CreateWorld 2015
A Digital Arts Conference

12-13 February 2015

Conference Proceedings

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Program
CreateWorld 2015
A Digital Arts Conference

THURSDAY 12 FEBRUARY 2014

10.30 am	*Registration – **Building S07 – Griffith Graduate Centre***	
11.00 am	**Conference Opening**	***Building S07, Room 2.16*** **Dr Geoff Garrett, Queensland Chief Scientist**
11.15 am	**Keynote 1**	***Building S07, Room 2.16*** **Is There No Digital Arts? –** *Cat Hope*
12.15 pm	**Session 1**	***Building S07, 2.16*** **Opera Composition and Performance Utilising Computer-Based Recording Technologies and Virtual Instruments: A Case Study** – Eve Klein
		Valuing the Mature Dancer through Digital Technology – Sonia York-Pryce
1.15 pm	*Lunch*	
2.15 pm	**Digital Art presentation**	***The Cube, P Block - QUT*** **The Cube demonstration**
2.45 pm	**Session 2**	***QUT P Block, Rm 413a. Next to the cube*** **The Spatial and Temporal Poetics of Webcam Viewing** – Alannah Gunter
		Audiovisual Installation as Ecological Performativity – Teresa Connors
3.45 pm	*Afternoon Tea*	
4.15 pm – 5:15 pm	**Workshop and Demos**	***Building S02, Room 2.16*** **River Listening –** *Toby Gifford*	***Building S07, Foyer*** *Demo -* **The LAB colour space: An invaluable tool for working photographers** – Russell Brown
7.00 pm	*Conference Dinner at The Shore Restaurant, South Bank*	

FRIDAY 13 FEBRUARY 2014 — ***Building S07 Room 1.23***

9.00 am	**Keynote 2**	**Creative Candidates, What Industry is Looking For -** *Tim Kitchen and Richard Turner-Jones*
10.00 am	**Session 3**	**That Syncing Feeling: Networked Strategies for Enabling Ensemble Creativity in iPad Musicians** – Charles Martin
		For Grief: A photographic social documentary of funeral directors and their experiences – Yoko Lance
11.00 am	*Morning Tea*	
11.30 am	**Exhibition**	***Building S07, Room 2.16 & 2.17 & 2.18*** **Exhibition –** Debra Beattie, Darren Fisher, Tyson Foster, Sara Irannejad, Yoko Lance, Kellie O'Dempsey
12.30 pm	*Lunch*	
1.30 pm	**Session 4**	***Building S07, Room 1.23*** **Crustacean Caquaphonics –** Toby Gifford & Matt Hitchcock
		Cinematographic Evolution: What Can History Tell Us About The Future? – Daniel Maddock
		Seeking the animation artist in a multi-projection environment – Andi Spark & Leila Honari
3.00 pm	*Afternoon tea*	
3.30 pm	**Session 5**	***Building S07, Room 1.23*** **Permitting Chaos as Creative Strategy** – Daniel Della-Bosca
		Using Digital Technology in a Fine Art Practice – Sara Irannejad
4.30 pm	**Closing Panel**	**Trends in Digital Arts and Design**
5.00 pm	*End of conference formalities*	
6.00 – 11.00 pm	**Performances**	***Building S01, Queensland Conservatorium / Opera Queensland*** **Studio 4101 - Performances at Opera Queensland / Queensland Conservatorium** Complementary entry for CreateWorld delegates. http://operaq2015.com.au/whats-on/studio-4101/

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IC Central specialises in building and validating digital proficiency skills that lead to industry recognised certifications. We advise and educate community, academic, industry and government organisations to demonstrate how digital literacy and proficiency can advance an individual and an economy.

Is There No Digital Arts?

Cat Hope from West Australian Academy of Performing Arts, Edith Cowen University.

Central to the book Digital Art – An Introduction to New Media is the idea of digital art as part of the ongoing continuum of technology that artists have been fascinated with throughout history. 'Digital' simply means the assignation of numerical values to phenomena[1] (Lister et al. 2003: 1516) – a mathematical process and format that is applied to information. Does digital art engage new processes compared to other types of art on that basis alone? The digital has been engaged to create, transform, record, reproduce, transmit and archive artworks as well as other aspects of our lives, but does it create a new type of art? This presentation discusses this polemic, with an emphasis on the impact and potential of the digital on the performative arts.

Associate Professor Cat Hope is an academic with an active profile as a composer, sound artist, soloist and in music groups based in Western Australia. She is the director of the award winning new music ensemble Decibel and has toured internationally. Cat's composition and performance practices focus on low frequency sound, graphic notation, noise and improvisation. Her works have been performed at festivals internationally and broadcast on Australian, German and Austrian radio. In 2013 she was awarded a Churchill Fellowship to study digital music notations internationally, and has been awarded the APRA|AMC Award for Excellence in Experimental music in 2011 and 2015. She curated the 'Drawn From Sound' exhibition of Australian graphic notation in Sydney 2014 and Perth 2013. She was the Peggy Glanville Hicks Composers house resident in 2014, and is a fellow of the Civitella Ranieri Foundation.

Cat is currently a researcher at the Western Australian Academy of Performing Arts at Edith Cowan University. Her co-authored book Digital Art – An Introduction to New Media is out on Bloomsbury Academic.

Creative Candidates, What Industry is Looking For

Tim Kitchen and Richard Turner-Jones from Adobe.

This presentation looks at recent research into how the evolving marketplace and technology are changing the evaluation criteria for job candidates and increasing the need for creative problem solving and digital visual media skills. Two primary factors driving this change are the digital revolution and the belief that creativity and creative thinking are becoming indispensable to success. It will also demonstrate some of Adobe's new Creative Cloud initiatives and efficient workflows for full time Creatives in a range of fields and those looking just to have a creative edge.

Dr Tim Kitchen is the Senior Education Advocate at Adobe for Asia Pacific and the Vice President of DLTV (Digital Learning and Teaching Victoria). He is also the Co-Director of the Building Bridges interfaith dialogue program in Melbourne schools. Tim started his education career in 1991 and has taught in all three sectors (Primary, Secondary and Tertiary). Most recently, he was the Director of Learning Technologies at Strathcona Baptist Girls Grammar School in Melbourne, Australia. Tim is on the sessional teaching staff at Swinburne University of Technology in Melbourne where he teaches ICT in Education and also works casually with Wilkar Productions as a video producer, camera operator and editor. A passionate advocate for creativity in education, Tim is a regular writer and presenter for a wide range of national and international journals and conferences.

Richard Turner-Jones is a Solutions Consultant for Adobe (ANZ) utilising his knowledge of Adobe's tools & services to develop a seamless integration into existing workflows. With more than 18 years in the multimedia and web application development field, as both an Adobe Certified Developer and Instructor, he has been involved in the development of many high profile projects for the Australian Army, Airservices Australia, Suncorp and Caterpillar, to name but a few. In addition, he works fostering and supporting the local creative community including managing the Brisbane Adobe User Groups.

Dr. Tim Kitchen

Richard Turner-Jones

Peer Reviewed Full Papers

Opera Composition and Performance Utilising Computer-Based Recording Technologies and Virtual Instruments	Eve Klein
Valuing the Mature Dancer through Digital Technology	Sonia York-Pryce
The Spatial and Temporal Poetics of Webcam Viewing	Allanah Gunter
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Opera Composition and Performance Utilising Computer-Based Recording Technologies and Virtual Instruments

Dr. Eve Klein
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Abstract

Classical music has resisted incorporating music technologies into its mainstream compositional practices, in part because technology allows greater access to the techniques and timbres associated with virtuosic human acoustic performance. However, classical music composition and production can be enabled by music technologies, and they offer an effective vehicle for women to test and occupy the role of composer, performer and producer.

This paper outlines how home-studio music production technologies were used to compose and stage The Pomegranate Cycle (2010, 2013). The Pomegranate Cycle was composed, recorded, performed and produced by a female opera singer using consumer-level recording technologies. This self-directed methodology is unique in opera, providing a model for other singer-composers.

Introduction

According to Arnold et al opera is defined as 'work intended to be staged, in which singing plays a dominant part in portraying the actions and emotions of the characters'[5]. Others like Brown consider these definitions as 'narrowly conceived' because there are 'so many exceptions among the operatic works' that they prefer to define opera 'more generically' as 'drama in which the actors sing some or all of their parts' [7]. Brown believes that the three principal elements of operatic works are 'music, drama and spectacle' [7]. This latter definition of opera is exemplified in the work of composers such as Robert Ashley and Philip Glass who have produced operas which deliberately do not utilise traditional operatic narrative structures, vocalities, compositional devices or staging techniques [18 pp.89-99]. Opera can be difficult to conceptualise and is, therefore, a notion best defined by its participants: composers, conductors, directors, performers, and audiences. This article does not deploy a fixed definition of opera to regulate discussion, rather I have drawn upon opera as a current day musical genre employing a vocal style, and/or elements of spectacle, narrative, and structure that signify as opera to its participants.

Despite being a widely performed contemporary musical genre, operatic repertoire staged by the world's major opera companies is overwhelmingly historical [12; 19; 21]. Feminist and queer musicologists have critiqued historical operatic repertoire for reproducing narrative tropes that subject female characters to violence, rape or death [1; 3; 10; 23]. Opera singers negotiate these tropes while themselves possessing very little authorial power within the structure of tra-

ditional opera companies where directors, conductors, designers and coaches take primary responsibility for a production's interpretive and aesthetic qualities. Therefore, there is a need to challenge historical representations of women in opera by encouraging the presentation of newly composed operas and by incorporating performance strategies which allow female singers to take on greater authorship within a production.

