2010) *Mapping Intermediality in Performance*. Amsterdam University Press. p 17.

For example, in *Inter-activity* when the user touches the globe interface the datastream from that ‘interactive moment’ (produced by the movement of the globe via accelerometers) became a uniting ‘bond’ which both sound and image originated from. In *Inter-activity*, with notable reference to Deleuzian concepts (becoming, flux and flow), the individual perception and *experience* of time takes precedence over that which is ‘given’ as a clock time or machine time.¹⁴³ This was mainly exemplified in the ‘goalless’, directionless experience of the work – there was no development of the work and no ‘end’ artwork, simply a continuous shifting aural-visual output resulting from the user spinning the globe. As such, temporality once more becomes relevant in this context,

...above all perhaps, the notion of becoming binds together the concepts of difference and temporality. Time, for Deleuze, is not a discrete ‘now’ that beings occupy or are contained by; rather, ‘we abstract the “now” as some sort of being or thing from the becoming or flow of time’ (Colebrook 2002: 41). Time is immanent to what lives and as such what lives is ceaselessly becoming or self-differentiating; or, as Todd May summarises, ‘Becoming is the unfolding of difference in time and as time’ (May 2003: 147).

(Cull, L 2009:31)

This ‘personal’ engagement with temporality, personal in that the work draws the user’s experience to their awareness of time and not the events occurring in it, becomes the basis for such works exploring these Deleuzian notions, such as Model5’s *Granular Synth* work mentioned above, rather than the dictated duration of a work that begins and ends. The work that affords a ‘becoming’, as it were, affords individual, multiple and simultaneous time-scapes, or in Cull’s terms ‘differential presence’. Intermediality, in digital contexts, facilitates the conditions for such experiences readily through its disposition to provide platforms,

¹⁴³ The time it takes for code to be processed or CPU tasks to be completed

environments, mediums for multiple temporalities, histories, spaces and the disruption and levelling of traditional notions of space-time relationships. Nelson proffers the potential of the digital intermedial to disrupt and renegotiate our traditional perceptions of time, space and reality,

The capacity of digital technologies multi-modally to integrate sound, visuals, words and temporal dynamics (in respect of the ease of digital editing in both real time and during recording) ...have invoked the possibility of transformations from the physical to the virtual in additional dimensions of space and time.
(Nelson 2010:16)¹⁴⁴

The Actual-Virtual Divide

Such explorations of shifts in temporal experience in digital contexts draw our attention to the fact that it is the resonances between the virtual and the actual realities, and their interplay as a complex, interwoven condition of digital contemporaneity, as the locus for such disruptions and compounded states of intermedial, inter-reality experiences. Our perception of time is founded in both a combination of clock time and cognitive experience of durations. Yet, when confronted by the numerous dislocations, re-applications and reductions of time via digital technology and virtual media, our experience and sense of time is complicated enormously. Thus, our relationship to virtual and actual realities and the actual specifics of this relationship are not straightforward, it is not a clear dichotomy between both realities as the term 'divide' suggest. Our contemporary experience of virtual and actual realities is one that stretches across a spectrum of 'between-ness',

¹⁴⁴Nelson, R (2010) *Introduction: Prospective Mapping and Network of Terms* in Bay-Cheng, S. Kattenbelt, C. Lavender, A. Nelson, R. (eds.) (2010) *Mapping Intermediality in Performance*. Amsterdam University Press. p 16.

inhabiting liminal territories of digitally-augmented 'real-life' and 'virtually-constructed' everydayness. Peter Petralia, drawing on Farman, addresses this idea,

...a distinction between 'real' and 'virtual' is in fact totally misleading in our current conceptions of space. Very often, the virtual (as in that which is conjured up through technology) is more 'real' than something we might experience physically because our identities are more and more being configured by and for digital media. (Petralia, P 2012)¹⁴⁵

In *Digital Spaces*, I am not offering any kind of (semi) immersion or control of a virtual avatar in virtual space - to represent the physical space virtually (in that it has three dimensions, a floor, walls/space to walk in) and position a representation of a virtual self inside it. I am self consciously giving the audience a window into the digital/virtual environment in an attempt to mark the dichotomy and complex relationship between the actual and the virtual. I do this not through parallel analogies, or similarities and representations, but through the differences and frictions and our awareness/encounters with those equally interesting spaces in our everyday. *Digital Spaces* never attempts to place the user in the work. The audience is neither simply a spectator nor actor: the work is an installation in form, and not a performance where an audience watches for a specific *duration* of time, separated from the action on stage and on screen. The audience's position and role is characterised by an awkward *betweenness*, they are never fully immersed in the digital world they tread – they are able to walk both actual and virtual realities simultaneously but never anchor their experience in any individual one. The contrast, or inbetweeness,

¹⁴⁵ From Petralia, Peter (2012) 'Reach Out and Touch Someone: Technology and the Promise of Intimacy (conference edit)', TAPRA, Kent University, 5-7 September, Online at: <http://bit.ly/QOh4GA>.- Farman, Jason (2011) *Mobile Interface Theory: Embodied Space and Locative Media*, New York: Routledge.

was set through the elements of the defined anchored physical space, in the white, taped-out square - and the a-temporal experience of wandering the limitless, shifting virtual mediascapes. One experiencer commented,

I entered this constructed space with a real sense of anticipation and excitement – there was something about the white taped square that defined – framed – my own bodily presence. (Digital Spaces showing – December 2013)¹⁴⁶

This liminality also extends to the audience's role in a participatory context of the artwork, but I will expand more on this in the next section of this chapter.

Both the experience of temporality and the complexity of actual-virtual experience have been common, re-occurring conceptual frameworks emerging from my practical work. The creative process, being one located between the more conventional/traditional practice of composing in sound and image yet compounded by the digital nature of that media and the development of both technological and interactive contexts, has positioned my work to dispose certain dislocations and liminality in experience. Our sense of time conditions many aspects, and predicates our understanding, of experience. In creating work within the context of technologies that dispose themselves to renegotiating more conventional understandings of time, space and 'reality' a substantial portion of my praxis has been concerned with addressing these ideas as the main concerns of both a theoretical-critical framework and as the embodied experience of the work as a whole. I will talk more about the 'composition of experience' in the final section of

¹⁴⁶ Collected responses from Digital Spaces work-in-progress showing December 2013 – see Appendix Three for responses – Jane Linden.

this chapter, however, it becomes clear that in composing and constructing in digital software that the reflexive nature of the process – where the media content takes on aspects of the technological form and vice versa – engenders experiences and conceptual resonances of what it is to ‘experience’ by instantiating subtle disruptions in our understanding of it. *Digital Spaces*, for instance draws the user’s attention to the complex relationship and divide between the virtual and actual realities they explore, to their own role as author or experiencer, and to the materials they use in constructing this experience in the non-linear and dispersed temporality (temporalities) they explore. Most prominently, my work disposes itself to provide perspectives on the constructions and interplay of elements which constitute our contemporary digital existence and experience. Temporality and the abandonment of a singular, definitive reality where the virtual and actual can be successfully divided are foremost critical issues in constructing a creative practice in this context and across compositional/technological fields.

Section 3: In what ways do digital-intermedial frameworks mobilise dislocations in authorial and audience roles in interactive contexts?

In contemporary music and arts practices the previously distinct roles of author, composer and performer have become increasingly conflated, catalysed by the use of computer technology. (Harris and Bongers 2002:239)¹⁴⁷

There are many areas of my practice that mobilise dislocations between conventional audience-author roles – not least that of interactivity. I define such ‘dislocations’ as any instance, circumstance or process of audience encounter with an artwork that extends beyond that of spectating and experiencing a work in way that requires the audience to perceive or consume what the author has presented or produced.

However, in inspecting my own processes and the composite aspects of my practice it seems clear that each area: composition, interactivity, digital technology, dispose themselves towards disrupting a more traditional conception of author-to-audience message, artwork functionality and circumstance for consumption/spectating.