This paper outlines how home-studio music production technologies were used to compose and present an opera entitled The Pomegranate Cycle (2010, 2013). The Pomegranate Cycle was composed, recorded, performed and produced by a female opera singer using consumer-level recording technologies. This self-directed methodology is unique in opera, providing a model for other singer-composers. The Pomegranate Cycle has two primary modes of output: an album recording and several staged performance versions. Its libretto delimits a single continuing narrative centred around four characters which are portrayed by a single mezzo soprano.

The score is the fulcrum upon which traditional opera relies to define the parameters of the work. The realisation of an opera through live performance or on recordings is an extension of this relationship between work and score. The Pomegranate Cycle was composed through the process of recording, the crafting of which, also established the framework for live performance versions of the work. This mode of creation reflects compositional techniques more commonly associated with popular music [see: 25]. It utilises both commercial and custom-made virtual instruments, samples, sound-processing plug-ins and multi-channel surround sound recording techniques. Music was scored in Sibelius notation software. Recording and editing took place in standard Digital Audio Workstation (henceforth DAW) software Logic Pro and Pro Tools. Live performances were realised using a combination of Live DAW software, custom-made plug-ins and instruments, and custom-built gestural control devices. A comprehensive notated score was not produced because it would be inadequate to describe the use of sonic editing, layering, and real-time sonic processing integral to the work's sound design.

The technology-centred approach to composition and performance employed in the opera's creation emerged out of a desire to challenge the representation and location of women in opera. As a professional opera singer I wanted to effect change by 'Doing-It-Myself' and composing new work. Consequently, the methods employed in the creation of this work draws from Do-It-Yourself-orientated (henceforth DIY) models of creative practice utilised in various popular music genres. DIY practice allows the singer to become the producer, the composer and the artist simultaneously. This model has proved successful, allowing the composition and performance of an opera as a solo practitioner working outside conventional classical music structures.

Context and Problems

Technology-enabled DIY approaches to musical composition and performance are now ubiquitous within popular music [25 p.110], but musicians trained in the Western classical traditions[1] have been more reluctant to integrate technology into composition and performance practice methodologies [see: 18 pp.158-161]. Where artists have explored and integrated technologies with classical music textures, structures or performance techniques such work has tended to attract niche/fringe classifications such as 'new music' 'acousmatic music', 'crossover-classical' or 'alt-classical'. These classifications serve to separate such works from classical music's historical traditions and genres. Artists and institutions focused on the presentation of classical repertory have primarily used media technologies to create perfect recorded versions of repertoire which sound like seamless, virtuosic concert hall performances [see: 20]. This is partly a consequence of classical music "instituting primary value" from manual human craft [14 p.58] and partly a result of the imbalance of between the presentation of historical and contemporary works in classical music repertory performance [19 p.75]. The implications of DIY recording processes are also problematic because the DIY ethos asserts that things can be made independently of, or in opposition to, tradition [24 p.4]. The results can include rough edges, and the process of creation may be inscribed on the end product. Classical music's traditional focus on virtuosity and Werktreue[2] is in natural opposition to such ideals and aesthetics. However, recording technologies have advanced to such a degree that truly fine sonic results are possible, even within self-directed projects. There is great potential to expand approaches to classical music practice—including the representation of repertory—by further integrating computer-oriented composition, production and playback techniques into live classical music performance. Such a discussion is worthy of consideration, but is beyond the scope of this article [see: 20].

Historically, classical music composition pedagogy has been oriented around the study of orchestration and periods of training with leading composers. Conservatoires and tertiary music institutions play a key role in a composer's development because they provide access to the resources and networks required to forge a career. Conservatoriums provide access to human players and ensembles as a means of testing and realising notated works, and such processes act as a marker of value for composers. Orchestral works realised using virtual instruments and MIDI based technologies are often critiqued for sounding "metallic", "flat," "ersatz orchestral sounds," "mechanical," "weak sounding," and "depressingly synthesized" [22]. Such criticisms persist despite radical improvements to these technologies over the last twenty-five years. According to Morgan screen composers who employ virtual instruments to realise orchestral works encounter prejudice from art music aficionados when they acknowledge their use, despite this being both credible and common compositional practice within their industry [26]. The problem is not necessarily the technology, nor its aesthetic application, but rather the anxieties the use of such technologies can generate.

Women who want to forge careers as composers encounter difficulties because they are significantly underrepresented in the profession. In Australia only 17% of composers are female [11 p.6]. In Britain only 14% of the Performing Rights Society for Music Foundation's registered composers, songwriters and music publishers are female [4]. In America women constitute only 15% of composition faculty members, only "15% of living composers whose works were featured on recent orchestral seasons and new-music series" and in "the history of prestigious composition prizes, women obtain top honours only 9% of the time" [2]. Women are entirely excluded from the classical music repertory canon [23 pp114-115; 9]. A lack of representation creates metaphorical and real obstacles for women who want to compose.

DIY and technology-centred approaches to music composition and performance can confront stigma in traditional classical music communities precisely because they are perceived as lowering the barriers for accessing the timbres and techniques foregrounded within Western art music genres. For example, Godlovitch states that synthesiser technology lacks "the right pedigree" to fit comfortably into classical music environments because its players have not "emerged and evolved within the continuous traditions of the standard Guilds…if the repertoire cannot exclude the masses, then the instrument is used to do so'" [14 p.78]. However for the purposes of women, who struggle for representation within the classical music 'Guild', these same technologies offer great possibility for bypassing 'Guild' regulations. Technologies provide an infrastructure where classical composition can be developed, and the tools for realising such compositions as either recordings or live performances. Orchestral works can be created using virtual instrument software which is wholly programmed and edited within a digital audio workstation environment. While not necessarily ideal, such configurations allow emerging composers to test and develop their craft, and it also enables them to sonify their work for circulation and feedback. This is not the same practice as learning to play an acoustic instrument to a virtuosic standard, nor handwriting a notated score for performance by a human ensemble. However it is a practice which teaches composition skills and allows emerging composers the opportunity to develop their own authorial relationship to orchestral timbres. This opportunity is especially valuable for women exploring composition for the first time as it affords them the privacy to develop compositional techniques within somewhat unfriendly contexts.

Project Overview

The Pomegranate Cycle is a fully-staged operatic monodrama with a continuing narrative. Its structure is divided into three short acts which portray: the kidnapping and rape of Kore; Demeter's search for her lost daughter; Kore's transformation into Persephone; Persephone's release from her captor; the public response to Persephone's rape, and her eventual process of healing. One singer portrays four separate characters, swapping between roles and displaying contrasting characterisations through changes to physical and vocal inflections. How The Pomegranate Cycle engages with and reflects upon operatic narrative structures and vocal

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[1] For convenience this paper will employ the terms 'classical' and 'classical music' to encompass all genres of Western art music oriented around historical music repertory and its related pedagogies and performance traditions.

[2] The drive to realise a work as it was conceived of by its composer within the musical score. See: [16 p.89] and [15 p245].

conventions has already been detailed in a previously published academic paper [see 18].

The Pomegranate Cycle is composed for a mezzo-soprano, laptop, custom-designed sound sculptures and visual projections. The opera draws upon ambient electronica and post-classical forms and is composed from song, spoken word, concrete sounds, glitch, traditional scoring for symphony orchestra and layers of digital audio processing. The work's composition demonstrates how music technologies can allow a singer to compose and convincingly realise opera across multiple audiences and performance contexts without access to the kinds of institutional support or infrastructure which opera productions normally require—such as a facilitating opera company to produce the work or a live orchestra to realise its score. In live performance, the work utilises playable sound sculptures, triggering laptop based sound libraries and processing plugins. This allows the singer to manipulate her vocals, and initiate and manipulate sounds in real-time. In doing so, the singer becomes an author within the work.

Project Methodology

The Pomegranate Cycle was realised in a series of distinct stages, which are broken down in Table 1. Table 1 includes a brief description of the processes involved in realising each stage of the work, along with a list of the resources used to achieve these outcomes. The resources required are extensive, however most are accessible through prosumer-level home recording studios. Which is to say with a few notable exceptions (discussed below) they should all be readily available through social and/or creative networks.

The methodology used to create this project draws from notions of DIY, particularly the impetus of 'making do with what you have' and leveraging contacts to fulfil labour, skills or equipment shortfalls. This requires being clear and communicative to volunteers who are supplying labour or resources for the project, and where possible, being flexible with deadlines. Where this methodology of self-directed and realised work differs from a low-fidelity 'DIY ethos' employed in popular music genres such as punk, is that the project needed to negotiate certain markers of 'quality' and 'virtuosity' required to keep the work convincingly in-dialogue with the tradition of opera. These markers are: the integrity of operatic vocal tone and production and its location within ambient resonant spaces; the incorporation of convincing orchestral timbres; and a musical/ sonic complexity employed to add additional meaning to the stage narrative beyond the libretto text. Key to this project was managing the tensions that played out when pursuing a self-directed project that was oriented around the classical music traditions, and by necessity this project was engaging with and operating against the processes required to produce an opera.

The overall design of The Pomegranate Cycle is premised on economy. There is one singer, who embodies all of the opera's different characters and is accompanied by a laptop. As a recording project, this minimised the need for sourcing, rehearsing, coordinating and recording other musicians, which reduced the complexity and expense of the process. Free or cheap spaces were utilised for recording, these being a university recording studio for initial test recordings, my own home studio for editing and basic overdubbing and a local church with a good reverberant acoustics. The final versions of the operatic arias were recorded with a surround sound microphone array in an acoustic environment that best represented the harmonic overtones present in my voice: a church with a reverberant acoustic and minimal ambient noise. This was important because the reverberant timbre of the classically voice acts to anchor the work to the operatic tradition. The minimum equipment necessary for realising a recording in this way is: a laptop computer, a DAW, an orchestral virtual instrument package, a transparent audio interface, microphones, monitoring headphones and access to a quiet ambient space for recording.

Adopting a self-directed model for the creation of The Pomegranate Cycle required that some traditional elements of operatic staging be rethought. Notably, there was no set for the performances, only sculptural elements and props were included on stage. The sparsity of the set was overcome by incorporating a backdrop of video projections. Videographer, Ravi Glasser-Vora, shot and edited seventy minutes of footage to accompany the performance as a volunteer. This was loosely divided into scenes mapped to individual songs and contained interrelated thematic content. The scenes did not match the diegetic locations where the action of the story was occurring, but instead, they were used to add a metaphorical and political layer to the work, underscoring themes present in the libretto text. Similarly, access to a traditional orchestra was not feasible. Thus, the utilisation of virtual orchestral instruments on a laptop necessarily directed my approach to composition (see discussion 'Symphonic Simulation' below). Aspects of the tradition that I wanted to reference were the relationship between opera and dance, and the convention of opera being a fully-staged sequential narrative. Opera director Narelle Yeo agreed to set the work as a volunteer. Auditions were held for a volunteer dancer and Liz Evans joined the show as the second principal artist. A sufficient number of dancers auditioned, which might have allowed for more performers being incorporated into the staging. However, transport and accommodation costs for a larger ensemble would not have been feasible. The work received two production runs during 2010, firstly at The Brisbane Festival (Metro Arts, Brisbane), and secondly at Sydney's Imagine Festival (Cleveland Street Theatre, Redfern). Other versions of the work have been staged subsequent to the 2010 performances with different creative teams.

In total The Pomegranate Cycle cost approximately AU $4600 to produce across the work's multiple outputs. This can be broken down into the following components: AU$900 for software, AU$2500 in expenses related to four production runs of the work in Brisbane, Sydney and Perth, AU$900 towards CD duplication costs and AU$300 in venue hire. In my experience as a singer, it has cost the boutique opera companies I have worked with well in excess of $45,000 to stage short, single production runs of a repertory work with a chamber orchestra. Such productions incorporate large numbers of volunteers contributing free labour and skills and principle singers often perform without payment. The primary expenses in these productions are venue hire, payment of the orchestra, construction of the set and promotion. By rethinking approaches to composition and performance, a small-scale opera production can benefit by substantially reduced production costs.

Breakdown of the Stages, Processes & Resources Used in The Pomegranate Cycle
Key: #=Self-directed, @=Assisted by other people, %=University or other institutional support

STAGE	PROCESS	RESOURCES
Initial investigation & research	• Brainstorming initial ideas # • Researching topic # • Writing project proposal # @ • Creating libretto structure #	• Library • Internet Access • Word Processing Software
Writing Libretto	Writing, editing and rewriting #	Word Processing Software
Experimentation and Structural Development of Composition	• Improvising Musical Ideas using voice and piano # • Recording improvisations into computer-based notation software #	• Voice • Piano • Hand-held recorder • MIDI-Keyboard connected to a laptop with notation software • Headphones/Speakers
Writing instrumental and vocal lines using virtual orchestra software	• Fleshing out ideas using virtual instrument software to realise instrument timbres # • Working ideas into complete orchestral parts, taking into account the timbres available in the virtual instrument software, including areas of strength and weakness # • Programming changes of articulation and velocity to reflect different instrumental playing techniques # • Singing and recording sketches of vocals to test their relationship with instrumental timbres # • Reworking in response to feedback # @ %	• Virtual Instrument Software • Notation Software • DAW • Headphones/Speakers
Recording	• Finding appropriate locations to record vocals: university recording studio, home studio, and a local church # % • Treating the acoustics of the recording location to produce better sonic results: putting up quilts, mattresses and acoustic foam to lessen reflections entering the microphone from parts of the space likely to introduce undesirable reflections, distortions or noise # • Self-recording operatic vocals into a laptop computer, using microphones in a surround-sound array to capture natural reverberation from the recording space # • Self-recording spoken-word vocals and overdubs into a home recording computer using a basic condenser microphone # • Recording found sounds at various locations using a handheld digital recorder #	• Various recording spaces accessed either for free or at low cost. • Absorbent material such as mattresses, quilts and acoustic foam. • Various microphones, most from my personal collection, but also borrowed from the university and colleagues. • Microphone stands • Laptop • DAW software • Analogue-digital converter • Preamp • Cables • Headphones • Hand-held digital audio recorder
Mixing	• Setting up a MIDI-Over-Lan network to stream virtual instrument playback between multiple computers # • Bouncing down finalised orchestral MIDI parts to audio # • Editing vocal parts # • Integrating & editing concrete sound components # • Applying processing & effects # • Mixing relative volume levels & spatial positioning of tracks # • Reworking in response to feedback # @ %	• MIDIoverLAN software • Two computers • DAW software • Virtual instrument software • Effects and processing plugins • Headphones/Speakers
Mastering	• Adjusting the colours/textures, volume and positioning of final stereo tracks in relation to each other # • Reworking in response to feedback # @ %	• Computer • DAW software • Processing plugins • Headphones/Speakers

STAGE	PROCESS	RESOURCES
Staging the work as a live performance in Brisbane & Sydney (2010)	• Applying for performance opportunities at festivals # Venues were provided but other resources required: - Obtaining suitable cast & crew (found through net-working and advertising) #@ - Obtaining insurance & clearances for the show # - Designing, funding & coordinating advertising # - Acquiring costumes, props & makeup #@ Other considerations included: • Managing rehearsal periods #@ • Assigning workloads to volunteers # • Obtaining funding for expenses # • Shooting and editing images and video for use in the performance @# • Booking and managing accommodation, flights and other transport # • Documenting performances for later use #@	• Laptop • Internet access • Volunteer personnel • Wordprocessing software • Website infrastructure • Photo editing/design software • Video editing software • DAW software • Virtual instrument software • Effects and processing plugins • Headphones/Speakers • Audio interface • Microphones • Video cameras • Photography cameras • PA, mixer and cables • Data projector & screen • Costumes & makeup • Props and basic set pieces • Programs • Various items of hardware (e.g. ladders, tools)
Reconfiguring the work for staging in different contexts: pubs, festivals, series performances, and galleries (2011-2013)	• Adjusting performance to suit different venues and audiences# • Editing composition's duration to allow for shorter and longer stagings of the work. • Coordinating costumes, props & makeup # • Booking & managing accommodation, flights and other transport # • Coordinating advertising & promotions with event organisers #@% • Documenting performances for later use #@ • Designing and building sound sculptures to allow for alternate live-triggering and gestural control of sounds on stage and to provide an installation component to the staging #@	• Volunteer Personnel • Wordprocessing Software • Photo-editing/design software • Video editing software • Website infrastructure • DAW software • Virtual instrument software • Max/MSP software • Effects and processing plugins • Headphones/Speakers • Audio interface • Microphones • Video/photography camera • PA, mixer and cables • Data projector and screen • Arduino boards and electronic components • Costumes, makeup and props
Promoting and discussing the work online (2010-2014)	Interacting on social networks such as Facebook, Twitter, Soundcloud & YouTube for promotion & content sharing #@ Capturing and editing video & audio for online sharing # Updating website & blog #	Computer Website Infrastructure Photo editing/design software Video editing software DAW software Processing plugins Headphones/Speakers Audio interface
Releasing the work as an album on Wood & Wire (2013)	Reworking recording for album-release format # Photo and video shoots #@ Photo and video editing #@ Album design @% Press release and album-specific publicity on traditional and social media #@% Distribution and duplication networks #@%	Computer DAW software Effects and processing plugins Photo editing software Video editing software Broadband internet

Table 1: A Breakdown of the Stages, Processes & Resources Used in The Pomegranate Cycle
Key: #=Self-directed, @=Assisted by other people, %=University or other institutional support

The Pomegranate Cycle was an independently driven and realised project. Yet I did have access to a community of artists that I have known through my practice as an opera singer and electronic music performer. In particular, the experimental music and performance communities were extremely welcoming, giving exposure to my work and providing opportunities for me to present performances of The Pomegranate Cycle. Ultimately, it comes down to access. The Australian electronic music and experimental communities are welcoming to female artists. In these communities, there are many female role models who have established themselves through practice, and who have subsequently gone on to teach at universities, host events, run record labels or form women's artist collectives. Some examples include Dr Ros Bandt (sound artist, composer, academic researcher and director of The Australian Sound Design Project), Melinda Taylor (International DJ, electronic producer and co-founder of the indie-label Couchblip!), and Dr Donna Hewitt (composer, singer, experimental performer, academic and member of the collective LADY Electroncia). It is usual to attend a gig in the experimental electronic music community and find at least one woman performing her own compositions. While gender ratios are uneven, the spirit is far friendlier towards female composers than has been my experience within the classical music community. Having the support of these communities has meant that I have been provided with the spaces, networks and resources to extend my compositional practice.