In creating my work I was constantly considering my role and that of the audience - this aided me in framing my work, less so to explain it to others, but to understand where I could locate and conceptualise my practice. Participation has a long history in the arts which I will briefly refer to later in the chapter. It is, again, in composition, however, that my earliest awareness of audience-author roles became apparent to me – most likely as I was in fact ‘authoring’ at that stage, in a traditional sense, more so than at any other time . However, locating the beginnings of audience-author relationships extending beyond a unidirectional author-to-audience ‘message’ situation is not so straightforward. Interactivity and digital technologies share agendas of

¹⁴⁷ Harris, Y. and Bongers, B. 2002 *Approaches to creating interactivated space, from intimate to inhabited interfaces*. In *Organised Sound* 7(3) Cambridge University Press

democratisation in information, experience, and the practice of, what could be described as, 'prosumption'¹⁴⁸. Yet within composition the specifics of *what* the audience will experience, as opposed to the *how* (which is conditioned by the construction of the technological/interactive frameworks), is set by the author. It is the interaction of the *what* and *how* as the artwork itself that pre-disposes a certain *kind* of experience to an audience. The reflexive process of developing both technological and compositional aspects has already been documented in this thesis, however, analysing the forms, dialogues and the broader conceptual implications of my methodology will allow me explore my practice in greater depth and identify how specific 'dislocations'/problematics are constructed.

Composition: Moment form, Meta-Composition and Temporality

Here I will draw on two methodological concepts from a mostly musical lineage that have come to be relevant and functional in both practical and analytical ways in addressing specific processes and frameworks of my compositional practice. Moment form is a music composition process whereby small fragments of music, typically composed by the author, are used via systems of indeterminacy to compose larger works. It could be argued that moment form was a continuation of Serialism's aim to disrupt functional harmony and challenge the hierarchical structural relationships that had become embedded in traditional tonal music. It is a concept that became significant in reflecting on my compositional practice as its use of fragmented form and emphasis on temporality (disrupted in the same way as functional harmony in this framework), share links with numerous other elements of my practice.

¹⁴⁸ *Prosumer*: a term coined by Alvin Toffler in his 1980 work *The Third Wave* and now often used in reference to Web 2.0 technology whereby the line between consumer and producer has blurred.

Notably, the disruption of singular conceptions of temporality as its use as material for form returns as an important structuring and conceptual framework.

Every present moment counts, as well as no moment at all; a given moment is not merely regarded as the consequence of the previous one and the prelude to the coming one, but as something individual, independent and centred in itself, capable of existing on its own. An instant does not need to be just a particle of measured duration – can make a vertical cut, as it were, across horizontal time perception, extending out to a timelessness I call eternity. This is not an eternity that begins at the end of time, but an eternity that is present in every moment. I am speaking about musical forms in which apparently no less is being undertaken than the explosion – yes – even more, the overcoming of the concept of duration.

(Stockhausen 1972:120 –122 quoted by Helsinki, cited in Kramer 1978)¹⁴⁹

The characteristics of moment form, as Stockhausen defines it, are similar to polyvalent, mobile or aleatoric form, but he differentiates the term from these other indeterminate techniques through an emphasis on the temporal qualities and the conception/perception of their relationship with temporality. In *Digital Spaces* this form operates in its use of media as video loops (moments) responding to the location of the user. The audience-user enters a media zone triggering the appearance of a new video segment which could be at any point in its loop, yet there is no set narrative and therefore no set beginning (start) or end (stop) point for the video media. The user decides when each moment will cease by moving out of the zone, typically after experiencing a loop point. Composing these video loop forms afforded the possibility to create an experience that ‘overthrows the temporal concept’, and concept of duration, in Stockhausen’s terminology, yet allows both to

¹⁴⁹ Stockhausen *Texte I*, p. 99, trans. Seppo Heikinheimo in his book *The Electronic Music of Karlheinz Stockhausen* (Helsinki, 1972: 120-21. Found in Kramer, J (1978) ‘Moment Form in Twentieth Century Music’ in *The Musical Quarterly*, Vol. 64, No. 2 177-194. Oxford University Press

exist in a subverted form. The fragmented, ‘moment’ form of the composed video material in *Digital Spaces* is disposed to function within interactive systems, such as that identified by Manovich (database narrative). This opens compositional practice to constructing work that is based less around cohesive messages and based more around interconnected signifiers. Rowe suggests that:

Interactivity qualitatively changes the nature of experimentation with compositional algorithms (Rowe 1993:2)¹⁵⁰

The significant emphasis that Stockhausen places on the temporal aspects, or the ‘overthrowing of the temporal concept’ rather, of moment form connotes both a willingness to explore and subvert an audience’s experience of the ‘composed work’ in a general sense and, perhaps, problematise the notion of what it is to construct experience in time. By affording the user control of time itself and the possibility for them to manage and experience multiple areas of temporality, the author-composer essentially relinquishes one of the most significant tools for communicating meaning in creative practice. Communication is after all based heavily in temporal frameworks – for example the order of words in a sentence (syntax) affects meaning to its most fundamental level. Such democratisation of temporality via moment form is exemplified in *Digital Spaces* as the user may not have control or any choice in terms of what content is used in the work they do have more *input* into *how* and *when* they experience the different fragments of content. The resonances and connections are ultimately the audience’s to make as they control the *conditions* for experiencing the pre-composed and live content output. It is worth noting that works such as of John Cage’s

¹⁵⁰ Rowe, R (1993) *Interactive Music Systems: Machine Listening and Composing*. Cambridge, MA: MIT Press

'Number Pieces',¹⁵¹ Henry Cowell's *Mosaic Quartet* (1939),¹⁵² and Earle Brown's *Twenty Five Pages* (1957),¹⁵³ amongst others, from the thirties to the sixties utilise open temporal, or temporally disruptive, compositional forms predicate the exploration of this idea in my compositional journey – for example Cage's sections without content that focused on brackets, or set durations of time. However, the distinction here is that, in the case of Cage, his use of time was often an important structuring element of many works,¹⁵⁴ his collaborations with Merce Cunningham in particular, and constructed time boundaries within which the performer was given a framework to improvise or realise an indeterminate process.¹⁵⁵

'There can be no right making of music that does not structure itself from the very roots of sound and silence - lengths of time' (Cage in Kostelanetz, 2003)¹⁵⁶

This is essentially the inverse of what moment form offers – as dealt with in the context of my research. Moment form offers the dissolution of duration as a composed element, either by author or further indeterminacy, and the mobilisation of temporality as a form with which

¹⁵¹ A selection of works titled with numbers, as such – 'number pieces', Composed over a period of six years, the first being *One* (1987) and the last work, '*Thirteen*,' composed in May 1992. The numbers refer to how many performers each piece needs and feature a number of fragmented sections to be performed either for set or flexible durations.

¹⁵² Cowell, H. (1939) *Mosaic Quartet*, String Quartet No. 3. – was a collection of five movements with no pre-ordained sequence. See The Colorado Quartet & Musicians' Accord (1999) *Henry Cowell - "Mosaic": a collection of chamber works*. [CD] US: Mode

¹⁵³ Brown, E. (1957) *Twenty Five Pages* for 1-25 Pianos was a collection of twenty five loose pages for piano which could be re-arranged, and performed in any order by performer. The staves also had no clefs so that the pages could be oriented however the performer wished.

¹⁵⁴ It is worth stating that I do not believe Cage privileged set durations in all his works, simply that in many, typically collaborative pieces, that such devices served to provide much needed, yet minimal set parameters for works to start and end. See Schleiermacher, S. (1997) *Twenty-Five pages*. [CD] Germany: WERGO

¹⁵⁵ Notably Cage's 'time length' pieces including 4'33, 34'46776 for a pianist, 27'10.554" For a Percussionist, and 59½ seconds.

¹⁵⁶ Kostelanetz, R (2003) *Conversing with Cage*. 2nd Edition Routledge p.81-2

the audience or performer can compose further in conjunction with set or improvised content.

In fracturing time and giving it, piece by piece, to an audience to construct personal, individual resonances, meanings, structures and form liberates compositional practice from the exclusive ownership of the artist – yet it also begets complex meta-relationships between both parties and the work of art itself as what could be seen as a meta-practice or meta-composition.

Meta-Composition

In their 2002 essay, *Pikapika – the collaborative composition of an interactive sonic character*, Tomie Hahn and Curtis Bahn describe the notion of a 'meta-composition', one that emerged from writings on Harold Cohen's work with computers and the processes of art and programming,¹⁵⁷

Two basic criteria for meta-composition that serve to differentiate it from other musical structures are:

1. The interpretation of a meta-composition creates musical structures that will differ structurally in each instantiation, as a result of dynamic processes.