The experimental electronic music community is also welcoming of new approaches to music practice. Experimental music, by definition, encourages an 'anything goes' attitude to musical style, performance techniques, and genre, thereby encouraging artists to form their own unique perspectives on composition. As a consequence, everyone takes a self-directed approach in these communities. There may be exemplary practitioners, but there is not an established tradition which artists are regulated against, and so the community progresses in a circular fashion: they hear each other's work, they experiment and compose, they perform and they reconfigure. Some sections of the experimental community are dedicated to acoustic music performance, but technology forms the backbone of many approaches to experimentation. From circuit-bent toys, to self-programmed MAX plug-ins, to hand-built synthesisers or acoustic sounds processed on laptops, many experimental music practitioners explore technology as an everyday part of their craft.

Symphonic Simulations

Virtual instruments are software plug-ins which trigger sounds using the MIDI-based protocol of digital music communication. Historically virtual instruments have triggered high-quality samples recorded from acoustic instruments played by humans in pristine acoustic environments such as orchestral sound stages. Virtual instruments were distinct from synthesisers that used combinations of signals or digital algorithms to generate and shape a sound. In current practice, it is difficult to make a distinction between synthesiser and virtual instrument plug-ins because contemporary plug-ins often combine synthesised sounds with sampled sounds or processing to form the final sonic output.

The foundation of my compositional practice has been the use of virtual instrument software, particularly orchestral plug-ins like East West/Quantum Leap Symphonic Orchestra and VSL's Vienna Instruments plug-ins[1]. Both plug-in libraries utilise recorded samples of orchestral instruments which replicate dozens of different articulations (playing techniques) produced within each instrument and instrument family. When programmed correctly within DAW software the results will sound seamless for the listener. Research by Morgan shows that the use of virtual instruments by screen composers is normal practice with 15% of screen compositions containing only virtual instruments and 55% of screen works combining virtual instruments with recordings of human players [26]. The primary reason screen composers state for using virtual instruments in Morgan's study are ease of use, access to instrumental sounds and economy [26].

Like screen composers, I have utilised orchestral plug-ins to access orchestral timbres that I could not realise in other ways, particularly operating as an independent artist. However, my use of virtual instruments is not intended to substitute for orchestral players. I use them as instruments in and of themselves. The intention is to reference traditional orchestral timbres as a marker of the classical tradition. These instruments simulate orchestral aesthetics, signposting them, but ultimately standing on their own as something that both sounds and functions differently. Baudrillard believes that abstraction today is "no longer that of the map, the double, the mirror of the concept", and that "simulation is no longer that of a territory, a referential being or substance" [6 p.1]. Rather, "it is the generation by models of a real without origin or reality: a hyperreal", where "the territory no longer precedes the map, nor does it survive it" [6 p.1]. Classical music is the terrain, and virtual orchestras, as simulations of acoustic orchestras, generate new hyperreal sonic potentialities. This opens composition to possibilities formally unachievable with human players. Milton Babbitt and Glenn Gould utilised a hyperreal approach to music technologies to realise aspects of compositions not available to them by means of human acoustic performance [13 p.288, pp. 243-44; 17 p.42]. Similarly, when compositing The Pomegranate Cycle, I looked at the available timbres that virtual instruments were capable of producing and composed the instrumental parts to maximise the aspects of these timbres which sounded the most credible. Frequently, particularly with string instruments, I employed the most extreme pitch ranges, or layered multiple independent solo lines for the same instrument, as opposed to separating out harmonic textures for different instruments in the same family. In the case of the piano, I constructed chords that extended beyond a human hand span. An example incorporating all of these possibilities is the piece, Seeds of Accusation (see: [28 Track 14])[2]. Employing these techniques was a conscious compositional choice based upon the sonic colours and layers I wished to achieve. In this context, unconventional and extreme approaches to instrumentation expressed the main character's defiance to her experience of violence explored in the opera's plot.

Adopting virtual instruments as the 'orchestra' allowed me to compose for non-standard ensemble configurations. Narcissus Bloom & the Rape of the Pomegranate (see: [28 Track 5]) includes instrumentation for most symphonic instruments and piano, but other pieces such as Portent (I) and Land of Hades also include instrumentation for pipe organ, glass harmonica, verrophone, bass waterphone, tam tam and bowed crotales (see: [28 Track 2, 9]). Yet other pieces include prepared piano (Burning, [28 Track 10]), lithophone (Seeds of Accusation), and instrumental sounds produced by layering together the samples from two or more acoustic instruments (Punishment [28 Track 13]). These additional instrumental timbres add depth and dimension to the sound world, but would almost certainly not be available in an acoustic performance situation: pipe organs are not conventionally found in an opera house, and rare instruments like glass harmonicas and lithophones (effectively) never are. In embracing laptop-based virtual orchestras as my performance instrument, I also freed myself from conventional instrument configurations.

Baudrillard states that to dissimulate is "to pretend not to have what one has" while to simulate "is to feign what one doesn't have", and so "one implies a presence, the other an absence" [6 p.3]. However, he considers that simulation is "more complicated" because "simulating is not pretending: 'Whoever fakes an illness can simply stay in bed and make everyone believe he is ill. Whoever simulates an illness produces in himself some of the symptoms'" [6 p.3]. Consequently, while "pretending, or dissimulating leaves the principal of reality intact", simulation "threatens the difference between the 'true' and the 'false', the 'real' and the 'imaginary'" [6 p.3]. This is precisely where the conflict between classical music and virtual orchestral technologies originates. For many contemporary composers or listeners, virtual orchestral technologies produce enough of the timbres of a traditional orchestra to threaten the distinction between human acoustic generation and computer generation (see: [26]). Therefore, the foundations of classical music as the pinnacle of human manual craft are jeopardised. This is especially so when the virtual instruments' timbres are specifically composed for. By not trying to 'fake', or 'pretend' that the instrumentation in The Pomegranate Cycle was composed for an acoustic orchestra, I open up a dialogue with the tradition around the future of the craft.

Adopting Variable Recording Aesthetics

Classical music repertory recordings predominantly reproduce a singular aesthetic on record. Engineers and producers craft mixes where the object is "to achieve an aural image something like the sound perspective that might be heard from the middle of the stalls in one of the great concert halls" [8 p.146].

Replicating the concert hall environment on The Pomegranate Cycle recording seemed futile, given that the use of virtual orchestral instruments had already broken away from associating orchestral sounds with human manual craft. Consequently, The Pomegranate Cycle constructs a variable sonic reality in the same way that popular music recordings do. Sounds are layered and audibly processed, and instruments' positions within the stereo field move around to create tension and interest. An example of both sonic processing and variable stereo location is the treatment of the piano line in the introduction to Narcissus Bloom and the Rape of the Pomegranate (see: [28 Track 5]). In this song, a basic piano motif comprised of three notes is reversed, stretched, equalised, has reverb effects applied to it, and is alternately panned hard left and hard right in the stereo field. The Pomegranate Cycle thus demonstrates a contemporary and free approach to mixing, comparable to popular music production aesthetics. This variable sonic reality is useful to the construction of the opera's various landscapes. In the opera, the principal character moves between the human world and the underworld, and the narrative shifts between external experiences to internal monologues. The audience is similarly moved through these spaces whilst also being engaged directly through the opera's narration. Having the opera's sonic realities shift location, has facilitated the audience's movement through the narrative in an economical way. This means that, as a recording, the locations of the work carry through without the opera's visual performance components, and as a staged work, the absence of a realistic set is not marked, given that the sound world itself is hyperreal.

Employing variable mix aesthetics in the work served several purposes: processing the sounds of virtual instruments in a variable way meant that the listener could perceive that their function was intended to be different to acoustic orchestral instrument; it contemporised the aesthetics of the music by locating the work closer to the aesthetics of popular music; and in doing this, it allowed the work to circulate inside popular and experimental music communities. There are a growing number of classical artists adopting a contemporary approach to recording located either within alt-classical or ambient electronic music genres and The Pomegranate Cycle should be understood within the context of these musics.

Initial Reception

The work has been well received in the experimental music community, with multiple performances at festivals during 2010 and 2011. I also worked as a support act to rock bands, singing songs from the opera in pubs and at roller derby events. A reworked, installation and live performance version of the opera was performed at the Underbelly Arts festival in Sydney and at the Tura New Music Festival in Perth during 2013. The Pomegranate Cycle's hybridised musical aesthetics, enabled by a self-directed approach to composition, has allowed the work a wide circulation within popular music and experimental performance spaces.

A full-length recording of the work was released in 2013 by independent label Wood and Wire and to-date has been downloaded over 50,000 times. The album has received international radio broadcast and reviews; music has been incorporated into secondary works including dance performances and films. Most importantly, the opera was a finalist for Vocal Work of the Year in the APRA/Australian Music Centre 2014 Art Music Awards showing significant, positive critical recognition within the Australian art music community.

Conclusion

This paper provides a brief contextualisation of the technology-centred self-directed model of composition and production used to realise The Pomegranate Cycle as a recorded and staged work.

A central motivation of this project has been to develop a practice whereby a new model of opera can be proposed and tested. Working independently as a composer (and librettist) has allowed me to confront sexist conventions within

operatic narrative and also the absence of women from the classical modes of composition. Music production technologies have enabled me to circumvent institutional hierarchies and demonstrate change led by practice. This approach has required me to occupy multiple roles simultaneously, most notably, that of composer, performer, producer, marketer, designer, video editor, copywriter, makeup artist and costumer. In taking on such a mammoth project, I was able to learn vital skills as a producer and composer. My compositions improved in scope and complexity as the project developed, as did my ability to recognise problems and respond to listener feedback. Consequently, I was able to rework pieces to higher standard with significant critical acclaim. Developing as a composer is an ongoing process, and in realising The Pomegranate Cycle, I have established a viable mode of practice that can drive my efforts forward.

Based on these experiences, I conclude that exploring classical music composition and production through music technologies can be an effective vehicle for women to test and occupy the role of composer. If more women are able to access compositional roles, there is the potential to effect change by numbers. Methods to engage more women in self-directed approaches to composition requires further investigation but shows great potential as The Pomegranate Cycle demonstrates.

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Valuing the Older Dancer through Digital Technology

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Abstract

Today's focus on a youth-oriented consumer culture also weighs heavily in the current dance world and for some who are approaching forty years of age; retirement is perceived as the legitimate choice. Should this still be the case? Since attending the Elixir Festival at Sadler's Wells Theatre in London 2014 the research indicates there is a renewed interest within the dance world of the value and visibility of the mature dancer, recognising their lived body experience, performativity and inclusion in western dance culture. There has long been prejudice towards the mature dancer but a new shift acknowledging the lifetime of embodied dance experience is slowly being highlighted. Which is the preferred body to perform, the youthful or the mature, or is it inappropriate behaviour of the latter? By investigating through film and photography, from the personal perspective as a mature dancer, I aim to focus on the mature mover and conserve their visibility in the current dance world.

Keywords

mature dancer, technology

Introduction

Dance is obsessed with youth, like all the narcissistic enclaves of our society. Dance as sport, dance as glamour factory – a passion compounded of physical mastery and an idealisation of the human form. [1].

Valuing the older dancer through film and photography is the aim of this PhD project through the use of digital technology. My personal embodied experience of this journey, from the young performer through to the mature dancer has also been intrinsic to this research. To have this project discussed within the wider dance community would potentially enlighten and encourage all dancers, whether they are young or mature-aged, to acknowledge, that 'dancing does not have to stop' at a set time of life. Ageing dancers have demonstrated that performance is ongoing. Support from choreographers and audiences alike are indicating this to be true. It is not a case of older dancers performing past their corporeal ability but their performance skills are a sharing of their accumulated individual dance knowledge as well as their physicality.

Something intrinsic to dance that warrants the kind of reverential attention paid in each generation to a very few dancers – something about what they do that is different from the achievements of surpassingly gifted, magnetic performers in other arts to whom we pay homage. [2]

My research, as a mature dancer, through digital media examines the role of dancers who extend beyond the paradigm of age, and the contribution that they make to current dialogues in the field. It explores the mature dancer's perception of the shift of focus from age, (forty) to the body, the change of interest and the new emphasis. The transformation moves from quantity to quality of movement, with perceptions of ability over agility, tempered with maturity over youth. There is an inner subjectivity and honouring of experience that can only be perceived or embodied by a mature dancer. Research on this area highlights these dancers' embodied history and corporeal value, which places new importance on the naturalisation of the older dancer. Dance artist Ann Dickie surmises:

At last, people are beginning to recognize what some of us have always known – the value of the creativity and experience of older people! [3]

French theorist Laurence Loupe describes dance as:

A danced moment carrying its charge of what has been lit up in the bodies of the dancer and the spectator. We are all in search of these brilliant moments and of the indelible mark they make on us despite the elusive transience of their passing. [4]

The opportunity to capture these moments through video footage and/or the digital camera is the creative element of my PhD investigation into exhibiting the ingenuity of the mature dancer in motion. I am currently working with 2 groups of mature dancers, the Australian Dance Artists who are based in Sydney and four British dancers based in London, whose ages range from 57 – 68 years of age. All are either professional classical or contemporary dancers. I intend to produce 2 films, where the dancers will interpret a dance motif of mine in the vein of Sophie Calle's body of work "take care of yourself." I filmed myself demonstrating the movements and the 8 dancers choose how they will interpret this, either by copying the choreography, improvising, changing, ignoring, thereby recreating 8 new pieces of work. Early in January 2015 the filming of the British dancers commenced beginning the creative process for the final film: Interprete. This body of work will later be shown in an exhibition space as well as via vimeo.com and social media. This may also be accompanied by a performance from myself addressing the dance dialogue from the 8 dancers; as yet this is to be established.

Mature Dancer: Study of Collaboration

In 2014 I conducted interviews with 2 groups of mature dancers, the Australian Dance Artists, based in Sydney, and four British dancers based in London. Anca Frankenhaeuser (67), Patrick Harding-Irmer (68), Susan Barling (57) and Ross Philip (57) form part of the Australian Dance Artists who perform with the artist Ken Unsworth in site specific performances at his Sydney studio. These four contemporary dancers hail from the London Contemporary Dance Theatre and Sydney Dance Company, all carry a lifetime of dance language and embodiment. These dancers are part of my primary research and their assistance with the project has

been invaluable. These dancers will perform in the proposed film, where the motif will be reinterpreted; this is due to be filmed in April 2015. The second group known as the British dancers are composed of, Jennifer Jackson 60 (former soloist Royal Ballet Company, Dancing the Invisible), Susie Crow, 58 (former soloist Royal Ballet Company, Ballet in Small Spaces) Ann Dickie 68 (former Rambert, Tanz Theatre, From Here to Maturity) Nicholas Minns 62 (Rambert, Les Grands Ballets Canadiens).

For this process I use two cameras, a Nikon D5100, which shoots film footage via a tripod, whilst I use a JVC video camera for zooming in on headshots and close-ups. I filmed the British dancers in London during January 2015. The dancers first improvise to capture their chosen mode of movement, which I then filmed, one dancer at a time, allowing them only one performance, keeping the work raw and original. I also photographed the dancers as they 'warmed up' and experimented with the choreography, using time exposure settings allowed me to experiment and seize imagery as Walter Benjamin describes: "through photography the lens is able to employ such techniques as enlargement or slow motion to capture images that are quite simply beyond natural optics."

It could be argued that the images procured will confuse the viewer as to the age or even gender of the dancer as this is obscured. The slow shutter speed settings allow for a greater depth of imagery in this context whereas the film will display the mature dancers more obviously, highlighting their embodied dance experience, the gestural and corporeal is documented through their danced movements.

Figure 1: *Australian Dance Artists, Anca Frankenhaeuser & Patrick Harding-Irmer, Ross Philip & Susan Barling* Sonia York-Pryce 2014
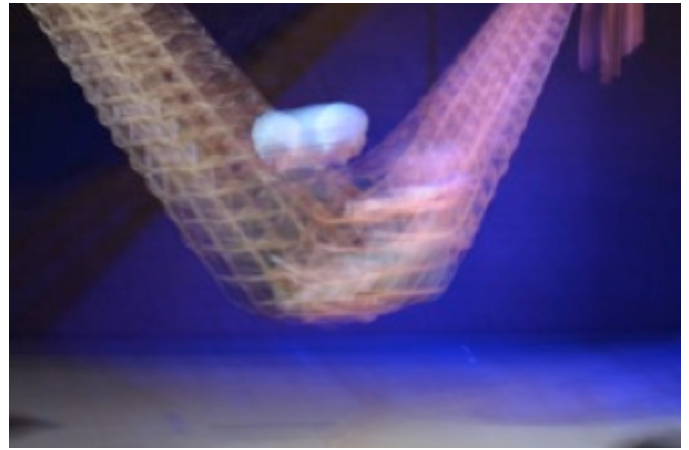

Figure 2: *Australian Dance Artists* Sonia York-Pryce 2014

Digital Technology – the Motif Film – Interprete

The concept for the creative part of the PhD, Interprete, is the film I wish to produce with the idea appropriated from French artist Sophie Calle's body of work titled: take care of yourself. Calle asked 107 women to respond (including a parrot) from the realms of anthropology, criminology, philosophy, psychiatry, theater, opera, and soap opera to this letter, reading and re-reading it, performing it, transforming it, and pursuing the emotions it contains and elicits.

http://www.paulacoopergallery.com/exhibitions/56

My intention is somewhat similar though not entirely, in that I will ask 8 dancers to interpret my movements in whatever form they feel appropriate, which could encompass changing the choreography, the intent and or transforming the motif into a totally personal sequence of movements.

I have returned to the studio, filming myself demonstrating the dance Motif, which is now a video to present to the dancers as the original choreography, a type of dance map. The Motif, is a selection of dance moves/steps choreographed by myself when a student at Laban School of Movement and Dance, London, in 1987. This sequence of movements (filmed and edited by myself) shot in the studio and then uploaded to http://vimeo.com will allow the dancers to view the choreography via a laptop or iPhone. This footage was shot from various angles, detailing the movements factually, filmed by myself, facing towards and away from the camera, then from the left and right sides consecutively. This demonstrates to each dancer a map of the movements and will act as a guide for them to interpret their own version of the motif.

https://vimeo.com/112907186 PhD two (Film 3)

Up-loading the film to http://www.vimeo.com makes accessibility to the material simpler because geography dictates this to be the best format for all the dancers involved with the project. The Australian Dance Artists and the British dancers, Jennifer Jackson, Ann Dickie, Nicholas Minns and Susie Crowe have found this way advantageous allowing them time to view the choreography and interpret from there. The latter will re-interpret the Motif in a studio space courtesy of Surrey University. The final editing will produce a short film/s of the eight dancers re-interpreting the choreography in a totally unique and personal style. As yet it is unknown until all the filming is complete whether the work will be shown as 8 short films, or 2 films showcasing the Australian dancers and the British dancers or become an amalgamation of all into one film.