1. As opposed to meta-art, the realisation of a meta-composition may be carried out by humans and/or technology."

(Bahn, C. and Hahn, T 2002:235)

Meta-composition describes a process of creative practice that essentially encompasses both the technological and compositional elements I have thus far segregated under one broad term – something I intimated as being possible in the beginning of Chapter One. It has

¹⁵⁷ See McCorduck, P. (1991) *Aaron's Code, Meta-art, Artificial Intelligence, and the Work of Harold Cohen*. New York, NY: W. H. Freeman and Company.

served me well thus far in exploring my own work to differentiate both the technological and composition practice and focus on their complementary, but distinct dialogues. However, in light of exploring interactive contexts and author-audience relationships the notion of meta-composition provides certain advantages and conceptual links in relating these elements.

Bahn and Hahn note on the lineage of meta-compositional practices which owe much to ‘the history of algorithmic composition’ from Mozart’s *Musikalisches Würfelspiel* (Musical Dice Games) to John Zorn’s *Cobra* game. The algorithmic/aleatoric nature of these compositions, as Hahn and Bahn note, are relatable to game structures. While it is not necessary to focus on this too much here, or return to gamification, it is poignant that games predispose users to both *play* and *participate* in the indeterminate realisation of a set process within certain parameters. However, the use of meta-compositional structures in digital-interactive contexts can facilitate the immediate and dynamic manipulation of the internal compositional elements (the ‘moments’ in moment form/the fragments of content) by the user-experiencer – affording control of what, in the game analogy, would typically be a ‘set’ process.

The stipulation of the meta-composition being that the musical result is structurally different in each instantiation... When realised with real-time computer systems, the meta-composition becomes a dynamic interactive structure where compositional relationships are realised instantly... (ibid)

As such, the process of composition is, to a degree, opened up to a participating audience-user via the system to dispose new combinations/arrangements of set elements for further construction by the user. In feedback, the experience of this process appealed to may

users and the opportunity to compose 'unique' arrangements and experiences was a compelling aspect of the work:

...and whilst I was aware that the hypertextual material was not infinite – that there must be patterns – I enjoyed the possibility that my own compositions might not be repeated.
(Digital Spaces showing – December 2013)¹⁵⁸

The construction of such meta-compositional forms that develop reflexively in both compositional and technological contexts, and compounded in interactive contexts, affords further compositional actions *as* engagement with the work. In some sense the author of the work composes so that the audience-user can compose further:

A 'meta-composition' is a compositional structure that itself composes, or facilitates compositional/performance. It can be a construct of media, oral/aural transmission, and/or electronic technology. The meta-composition informs conventional musical activities, such as composition, improvisation or performance, yet it does not prescribe a specific time-based musical entity. As with composition, meta-composition is both an abstraction of a musical idea and an activity; a noun and a verb. (ibid)

Outside of a musical context, it is a focus on the participatory and the interactive that also defines meta-compositional practices and, as Hahn and Bahn note, when 'realised with real-time computer systems' the significance of a digital context becomes apparent. The focus on the 'verb' as well as the 'noun' of a meta-compositional work – the actual 'doing', the participation of it - is further amplified when contextualised in the digital.

¹⁵⁸ Collected responses from Digital Spaces work-in-progress showing December 2013 – see Appendix for responses. See also DVD Appendix recordings for Digital Spaces – many users commented on the scope of the work and chance for them construct their own experiences as the focus for them in the work,

'Meta-composition' is a term that grows out of the concepts of 'meta-art' and 'meta-mediums', the difference being the inclusion of interactive social structures for music-making, as opposed to the view of meta-art being primarily an autonomous system. (ibid)

Within the composition/construction of digital technologies – more broadly, software developed for creative arts practice – there is commonly a social, participatory predicate inherent to this area. As Bown and Elderidge, note on such complementary practice:

This social element is evident in the popularity of computer music systems, such as Max/MSP, that maximise the potential for sharing objects at different levels of utility and complexity via mechanisms for easily organising and structuring components. This is by no means limited to music, but is an essential feature of all modern software development. (Bown and Elderidge 2009:192)¹⁵⁹

Meta-compositional/interactive frameworks, and their complimentary methodological forms, such as moment form, are, like digital circumstances themselves, implicitly based in connected and networked structures thus disposing themselves to propagate social and participatory forms of engagement, distinct from closed systems or those with singular, set meanings, outcomes or perspectives. Consequently, traditional author-audience roles become problematic and somewhat jarring in such settings. I experienced this in showing a work-in-progress version of *Digital Spaces* in which I constructed an additional, separate narrative element for the work – the result of which was not at all how I envisaged it. For this version of the work I filmed a series of first-person perspective videos, all scenes were seen through the eyes of a character I had created called 'the User', and depicted a variety of quotidian, everyday events including making a stew, taking a bus into town and having a number of conversations with a friend. The

¹⁵⁹ Bown, O. Elderidge, A. and McCorkmack, J. 2009 *Understanding Interaction in Contemporary Digital Music: from instruments to behavioural objects* Organised Sound 14(2) Cambridge University Press p 192

concept was such that in order to ‘progress’ through the work the audience-user must locate these ‘real’ scenes – differentiated from the re-appropriated digital media videos in their relative quietness, actual reality subject matter and first person perspective (often you could see the hands and body of the character through their eyes) – and so trigger new mediascapes/ a new set of mapped-out video media. Essentially, in wandering into a new zone in the demarcated, rectangular space and finding one of these real ‘memory’ scenes, the user would trigger a new set of video spaces. Most of them would be the digitally-based, internet scraped¹⁶⁰ material that makes up the majority of the content but within that new space would be another one, sometimes two, key scenes depicting ‘the User’s’ life leading down different ‘paths’. Each key scene was related to the others but had no specific ‘story’, continuity in time, or message to communicate other than to draw user’s attention to the relationships between the actual and virtual. Despite this ‘narrative’ element being open, feedback suggested that the user-audience found this element to be encroaching on their own role as ‘the User’. The idea of having an authorial presence, one which sidelined the audience’s experience as second to that of a character, was distracting and generally felt to be incongruous. Conversely, the audience commented that they enjoyed their experience¹⁶¹ of the ‘purely-interactive’ aspect of the work and their encounters with the more ‘open’ digital content. They felt this experience was imposed upon when encountering the ‘real life’ experiences I had inserted and even though none of those clips added up to a narrative or specific message, within *this* open framework I had

¹⁶⁰ Scraping is coding process of pulling online data, images - general media from online sources to offline/ separate platforms like applications.

¹⁶¹ See Appendix for comments and feedback on *Digital Spaces* – (See DVD recordings) Interviews 2 and 3 both testify to the awkward authorial presence of the character I had inserted and that the focus of the experience was their own experience and journey as the main ‘user’.

constructed, even a slight authorial presence seemed to confuse the experience as a whole.

This compounded practice of interactivity, digital circumstances and techno-compositional methodology (meta-composition) disposes a framework whereby social, participatory, networked principles are deeply ingrained in the foundation of each element: a setting in which two-way communication and collaborative discourse is privileged. Therefore, author-audience relationships are inherently subverted from traditional ‘top-down’, one-way instances of creating and experiencing work in this context(s). In *Digital Spaces*, the audience and author roles are not simply in a state of divided labour – in which the author allows the audience to *realise* the work, nor is it a participatory experience where the specific ‘doings’ and actions of the user *make* the work in content and form. In my role as author in *Digital Spaces*, I was both composer and architect/facilitator in that I set at play elements which an audience had the possibility to construct or compose their own work, but at the same time the experience of that composition formed, or rather located, the work itself. The possibility to consider the potential for the ‘death of the author’ in Roland Barthes’ terms, is intrinsic to each component of the practice and as such permeated every aspect of the work created within it. It is reasonable then to say in trying to instill an authorial presence in the work through open narrative, my mistake was not wholly one of trying to dictate experience or meaning but the consequential subversion of an open, intertextual experience through instigating the possibility for progress. While this has implications for some of the ideas relating to temporality as covered in the previous sections of this chapter (and revisited in the next), there is a corresponding link between the lack of need for progress and the subversion of author-audience roles in digital-interactive and their meta-

compositional frameworks. A useful analogy would be that it is the difference between being allowed to take your own *journey* via multiple, networked routes – giving equal precedence to the experience of travel and the arrival at a destination (a wandering) – and being *transported* from A to B by a guide. The journey, the experience itself, is the locus of the work, and as such is why author-audience roles are often subverted through these contexts and methodologies. In this context, composing an *experience* becomes the main concern for both author and audience.