Challenging Traditional Roles

As a mature dancer and Luddite, the involvement of technology in the project has been both a positive and negative experience. Keeping abreast with the endless changes with digital media is a constant source of angst for the mature artist. The positives are the ability to instantaneously record and document movement and imagery that can be assessed and critiqued personally as well as viewed on social media; a great platform for feedback and advice. The change from the times of the 1970s when video was just beginning to be utilised for teaching purposes in dance schools when I was a student to the technology available today it is staggering what can be achieved in the studio context. It is evident today that dance and film go hand in hand for promoting the work be it via social media, theatre publicity or otherwise.

As a dancer I have had to garner new skills to adapt with the ever-changing proficiencies needed to promote my arts practice, this was evident when I had to edit Australian Dance Artist's film: Soiree Sforza from 54 minutes to under 10 minutes duration, with kind permission from the cinematographer Paul Nicola, for the Elixir Festival at Sadler's Wells Theatre, London. (September 2014) I had to learn very quickly how to 'rip' a DVD, then edit, upload onto the net, then export via http://www.dropbox.com for Sadler's Wells Theatre. The edited version went safely to London and was viewed for 4 days during the Elixir Festival.

http://vimeo.com/104217911
Soiree Sforza The original uncut version.

Figure 4: *Making Room,* Jennifer Jackson
Sonia York-Pryce 2014

Figure 3: *Jennifer Jackson*
Sonia York-Pryce 2014

Research Aims

The research aims to highlight the value, validation and visibility of the mature dancer through film, photography and the questionnaire which forms the primary research, that has been submitted to 20+ dancers in the UK, Australia and Canada. This section of the research gives the mature dancer a voice and could conceivably become a publication; the data is ongoing as more dancers add their comments. The creative work produced for the PhD will be part of an exhibition and could lead on to other avenues of performance or further discussion in the dance world.

Immediately after the Elixir Festival

http://www.sadlerswells.com/screen/video/3884457938001#

closed, I was able to secure some studio time with mature dancer, Jennifer Jackson (part of BDM (Hons) and PhD primary research) who was rehearsing at The Ivy Studios, Surrey University, for her current work: Making Room. I was fortunate to capture time and fast exposure motion images for the research. She anticipates using some of the stills to promote her work.

Approach

My studio process is haptic. I decide a time to be in the studio with a digital SLR camera and a video camera. I have no fixed ideas of outcomes, rather I aim to produce images and sufficient film from which to reflect on and refine. The process commences as if I were choreographing a dance. I select a specific soundtrack as background accompaniment; this assists my process allowing me to concentrate on the project whilst moving in the studio space. In most cases the chosen soundtrack will be used in the final work. Here I am hoping to use music by composer Bill Ryan, with whom I have been in contact and I am awaiting permission to use the score. Through dance improvisation I experiment with movement, this helps to get me started, whilst the video or digital camera records. This investigation allows me to warm up the body, move in the space and to experiment freely captured by the video or the SLR camera. These images or movement sequences reference what is required to experiment or I may choose to not view the work at that time and observe at a later date.

Figure 5: *Self Portrait.* Sonia York-Pryce 2014

The filming of movement has revealed greater scope to experiment with space and motion, as the camera can record freely. I have experimented with the video camera in a fixed position on a tripod and intend to investigate by moving it around the studio, capturing the movement from as many different angles as possible. I have had interesting results from mounting the video camera high up on a ladder to give the appearance of aerial shots. This elevated position will give another interesting angle to capture the dance Motif in motion, should I choose to use this process. Studio assistance is going to be necessary to capture the imagery I aim to display.

Generally, I investigate and experiment with slow shutter speeds using a digital camera accompanied with simplistic lighting, in this instance with 2 redhead spotlights. I will revisit techniques that were previously explored in my Bachelor of Digital Media (Hons) film

 Does the Dancing have to stop? http://vimeo.com/78251127

and the accompanying self-portrait photographic project, with atmospheric lighting which produced interesting images. So far I have limited the filming and photography to myself, allowing opportunities to experiment and this has produced both positive and negative results.

Figure 6: *Self Portrait with iPhone.* Sonia York-Pryce 2014

The studio investigation has also provided enough material to produce 2 short videos as a starting point plus some much-valued film editing experience. These experimental techniques will assist in the process of creating a new body of work, as learning new skills. My previous videos have featured myself as the dancer, filming and editing unassisted but this body of work will give me invaluable experience creating alongside mature dancers as well as the technical assistance of an experienced cinematographer. It is anticipated that the final film Interprete will give a voice to the mature dancer's body.

1st video work:

https://vimeo.com/101821186

2nd video work produced, the promo for Interprete:

http://www.vimeo/103689205

Analysis

Dance and digital technology in today's dance world is a great asset, being able to revisit dance I have filmed in real time is a valuable creative3 tool as well as engaging audiences through the avenues of Facebook, Twitter, vimeo, You tube and www. Indeed, the Elixir Festival 2014 and my recent visit to Resolution 2015 at The Place, London, exhibit how dance and film are enveloped within each other, either used in the performance space or through publicity it gives the viewer immediate access to a dance company or choreographer which is invaluable. How did we ever manage before the intervention of these modes?

Individual Reflection

As a dancer, apart from being challenged in the technical sense, the documentation of process is necessary and somewhat daunting, hence the 'tongue in cheek' suggestion of 'dance your thesis' for the PhD. This example was recent-

ly exhibited at my MVA Confirmation, recorded via my iPhone, where I documented myself dancing as a dance dialogue to my proposed MVA thesis. This process, at the time was also an invaluable tool for the instant viewing of a dance performance, something unheard of in my days as a young dancer. Most dancers and choreographers in the past had to rely on dance notation as a form of reference or old film footage, quite the contrary to the immediate results viewed through digital technology today. The value of documentation through digital media is a necessary accessory for many dance artists today and personally forms the main creative element of the PhD and beyond.

Conclusion

Elizabeth Schwaiger, posits that the dancers' body, at any age, carries a specialised embodiment, their instrument is their physicality. The aged dancer's body carries such a strong dance vocabulary and should be valued. Schwaiger embrace's the mature practitioner's experience and embodiment, perceiving this passage of time is personally relevant, as it is in my case as a mature dancer. She posits positive qualities in mature dancers, their grace and fluidity plus the change in their performativity that could only exist because they are ageing. Dancer Susan Barling, Australian Dance Artists:

> Maturity helps my performance, I'm not trying to pull off a triple turn – I'm aware of the infinite possibilities I have to express myself within the dance. Before I thought it was more about perfection, now I feel it is more about connection. [11]

As such, dancer and educator Jillian Harris posits:

> Years of knowledge and wisdom stored within these older bodies go to waste and audiences lose transformative experiences as we, as a society, revel in the virtuosity of youth and fail to see physical feats as merely one aspect of an artistic investigation. [12]

Furthermore, Kathleen White notes, "to deny the older artist participation is to deny audiences the full power and pleasure of artists who have ripened and fully developed their expressiveness and grace." [13]

However, western culture's obsession with youth is being challenged by the recent interest and fascination with the 'new' mature dancer whose visibility on the performing stage is becoming more vibrant and acceptable than ever before. Digital technology is integral to my creative process and though this medium I hope to exhibit the grace, performativity and presence of the mature dancer is vital in the dance world where ageing is still a taboo issue.

Using digital technology to portray my arts practice is a means to exhibit these extraordinary mature dancers but it can never replace the immediacy or intimacy of a live performance in the theatre but for many it is the only way to view the craft of great dance artists.

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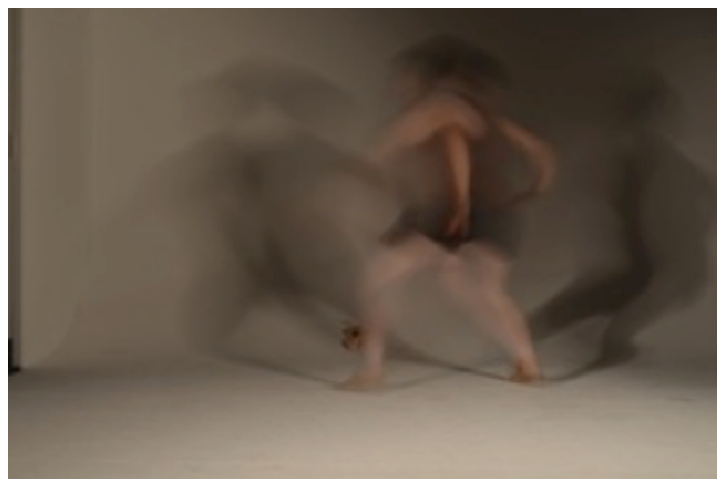
Figure 7: *Self Portrait.* Sonia York-Pryce 2014

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The Spatial and Temporal Poetics of Webcam Viewing

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Abstract

This paper will explore the aesthetics of the pixelated scenes relayed across the globe by streaming webcams. It will examine the mesmerising and transportative powers that these shimmering pixels possess – what is it that makes them poetic, and how does this differ from other types of vicarious travel? It will investigate the ways in which our experience of temporal and spatial relationships shift - how our perception of place undergoes a transformation as the line between 'here' and 'there' becomes blurred and suggest that a new digital and vicarious aesthetic has evolved to exist within the wider context of travel imagery.