Section4: In what way, and to what degree, can (composition in) digital interactive frameworks facilitate the composition of ‘experience’?

I have always been interested in the user-audience's experience as a locus for the artwork itself. Experience is a transient and ephemeral concept that exists beyond the physical 'work' or set text. A specific experience is, however, a complex thing to construct outside of a traditional author-audience relationship in which the author communicates his/her 'message'. However, often the individual resonances, intertextual readings and emotional responses to a work that are peripheral the author's intended message become the focus for a reader or experienter.

It may be that I do not actually compose experience in the sense that I have total control of media, the audience, and the interaction of the work. I do, however, compose the elements that dispose this experience, and that in total create a framework or circumstance for a user to have a specific *kind* of experience – which I differentiate from composing to create a specific *work* or pre-determine an authorial message. It is in the abandonment of the 'message' as an authorial concern that the experience, aided by digital-interactive contexts, that becomes the main compositional focus. It is the specific arrangement of these composed elements, as a form of meta-composition, that I aim to detail to articulate my use of the term 'composing experience'. In beginning to consider how the composition of experience may emerge it is worth commenting further on the relationship this concept has to the notion of 'levels of interactivity' in different works and the specific author-audience relationships. Each instance cedes and reserves different modes of authorial and audience control to realise the work and presents different levels and types of interactivity, and thus different types of experience. *Inter-activity* sets up a framework and interface for users to generate content within certain hands-on interactive parameters. Conversely *Digital Spaces* affords the user-audience the

opportunity to experience content through a more ‘passive’ mode of interaction (their movement in the space) but possess a greater potential to dispose a more “meaningful” experience.

It is ‘more meaningful in that it exceeds the initial novelty brought about in *Inter-activity* and steers clear of putting the user in a situation where they become pre-occupied with the action of interacting itself. In gathering written feedback from a work-in-progress version of *Digital Spaces*, levels of engagement/interactivity was identified as being a central part of the experience itself,

*Flipping from one level of engagement to another became part of this rich experience: The composition of the elements, the technical construction, and how this all functioned in the space would capture my attention and then the content of some of the video footage – both quotidian and disturbing – as well as mystifying in places – would arrest me, leading me to contemplate certain real world issues and moreover the reasons why they might have been selected by the artist. (Digital Spaces showing – December 2013)*¹⁶²

In speaking of experiences that are ‘more meaningful’, it might be argued that if I intended simply to give to the audience a specific experience why not simply remove the interaction altogether? However, it is the mobilization of specific elements in play that afford the possibility of the user-audience creating personal, meaningful experiences. In the interest of clarity I will revisit some of the differences between *Inter-activity* and *Digital Spaces* to further define what I mean by ‘more meaningful’ – or why one system was ‘successful’ and the other was not. The frameworks in *Inter-activity* and *Digital Spaces* are very similar but the audience has a different kind of control in each work. While the audience is effectively put in the same position and afforded the same kinds of things (they can experience and manipulate

¹⁶² Collected responses from Digital Spaces work-in-progress showing December 2013 – see Appendix Three for responses.

different media via their input) trade-offs are made in relation to what the interaction affords in terms of experience. In both works, the audience has the control to change what he/she sees and hears and in both instances these elements are not sign posted or explicit (to see/hear this do this/that action). The distinction between the levels/modes of interaction comes down to not *what* is interactive but *how* it can be interacted with. In *Inter-activity*, the content was abstract and open – the media was designed to be non-linear and pre-disposed to engender an immediacy in interactive affordances. Yet, the work had little in the way of A. a discernable objective and B. complex levels of engagement leading to a conceptual richness. This is something *Digital Spaces* did possess, and is the key to creating ‘more meaningful’ experiences – or what I would refer to as greater ‘depth’.¹⁶³ Ultimately, the system’s success in disposing certain kinds of experience must be determined by a balance between ‘depth’ or conceptual richness and repeatability and functionality. *Inter-activity* lacked both of these elements – perhaps because one is only possible through the realisation of the other. The functionality and interface ‘control’ was unreliable and actions were not easily repeatable. As such, the act of interacting became the focus of the work – not the sound or images as I had imagined. In exploring ways to engineer a balance between affording dependable interactivity, depth of experience and not allowing the interaction to pre-occupy the user (to become a barrier) I settled on reserving more control over content in *Digital Spaces* and affording a more subtle means of interaction by removing the device-object interface and using motion tracking cameras. As previously discussed, I created a more interactive

¹⁶³ Referring to *Digital Spaces* showing comments – *I entered this constructed space with a real sense of anticipation and excitement – there was something about the white taped square that defined – framed – my own bodily presence.* (*Digital Spaces* showing – December 2013)¹⁶³ See Appendix Three

(in that clear turn-based, sequential cause – effect chains formed the basis of the experience), objective-based version of *Digital Spaces* using an early version of the LPS decision tracking system. Yet, despite this version of the work being structurally sound and making sense in the context of a digital system, a great depth of interactivity does not always add up to a valuable immersive experience and this process exemplifies that principle. My own struggle in creating suitable systems for engagement runs deep in interactive system design and further still in the nature of digital technologies and their intangible existence in virtual ‘realities’.

Composing Experience - Composing Affordances

Digital technologies implicitly necessitate an engagement on the part of the artist-creator with *how* an audience will realise their work in the real world. Composing media from within virtual abstract environments which can translate into sensorial realms in other mediums becomes a chief concern in developing any work in digital-interactive contexts. This process marks the beginning of developing how an audience experiences a work – whether this begins in designing graphical user interfaces (GUIs) or plotting the transcoding of data sources between digital and actual (haptic) environments/interfaces. Holtzman offers that computers are in fact meta-mediums creating systems as meta-representations. He posits that:

Within the computer itself, in fact, there are only abstract structures, ultimately the computer must realize its 'constructions' in some medium to enable us to interpret the abstract structures it has created. Computers construct abstract representations - abstract structures - that can, with appropriate rules, be mapped onto any number of different media... The representations maintained in the computer in some abstract form can, in a sense, be thought of as a

metamedium. The representation within the computer is not the medium for its realization. It is an abstracted form - a meta-representation - of the structures that will be realized in some other medium...to a form experienced through the senses for human interpretation. (Holtzman 1996: 215-216)¹⁶⁴

For the author in interactive settings the relationship of the audience-user to the sensorial modalities of the work's physical media becomes a key compositional consideration. The development of software presents us with the notion of a designing a UI, the front-end experience of the programme or application – digital-graphical or actual. The notion of affordances, something I have referred to a number of times so far in this thesis, and their composition, as a part of my practice, opens a direct dialogue between the author and the intended experience of the work as affordances essentially dictate what can and what cannot be done, acted on and experienced in a given interactive situation. In the context of my own practice I have come across two kinds of affordances: those within the context of digital media and their mappings and those which the user encounters to perceive the finished work. I have detailed the notion of mappings in Chapter One but, for reference, this process is a considerably more complex process than for example, creating a film, animation or visual and composing music to accompany it. This is down to the impact of the multiple affordances and augmentations of each media being dictated by its unique modalities: their specific medial affordances (as seen in Elleström's model in Chapter One 'Mapping and Media Modalities in Media Contexts p. 34). How those modalities can be mapped together/set in dialogue, how the work may manifest as an experience for an audience and user and what format they will assume (for example – ported to, or extended, into the physical realm through hardware or a relational-

¹⁶⁴ Holtzman, S. 1996. *Digital Mantras*. Cambridge, MA: MIT Press pp 215-216

interactive space through user-dependency or initiation) can greatly impact the work's content and form.

In his 1977 essay, *The Theory of Affordances*, James Gibson defines affordances as agents for possible actions in the environment or as physical objects e.g. buttons to push, chairs to sit on, handles to turn – it is argued that obvious affordances indicate good design.

The affordances of the environment are what it offers the animal, what it provides or furnishes either for good or ill. (Gibson 1977)¹⁶⁵

As such, designing interactive, intermedial works in digital technologies presents many layers of complexity in relation to affordances. The numerous augmentations and possibilities for manipulating media as an affordance of digital circumstances begets the circumstances for multi-modal, multi-sensory and cross-media interaction. The affordance 'logic', as it were, often becomes considerably more complex and less clear to a user in digital circumstances. The challenge of creating such logic and interface usability becomes a prominent concern in composing experience in digital intermedial and interactive contexts.

Throughout the process of creating interactive work I have always maintained the notion that interactivity is only a *means* to experience, it should not be the experience itself. To clarify, there is most certainly an experience in interaction itself, but I have never intended it to be the focus of the work. I have always intended that the experience of a work be *facilitated* through the affordances interactivity offers the user to disrupt, re-arrange, personalise, and, ultimately, *compose* an

¹⁶⁵ Gibson, J.J. (1977) *The theory of affordances*. In R. Shaw & J. Bransford (eds.), *Perceiving, Acting and Knowing*. Hillsdale, NJ: Erlbaum.

experience. Creating a framework that delivers a specific kind of experience is key and such disruptions, re-arrangements and personalisations occur in the (inter)medial relationships and the resultant media forms that an interactive framework can provide through manipulation input and points of control – through designing affordances. My work *Inter-activity* (2011), had a large learning curve for an audience as much of the experience was based in figuring out *how* to interact with the work - notably, exactly *what* was afforded to the user. The physical object/interface of the globe, an object which already has defined affordances and a common use language, was digitally ‘augmented’ in terms of functionality, such that it afforded the user the manipulation of both an aural and visual environment. The physical affordances of *Inter-activity* were clear as they were grounded in an audiences’ understanding of how to use an atlas globe. Yet, as mentioned many times thus far, the music and visual manipulation that arose from turning the globe were a. not reliably repeatable and b. visibly related to the physical action of triggering the media to achieve satisfaction/comprehension of cause and effect principles. This was compounded by an ambiguous relationship between the sound and visuals. The affordances of the work as an interactive whole were diminished through these obfuscated cause-effect relationships between affordance and the resulting interactivity. The existing affordance ‘language’ of the globe did not correlate to the digitally augmented affects of that action, thus the interaction, and consequentially the overall experience, became confused.

A prominent concept in conceiving *Inter-activity* was that it would afford the possibility or a ‘vantage point’ to perceive certain conceptual dialogues at work in a digital environment through the user’s exploration of inter-connecting media i.e. communicate a sense of Auge’s non-place

– recontextualised as a *digital* non-place. This was not fully realised for the reasons mentioned above but the relevance of this position within the broader context of interactivity and the ceding of authorial control has provided me a perspective on how these elements (interactivity, the ceding of authorship and affordances) contribute towards the notion of composing experience.

It became apparent that much of what affordances offer is a point of reference or the locating of the user at a specific position within the work in a given use context. The interaction within *Inter-activity* exceeded a purely cognitive meshing of media forms through an emphasis on the physical-actual domain extending, or being bridged, into the virtual through the object, locating the user at a specific point in the work. The ability to engage with and affect structural relationships in and between the music and visual content in the virtual world marks a distinctive experience situating an awareness of the audience's position as part of the work, informing the experience and differentiating it from similar, non-interactive, sound and visual form combinations. As such, the beginnings of composing a framework that privileges experience-over-object (or artwork) can be set. Locating and positioning the user within certain boundaries and potentials is key to disposing kinds of experience that the user is situated *within*. It is worth returning, in this new context, to the words of Lovejoy that the early parts of this thesis drew upon,

With interactivity, readers, viewers, listeners can pass through the boundaries of the work to enter it. This puts them in a position to gain direct access to an aspect of authoring and shaping the final outcome of a work in that has never existed before the advent of the computer.
(Lovejoy 1997)¹⁶⁶

¹⁶⁶ Lovejoy, M (1997) *Postmodern Currents: Art and Artists in the Age of Electronic Media* 2nd edn. New Jersey: Prentice Hall

In developing *Digital Spaces*, a number of objectives were set in reaction to the failures and confused interaction in *Inter-activity*. I aimed to:

1. dispense with a physical interface - primarily to aid a more immediate involvement with the work.
2. ensure that the experience of work was not the *act* of interaction itself - due to bad design, unclear relationships between input and effect or intermedial dialogue i.e. how the sound and image are related to one another.

In choosing to have no physical interface I felt I could avoid many of the problems I encountered in *Inter-activity*. The chief means of interaction with *Digital Spaces* is via a demarcated white square space on the floor – above which the motion tracking camera transcodes the location of the user from real space into the virtual mediascape. The user needs only to walk within the confines of the real square space to explore the analogous digital space and discover the media within each zone – shown on the user interface ‘map’ (see fig 3.8).

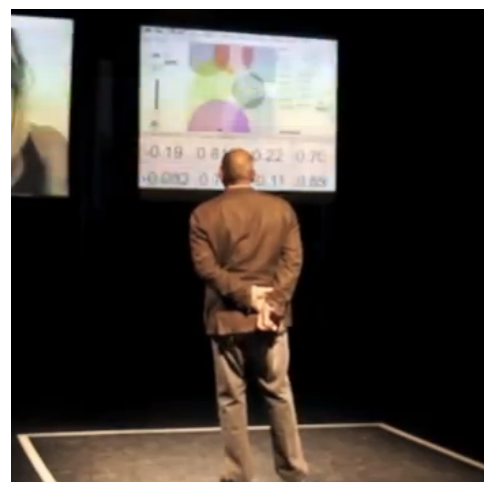
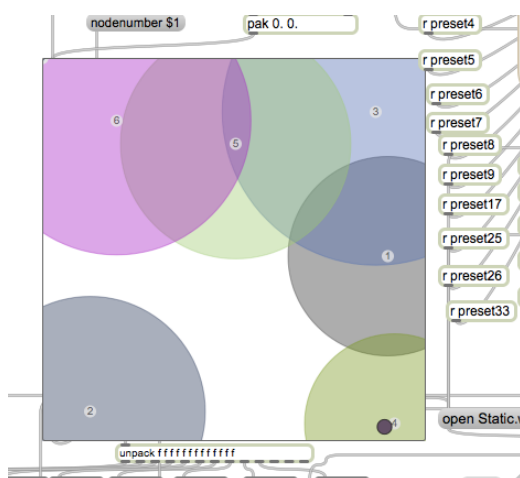


Fig 3.8 the node ‘map’ showing the user their location in the virtual space and the white square in actual space.

With such a minimal physical interface it may appear that the affordances are fairly limited. However, the result was such that in limiting the physical affordances, those obvious to the user, the functionality of those affordances from the actual to digital environments was improved and became considerably more focused and effective. The only affordances available to the user were that of exploring the boundaries of the white square space on foot. However, due to the corresponding virtual space being mapped (literally) to be a representation of the actual space, the affordances function in a complementary way. In *Inter-activity* the globe had no corresponding functionality between the actual-physical interface and the digital-virtual media results of that interaction. Additionally, both works differentiate themselves from one another through a similarity in function. Both works draw upon the notion of existing affordance languages in other existing objects. *Inter-activity* utilises the existing object itself and re-appropriates the language of the globe atlas. As mentioned, this was intended to provide familiar affordances to aid the user's immediate interaction. However, as already described, this was unsuccessful due to the dislocations between input and output. In respect to the way in which the media blends into the non-space areas - the distorted, transmission sounds enter – the effect is one *similar* to tuning a radio and searching through stations¹⁶⁷. However, the process is designed to be only *like* a process the user is familiar with, such that the operation of the work, the interactive language, has precedents that an audience can relate to. As such, the user-audience can spend less time trying to figure out how to 'play' the game to effectively experience the work. In *Digital Spaces*, I realised that in using existing affordances in interactive design the success of these affordances drew less on the objects

¹⁶⁷ Something testified to in the discussion/questions after the showing of the work in progress version of *Digital Spaces* – supporting Appendix DVD One material - seminar (at 39 minutes)

themselves but in accurately *referencing* the action or language. *Digital Spaces* only references the affordance functionality of a radio in a different (digital) context with different physical-actual affordances. This again underlines the notion that it is not what is interactive but *how* it is interactive – therein lies the core issue, the great importance, of designing affordances as a foundation for experience in digital contexts.