Keywords

Digital Poetics, Remote Experience

Introduction

Our perception of place undergoes a transformation, when we look at a scene through a webcam, as the distinction between 'here' and 'there' is reconfigured – it is as if, in a sense, we are there, even though our bodies remain here. Indeed, the digital wiring of the world effectively collapsed geographical distance, with a virtual map of webcams offering us a chance to connect in real-time with remote, yet carefully framed, landscapes. This compression of time and space has allowed us to become computer-chair tourists, able to embark upon a Grand Tour while never having to step outside our front door.

This paper will explore the spatio-temporal poetics that can be experienced when viewing a live webcam. In order to examine the aesthetics of this merging of space and time, it will trace a path through history touching upon ancient times, then progressing through the eighteenth and nineteenth centuries and on to the digitally connected, global world that we live in today. It will conclude with the notion that in this day and age, we are witness to a new digital, vicarious, poetic experience – a new sublime.

Vicarious Experience

When we gaze upon the frozen landscape of Iceland's Jökulsárlón glacier via a webcam, we undertake a virtual journey[1]. But can we really call it a journey? There is no duration spent getting from A to B, which is a vital component of the experience of travel – no equivalent to a road, train or plane trip. As Paul Virilio puts it, today's technology has ushered in a time:

> whereby everything arrives without having to leave, the nineteenth century's elimination of the journey (that is, of the space interval and of time) combining with the abolition of departure at the end of the twentieth, the journey thereby losing its successive components and being overtaken by arrival alone [1]

However, the immersive, virtual landscape and its accompanying virtual 'journey' are not recent phenomena. Their history extends from the prehistoric cave paintings of Lascaux and the frescos of ancient Rome through to the nineteenth century's panoramas, and on to today's virtual- reality computer-simulated environments. A further history comprises an amalgamation of the real and the virtual: the Claude glass[2] (the seventeenth and eighteenth-century painters' tool that captured the reflected landscape and transformed it into a tinted picturesque scene), photography, and, of course, present day's webcam.

During the nineteenth century, the representation of distant lands underwent a major transition, as new inventions allowed the mediated experience to shift in both a spatial and temporal sense. The panorama[3] was the first form of mass media entertainment. A hugely popular spectacle, it appeared in many large cities throughout Europe, the US, Australia, and New Zealand. Its highly illusionistic, immersive effects offered city dwellers, whom the majority were unable to afford the pleasures of travel, the opportunity to experience faraway and exotic locations, albeit in a remediated manner. Perspective techniques had to be adapted to deal with the painting's curvature, and spectators, no longer anchored at a fixed point, could walk about the platform and reorient themselves to a view that encircled them.

The contemporary telematic vehicle of vicarious travel, the webcam, did not appear until in 1991, two hundred years after the panorama's birth. The first, the Trojan Room Coffee Cam[4] set up in Cambridge University's Computer Science Department, allowed the researchers to see if a coffee pot in a staff room was full, and therefore, whether or not it was

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[1] Live from Iceland, http://www.livefromiceland.is/webcams/jokulsarlon/

[2] The Claude glass, also referred to as the black mirror, was a popular device among nineteenth-century tourists that allowed them to convert their views into Romantic landscapes. However, it was looked down upon by the critic John Ruskin who valued a more direct, authentic view. See Maillet, A. 2004 The Claude Glass: Use and Meaning of the Black Mirror in Western Art. Zone Books, New York.

[3] The panorama was invented in the late-eighteenth century but it was during the nineteenth century that it really came into its own. For an extensive survey on the subject see Oetterman, Stephen. 1997 The Panorama: History of a Mass Medium Zone Books, New York.

[4] The Trojan Room Coffee Pot Resources website, http://www.cl.cam.ac.uk/coffee/qsf/.

Figure 1: Gallery installation shot of *Lake Rotoiti* exhibition

worth making the long journey through the building to get a cup.

A year before the Coffee Cam emerged, Jonathan Crary had already recognised that:

> most of the historically important functions of the eye are being supplemented by practices in which visual images no longer have any reference to the position of an observer in a 'real' optically perceived world. If images can be said to refer to anything it is to millions of bits of electronic mathematical data. Increasingly, visuality will be situated on a cybernetic and electromagnetic terrain ... consumed, circulated and exchanged globally. [2]

It did not take many years before the webcam lens-to- computer distance stretched from just mere metres, within Cambridge University, to thousands of kilometres, reaching over oceans as it grew in tandem with the rapidly expanding Internet. In the ensuing years, webcams swiftly multiplied, their lenses being turned upon both private and public scenes, providing views, among others, into people's homes, onto street corners, and of national park vistas. In effect, they sprung up wherever anybody felt the inclination to install one, a network of mechanical Cyclopes, colonising the planet, to peer into just about anywhere.

In the twenty-first century, we now can 'visit' the other side of the world with a mouse click. As Guy Debord proclaims, all experience that was once "directly lived" has now become "mere representation ... simple images become real beings and effective motivations of a hypnotic behaviour". The spectacle makes "one see the world by means of various specialized mediations (it can no longer be grasped directly)" [3].

The experience we have of a place, via the webcam, becomes a substitute for being there; we are offered a simulacrum. While our bodies may be disconnected from these faraway locations, our brains are not; as a mesmerising flow of digital images is fed to us in real-time, we experience a sense of being present in two places at once – we undergo a form of telepresence. However, it is a limited form for it only possesses two of the three properties that, according to Oliver Grau, define telepresence, enabling the viewer to be in three places at once:

> a) in the spatio-temporal location determined by the user's body, b) by the means of teleperception in the simulated, virtual image space [...] and c) by means of teleaction in the place. [3]

In most cases, but no means all[5], "teleaction" is missing from the equation. However, this incomplete sense of telepresence still possesses a powerful aesthetic quality for it is essentially generated through, as Debord describes it, the "privileged" and "mystifiable", sense of vision [4]. When viewing a webcam scene we encounter the poetics of remote transmission. Or, as Andrew Utterson describes it, "we experience exotic geographies through a profound metaphorization, revelling not in representation but in evocation, a stream of referents interiorized within the Internet's transcultural, simulatory domain" [5].

Webcams, directed at sublime, simultaneous views[6] of nature's spectacles, are capable of enchanting us. Framed within our computer screen, we encounter a hyper-real vision of nature; at times, more capable of evoking the experience of the romantic sublime than one would experience if

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[5] Some webcams, for instance the Blue Mountains webcam http://www.captiveye-scenicworld.com/camera/camera.htm allows the viewer to operate the camera's pan and zoom movements for a short duration.

[6] Webcams deliver their images in a variety of ways; some are video streaming while others produce jpegs at consistent intervals, ranging from one second through to hourly or even longer.
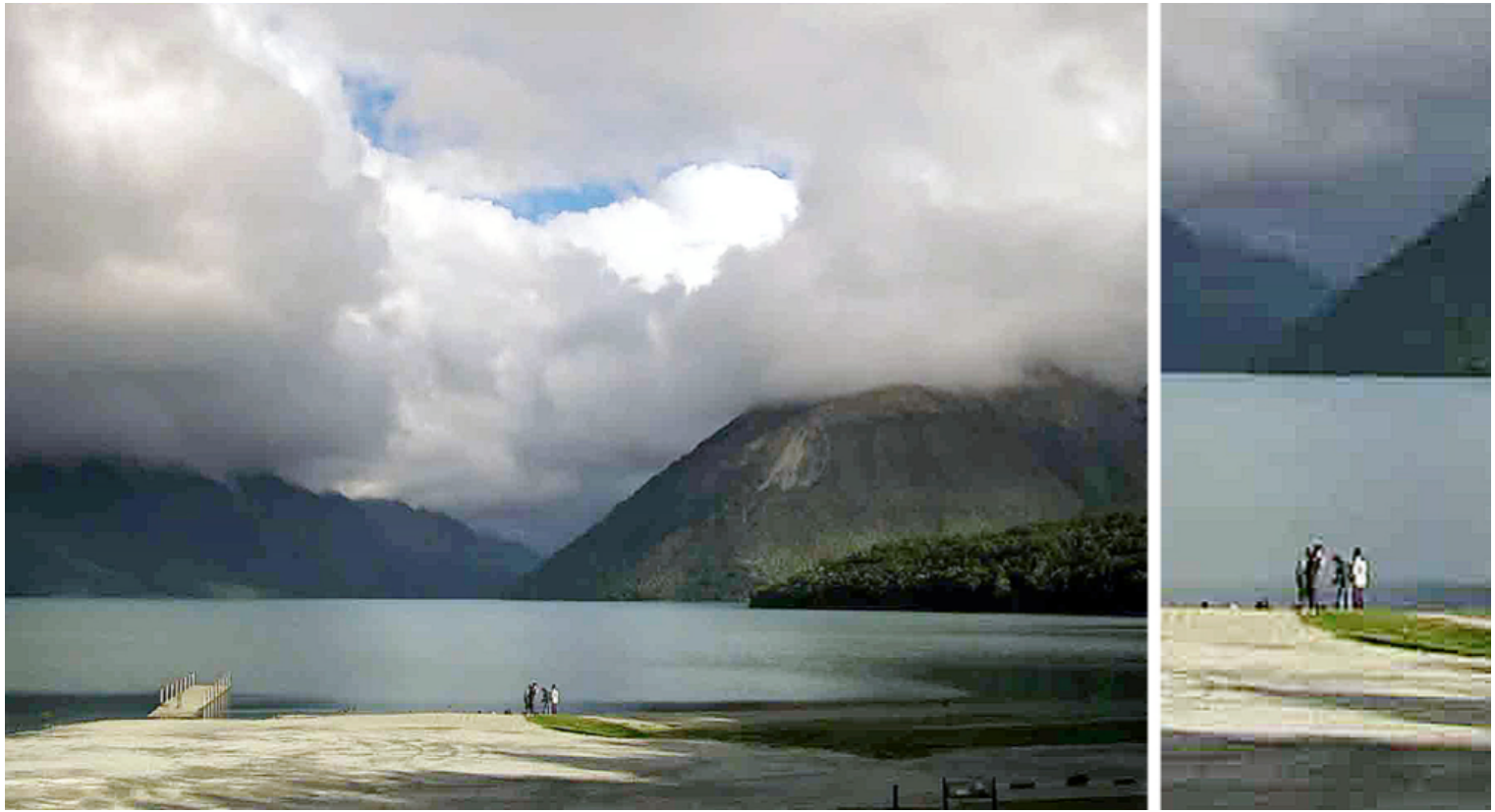
Figure 2: *Lake Rotoiti #3* with detail

actually standing upon a shore. Often, like a staffage figure in a Caspar David Friedrich landscape painting, an unsuspecting sightseer may wander into a scene who provides not only a sense of scale but also a point that we can vicariously project ourselves onto.