In interactive contexts, affordances not only create entry points, or ‘bridges’ and areas of control between the actual and virtual, but also dictate how such works are experienced. Composing the right affordances for an interactive work is as important as the conceptual framework or the content. This often dictates how an audience encounters those elements thus conditioning the overall experience of the work. Many of the works I have considered to be to be unsuccessful have revealed inconsistencies with affordances – as in *Inter-activity*. It is my claim that the composition of affordances is a significant element in the composition of experience in digital interactive contexts. In setting what actions can be taken, and how, the author defines one of the most fundamental elements of engagement. It is, however, within the negotiation between what actions are possible and how the system interprets them, which includes the content and form, that the user-audience constructs their experience of the work. Engaging with the elements that the author has set at play via the affordances constructed for such a purpose comes to define interactive settings. However, composing or constructing affordances does not by definition equate to the composition of an experience in its entirety. It does, however, seem to pose the possibility for commencing the process and act as a foundation for its realisation. There are numerous other concomitant elements within the broader field of interactivity and digital contexts that

contribute towards a more complete sense of composing experience in dialogue with the concept of affordances.

Temporality - Experience

As discussed, interactive-digital frameworks beget the circumstances for altered, and multiple, perspectives on time and temporality. In my own work *Digital Spaces* the structure of the system and form of the content came to be defined by the looping and fracturing of distinct, networked nodes of media. This fragmented form and content, a symptom of both the interactive context and the compositional methodology of 'moment form', implicitly renegotiates perceptions of temporal experience. In revisiting the concept of the 'New Temporality', coined by Manovich and since drawn upon by Rayner and Bay-Cheng to analyse the functionality of time in digital media contexts, the re-ordering and fracturing of temporality, as mentioned earlier in this thesis, has seen time used as a compositional material. In the context of audience-author roles, I have considered a notion of 'democratising time' from one set by the author in creating a work (duration) to one given 'piece by piece' to an audience-user. This has two main implications. Firstly, the time in a work is no longer the sole 'property' of the author (to be set as duration), and secondly this becomes agency for user-audience to construct experience as it is only *their* experience of time that matters.

The 'democratisation of time' and temporality implicit to interactive contexts, and moment form compositional techniques, beget further circumstance for the composition of experience. In fragmenting temporality and creating circumstances where the renegotiation of temporal perception is obligatory, it seems logical that the fundamental elements of 'experience', in a broad sense, are implicitly disrupted and

predisposed for renegotiation too. For example, in *Digital Spaces*, the media is arranged in small fragments, each looped and characterising distinct pockets of time. The work as a whole holds no duration or single temporal progression and, as all experience is generated *in* time, each fragment of media with its distinct temporality become the basis for constructing a broader sense of temporality and, as such, experience *by* the user-audience. The focus then, compositionally, becomes less concerned with composing a work with a duration – a temporality, and thus an experience that is set by the author – to one focused on providing the possibility for a user-audience to renegotiate and shape the temporality, or ‘duration’, of the work themselves, and thus shape their own experience. However, in breaking the fundamental agents of experience down to manageable elements in this way the notion of composing experience becomes more complex.

In revisiting the compositional process of moment form and meta-composition, the fragmentation of time in moment form becomes the basis for the broader democratisation of systems for composition realised in a meta-compositional disposition to facilitate participatory forms of engagement and ‘social’, open structures. These frameworks predispose a system of composition that facilitates further composition, ‘a compositional structure that itself composes, or facilitates composition/performance’: a methodology and an act, a noun and a verb. In feedback from the user/audience members one experimenter noted,

At once I became a manipulator of this work – aware that other audience members – standing outside this square and watching the screens – would need to see me as a conduit of possible compositions...

(Digital Spaces showing responses– December 2013)¹⁶⁸

¹⁶⁸ Collected responses from Digital Spaces work-in-progress showing December 2013 – see Appendix Three for responses.

For example, in *Digital Spaces*, the system disposes different structures/arrangements of video media which the user is free to experience – a meta-compositional process. The material itself is composed similarly to the description Stockhausen's moment form in that it is fragmentary and has no specific duration with no certain end or beginning, as it is looped. As such, the composition of experience in this temporally and creatively 'democratised' context becomes the activity of both the author *and* user-audience.

Viewed as a broader practice methodology, the numerous elements and notions of fragmented temporalities, (moment) compositional forms, interbraided compositional-technological practice (meta-composition) and interactive digital contexts, and their dialogues, have direct implications to the 'composition of experience'. The complexity of these dialogues and interrelated elements, however, appropriately displace archetypal notions of composition from the arrangement and setting of elements by an author to the dynamic, compounded dialogues between author-audience roles, user-affordances, digital intermedial mapping/contexts and structural characteristics in content and form (conditioned by digital technologies).

The degree to which the composition of experience is possible lies not solely in the hands of the author, as the elements that dispose the possibility for this process complicates both the notion of the authorial role and that of composing itself. All elements of my practice, to some degree, have been characterised by attention to democratisation, the participatory, the networked and shared. So too has the practice of composition. Undoubtedly, as an artist/author, I set specific structures and compose with (digital) media in a traditional sense – but the locus of the work lies not within a *specific* meaning and or experience but how

these elements predispose and set at play the conditions or circumstances for further composition. The user manipulates those elements that I have afforded them control of, yet, their composition lies only partly in constructing and re-arranging these elements I have provided for them. The composition of their own experience is a central focus and realisation of the work itself – it becomes the locus of the work. It is at once a methodology for the author and an act for the user-audience, ‘a noun and a verb’.

Conclusion – Final Thoughts

In the introduction to this thesis I articulated four related research questions that this final critical chapter has sought to address. I also identified four interrelated theoretical areas: composition, interactivity, technology and experience that have formed the basis and framework around which this critical writing has evolved. It is a consequence of both the format and methodology (practice-as-research) of this writing that the ‘answering’ of these questions, in this thesis, is only realised in part - as much of this research has been conducted in practice. It is then perhaps more realistic to claim that this thesis actually explores the relationships between the practical doing of the work, my own analytical writing and its contextualisation within the writing and practice of others in the same/related fields than *answering* these questions per se. This conclusion, then, does not articulate the completion and resolution of this research, as such, but rather the beginnings of these answers and the direction for further, future research.

Composition, in principle, has been central to my creative practice and critical reflection: the word appears in three out of four of my research questions. The composition of experience, the composition process within digital technology contexts, and the implications of an interconnected compositional and technological development have emerged as being (articulations of) key research areas of my work. As with interactivity and the kinds of engagement that have emerged from each project I have undertaken, composition has manifested in many different levels and degrees. From the more traditionally author-composed, closed work in *Comrade Coffee* to the open, fragmentary and experience-centred framework of *Digital Spaces* – with *Inter-activity* being somewhere in-between those forms – the functionality, mode and role of the compositional process has varied, mutated and evolved over time in the broader context of this research. The experience of *Comrade*

Coffee, Inter-activity and *Digital Spaces* is based not only in the perception of the composed forms but the dialogue with participation and composition from the audience's position. The situation of the audience within not only an artwork but also a participatory, open compositional framework provided the possibility for a personal, individual connection or relationship with the piece beyond that traditionally offered in a 'closed' text or work. Within *Digital Spaces*, for example, one user focused in on their sense of personal control and journey as the main experience of the work,

Could I determine the outcome of my own journey? What would a recording of my own journey look like? How might it compare with others? What more would be revealed?
(Digital Spaces showing responses– December 2013)¹⁶⁹

Participation, interconnection, democratisation (of temporality and contribution roles) and the 'shared' nature of my works have arisen from the dialogues between, and functionality of, interactivity, experience, composition and technology – their interrelationship eliciting and being characterised by those concepts. In identifying the locus of my practice, *Digital Spaces* comes closest to realising and embodying this balance between those four key elements – *interconnectivity* becomes key in examining composition in my research. Interconnectivity as the basis for compositional practice, in the contexts of digital technology and interactivity, beget new possibilities for creative arts practice (in the interconnecting of media, audience-author roles, and the use of data as a compositional starting point/medium) as identified in analysing the intermedial processes in my works earlier in this thesis. In *Digital Spaces* especially, composition, in terms of a specific, distinct practice,

¹⁶⁹ Collected responses from Digital Spaces work-in-progress showing December 2013 – see Appendix Three for responses.

became a problematic idea. The interrelated processes and dialogues between the technological elements in development, and the role of the audience in creating the possibility for further compositional processes to take place (see Meta-composition) problematise the notion of composition as a). a practice belonging to the author and b). the *setting* of specific elements for the creation of meaning, the communication of a message or the realisation of an artwork. As I mentioned in my introduction, the distinction between technological development (primarily programming digital software) and compositional practice – one I outline with the help of Oxford Dictionaries, as being divided into *producing* and *constructing*,

...breaks down later in my research as I acknowledge that my practice becomes defined by the 'composition' of those previously distinct areas – technological, arts/creative media, interactivity frameworks - as a whole: which is more a focus, in my practice at least, on how elements are interrelated with each other and to an audience. (Donovan 2013 – PhD Thesis - *Introduction*)

Composition in *Digital Spaces*, then, comes to represent a much larger, less rigid concept than that outlined initially in the introduction of this thesis.¹⁷⁰ What has characterised my processes and practice most prominently has been the interconnection, interrelation and reflexive dialogues between technical, interactive and compositional elements – not as three distinct areas but as larger meta-process.

This research is by no means concluded and the debate and practical contribution towards the interconnectivity of these four areas, and the

¹⁷⁰ [*mass noun*] the nature of something's ingredients or constituents; the way in which a whole or mixture is made up: *the social composition of villages* – from "composition". Oxford Dictionaries. April 2010. Oxford Dictionaries. April 2010. Oxford University Press. 13 March 2013 <<http://oxforddictionaries.com/definition/english/composition>>.

notion of composing experience may be explored much more extensively through this framework and approach. In taking this research forward, the interrogation into the specifics of the relationship between composition and technological development (within and outside of software development) in more practice-as-research projects can only be beneficial to the field. It would be useful to explore what the experience of the user-audience would be in encountering a work that had separated the processes of composing content (and its form) and to the development of the technological framework (digital-interactive system) to dispose the experience itself. Would the experience be as cohesive in conceptual and functional contexts? What aspects of the experience would be disjunctive if the answer was no? The notion of composing experience, for me, is an area that would benefit greatly from further interrogation. The degree to which both author and audience contribute throughout a number of projects could provide new, interesting perspectives on this notion.

It is within the problematic interstices of disciplines (sound art, music, film, photography) and the overlapping boundaries of (digital) media (audio, video and their technological mediums) that this thesis hopes to offer other artist-researchers strategies and entry points as opposed to definitive, complete answers. By raising questions and setting dialogues at play within these problematic liminal territories, this thesis aims to provide models and methods for practical, critical and reflective approaches and inquiries. My hope is that this thesis will not only contribute towards to the discourse on composition in digital-intermedial contexts in sound and image, the resultant critical resonances in authorial and audience roles, and how we might shape a fuller conception of the notion of 'composing experience', but that it will further place a focus on the interconnection of artistic creative processes with

that of technological development/construction. As discussed earlier in this chapter, the tendency for artist-researchers working within digital technologies, especially software programming, to cover up their technological processes and decisions in favour of explicating only the nuances of their (more traditional) compositional choices in media content or disciplinary contexts is detrimental to the progression of our understanding of this field. In looking at what aesthetic approaches were taken when filming a specific piece of content for a video installation for example, rather than how the installation system was constructed for the user-audience to encounter is only examining half of a process.

The intertwined relationship between composition and technological development has come to manifest in a number of different ways in each of my works. I hope that others will take up the many questions raised in this research to further explore how both elements exist/function in this closely reflexive dialogue throughout the process of creating digital interactive works. I also hope that this 'interbraided' process, and the context of digital technologies can form the basis for further creative work and research regarding how it may renegotiate our conceptions and experience of temporality and space and how these conceptual aspects contribute towards experience of the artwork. So too with the 'composition of experience', I hope for further research into how this meta-practice can engender democratisation in a work's temporality (duration) and authorial contexts to mobilise dislocations between author-audience roles and offer pre-disposed *experiences* rather than pre-determined/set artworks or authorial meanings.

Appendix One: DVD

In support of this thesis, I am including a DVD with video and photographic footage of *Comrade Coffee* (including an audio recording of the final musical performance) *Interactivity*, and *Digital Spaces* – plus a post-show seminar.

All video © Nicholas Donovan 2011

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Appendix Two: DVD – Software Projects/Experiments

In support of this thesis, I am including a DVD with the software project files for *Digital Spaces* and *Inter-activity* in addition to the small-scale software experiments that preceded each project. Note – this Appendix spans five disks due to the size of the data – 2.1, 2.2, 2.3, 2.4 and 2.5. It is worth noting that in order for all MaxMSP patches to work all folders from this appendix should be available on the local disk of the computer being used and that files paths should be selected in Max to locate all media content. The videos for Digital Spaces are separated into four folders, therefore a new file path should be created for each folder.

All programs, patches and software © Nicholas Donovan 2011

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Appendix Three: DVD – Recordings and Interviews

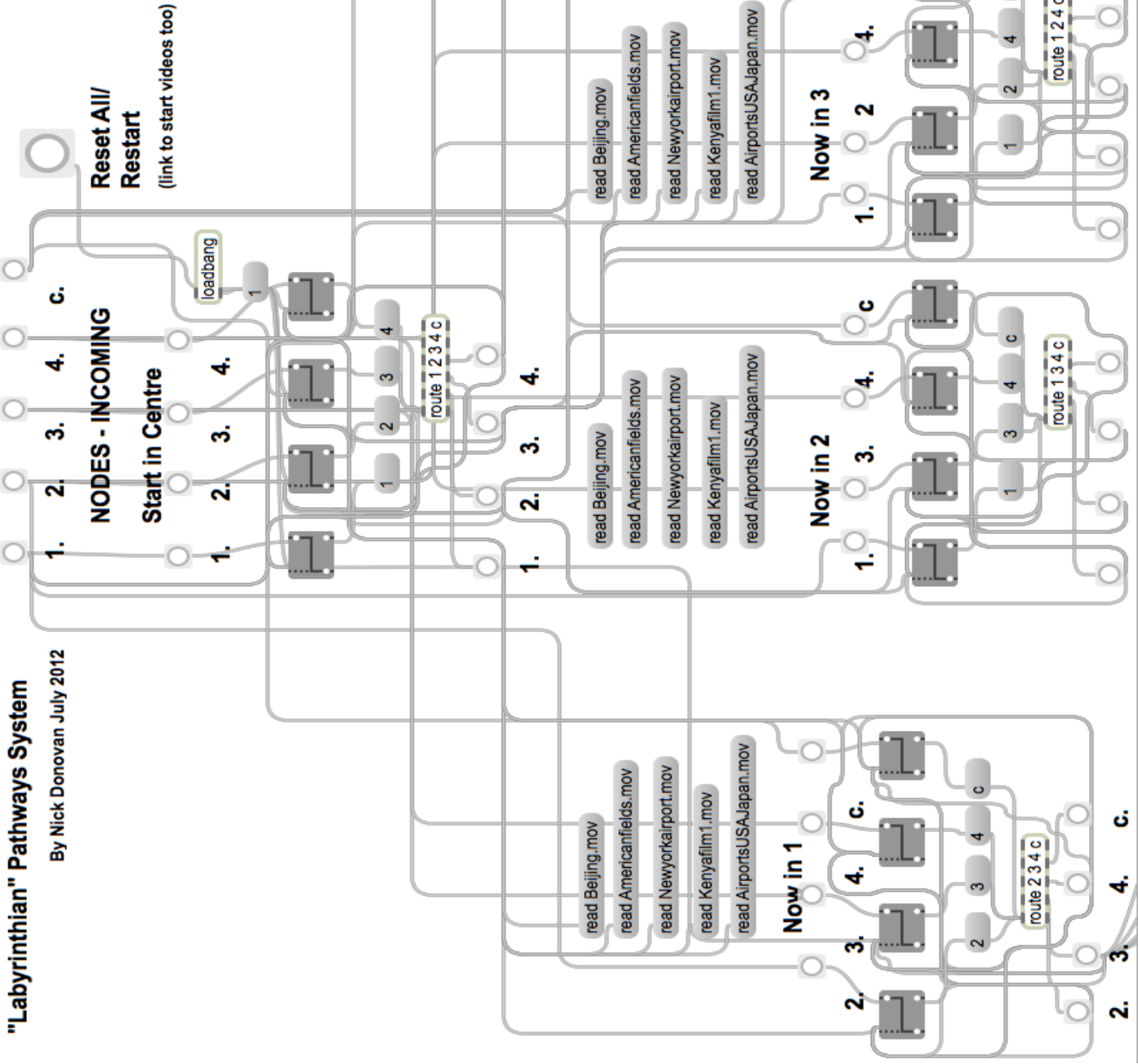
In support of this thesis, I am including a DVD with recorded interviews and written feedback from audiences after experiencing my works in addition to three large scale images of smaller figures from the body of this thesis.

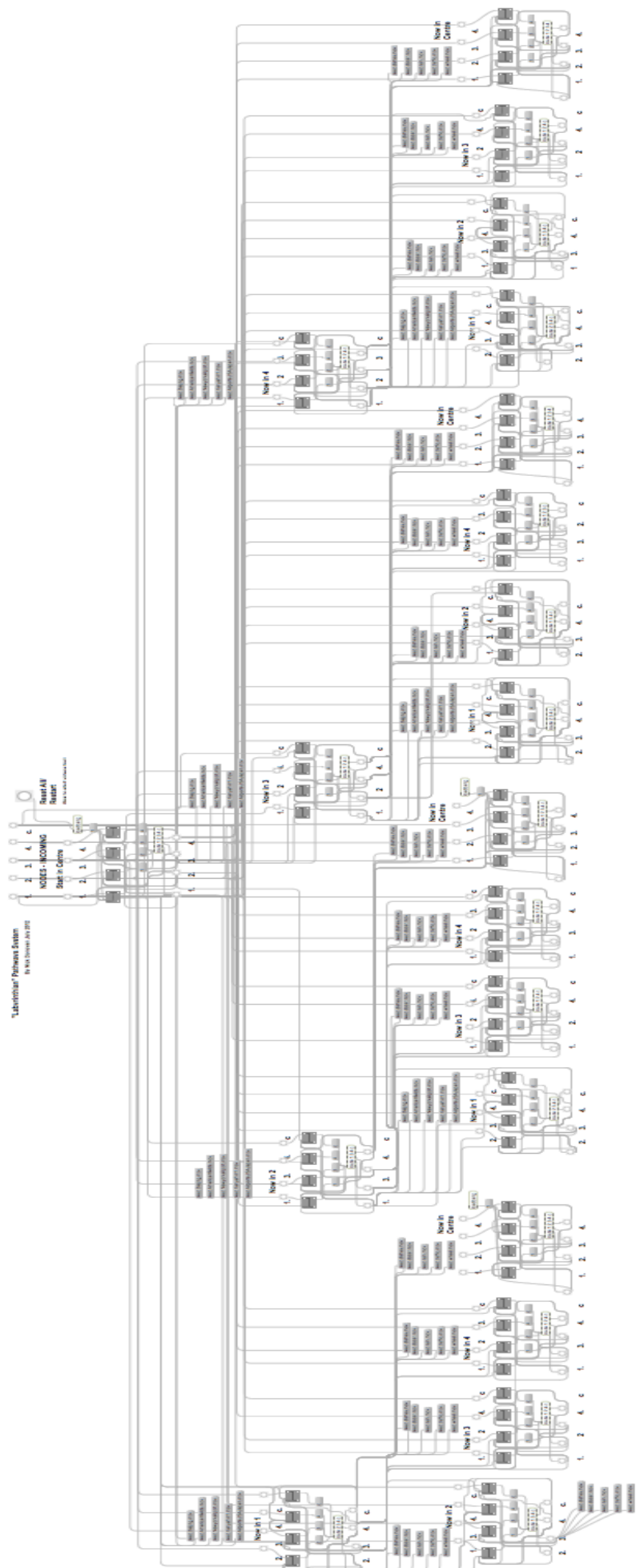
Duplication and distribution of these materials is strictly prohibited without written consent of the author.

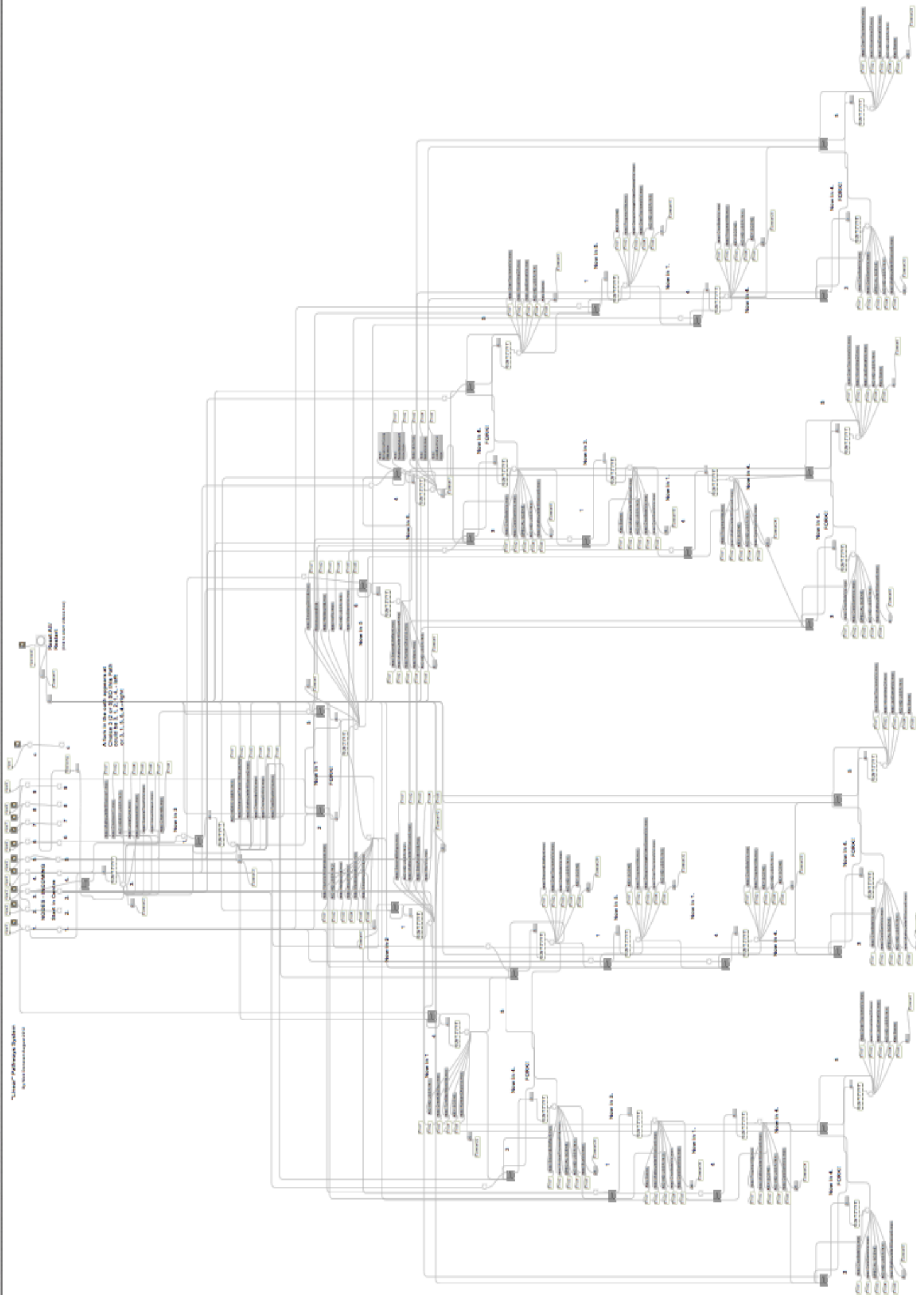


"Labyrinthian" Pathways System

By Nick Donovan July 2012







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