The series Lake Rotoiti (five 2 x 1.5 metres photomedia prints) is based on images I originally gleaned from a webcam directed at a sublime scene in New Zealand's South Island. Four of the five images contain figures with their backs to the camera, ranging from a lone viewer gazing out on to the lake reminiscent of Friedrich's The Wanderer, to small groups and even a large crowd contemplating the spectacle. Referring to Friedrich's paintings, Barbara Maria Stafford suggests that figures who turn "their backs on the viewer to gaze" produce an "emotional and cognitive inaccessibility ... profoundly subversive, thwarting the beholder's natural impulse to simulate the figures' expressions and so comprehend the situation. Uncertainty and ambiguity reign." [6].

The light reflecting into the Lake Rotoiti webcam's lens is reconstituted into pixels, which are then formed into blocks of colour by a jpeg compression algorithm[7]. These "underlying aesthetics of current imaging techniques", writes Sean Snyder, "play a role in establishing a sense of authenticity. Whether this is true or not, data compression results in the disintegration of image quality, leaving space for interpretation (or over-interpretation)." (Sydner 2008). To emphasise the images' digital construction and remediation,

I reprocess them by further compression[8]. In an unusual contrast of techniques, after this deliberate degradation, the computer is used as a digital darkroom to reference the history of landscape representation; I mimic traditional photographic techniques, such as controlling contrast, burning in the image edges (a common landscape photography practice), and enhancing tones within localised areas. Then, once again, the images are remediated; removed from the screen, they shift from the digital realm to the analogue; output as prints, the digital artefacts are even further accentuated due to their large scale. When seeing the images from a distance, they first appear as conventional photographic landscapes, but, as one nears, their digital foundation clearly emerges.

The Aesthetics of Binary Transmission

Webcams, such as the one pointed at the glacier Jökulsárlón, possess a hypnotic quality. This remediated light, reflected from an icy land at the top of the world, is transformed into luminous pixels of serene blues and soft greys that lull us into a kind of reverie. The seductive quality of these glowing pixels can be paralleled with other optical devices from the seventeenth, eighteenth and nineteenth centuries that, as Stafford explains:

> played a key role in this dialectical process of joining earthly to the unearthly experiences. Specifically, the technologies of projection, magnification, and transparency made it pos-

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[7] This algorithm reduces the size of a digital file through a lossy process; data is discarded in order to make it faster to transmit over the Internet. Pixels within a particular tonal range are grouped together, which gives a particular 'block' look to the resulting image. Mpeg compression is the moving image equivalent.

[8] This emphasis of the digital artefacts of compression is a method Thomas Ruff also uses in his series Jpegs (2004– 2007). This series investigates digital images' pervasiveness within our lives, and the ways in which they are disseminated and are received by us. Ruff appropriated the majority of images from the Internet, though some are photographs that he took himself.

Figure 3: *Adrift,* conceptualisation

Figure 4: *Head in the Clouds,* conceptualisation

sible to permeate tangible substances with intangible light [7]

Webcams are at times enchanting instruments, capable of placing viewers under a spell. Thomas J. Campanella describes them as:

> liminal devices ... because they are only briefly separated from the pulse and hue of life – for a time at least – they are infused with a touch of magic … they 'map' reality onto cyberspace, and vice versa [8]

In the view of Jökulsárlón, movement of the water's swift current and the shifting sunlight is rendered in fluctuating digital blocks formed as the algorithm performs its process of deconstruction and reconstruction, while other areas of the image remain relatively static like the frozen land they depict.

In 2001, Lev Manovich pointed out that for all the enthusiasm surrounding the precision and slickness of digital imaging, it was the aesthetic of compression with its poor image quality that dominated. He predicted that this would change as wider bandwidth and higher definition became more widespread [9]. Now, thirteen years later, the volume of global Internet traffic grows exponentially by the day[9], and the enhanced quality and higher resolution of the relayed, instantaneous image is following in its wake[10]. Unsurprisingly, the push for this greater verisimilitude comes from the realm of commerce as the physical offices of today evolve into the telepresent workstations of tomorrow[11]. However, volume tends to increase with greater access, and consequently, algorithmic compression will continue to be around for some time. Nevertheless, this digital aesthetic may eventually be remembered as a quaint characteristic of our time.

Framing Space and Time

Renaissance man Alberti's single-point perspective, a method of representing three-dimensional space on a two-dimensional plane, was based upon a framed grid that the painter (and later, the viewer) considered an image as if through a window (Alberti 1435). Not only a technique, linear

perspective was also a concept that rationalised and removed the body from human vision. This paradigm, Crary claims, shifted in the nineteenth century when optical devices, such as the panorama, stereoscopic, magic lanterns and other viewing apparatuses, introduced new means of viewing the world (Crary 1990). In the twenty-first century, a computer is capable of having multiple webcam views and perspectives framed upon its screen simultaneously. Although nineteenth-century optical devices and webcams may vary in methods of virtualisation, they all possess mesmerising, transporting powers. All incorporate a hybrid of physical and virtual space, even if the friction that exists between these two spaces manifests itself in different manners. Furthermore, all these devices bring the exterior into the interior, and impart to their respective viewers a scopic sense of control, a form of visually tying down an increasingly complex world. Each presents a vicarious experience; they offer the viewer a chance to escape their confines and extend their visual horizons, enabling new ways of perceiving the wider world.

"Like the window, the screen is at once a surface and a frame", Anne Friedberg states, "a 'virtual window' that changes the materiality of built space, adding new apertures that dramatically alter our conception of space and (even more radically) of time" [10]. Alberti's window is a mode that may well have become outmoded.

My art practice explores this relationship between physical and virtual space, as I endeavour to visualise and spatialise temporality. The installation Now How Far comprised a small, darkened room where within two monitors diagonally faced each other, each displaying a live webcam video-feed of a view looking out Jökulsárlón glacier. Viewers would enter the space and stand between the two monitors, sandwiched between two mirror images that relayed in real- time from the top to the bottom of the world. A sound, which at

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[9] For more information see Mitchell, S. and P. Spencer. 2012. Work-Life Innovation: The Role of Networked Technologies. Cisco IBSG, San Jose. 11.

[10] In July 2013, Japan tested 4K television streams over the Internet, refer http://www.bbc.co.uk/news/technology-22872891.

[11] For more information see Duffy, Frank. 2008. "Justifying Place in an Increasing Virtual World" In Work and the City. Black Dog Publishing, London. 56-59.

first seemed to be of waves breaking upon a shore or perhaps wind whirling through trees, permeated the space. However, on closer attention, one could hear the blips and crackles that revealed it to be electrical static noise, a soundtrack looping that I created through mixing together layers of differently pitched white noise, their amplification undulating.

To further test and extend the ideas within this installation, and experiment more with the properties of the panorama, I have created two further installation designs. The first (working title All Lost at Sea) consists of two semi-circular screens (see illustration) facing towards each other so as to form a bisected circle that the viewer is able to enter or exit through the two openings. On to each screen is projected of a live view of the sea, one the mirror image of the other, in the manner of a panorama this work will circumscribe the viewer.

The second design (working title Head in the Clouds) is a sphere (see illustration) that viewers move into to find themselves engulfed by sky, staring into a live transmission of infinite space yet simultaneously facing the digital surface of its rendering. The desired effect being that the viewer is disorientated - vicariously present within a real-time digital representation of the sky, in a sense suspended, horizonless and landless. The sky's immateriality rendered material in the obvious digital compression and the pixels' patterning and flickering, a tension created between the infinite and the bounded.

Whilst the photomedia series Lake Rotoiti documents single moment (telescoped snapshots reworked), the installations, however, present a real-time, immersive experience, albeit rendered into an ever-changing stream of pixels. As enclosed (or semi-enclosed) spaces they relocate the exterior into the interior, with the converging temporalities of the viewer and the viewed creating a poetics of simultaneity.

This quality of magically remediating and inverting space in real-time is analogous with that of the camera obscura. Both Crary and Stafford describe the sense of enchantment that viewers experienced when encased in a camera obscura.

> Many contemporary accounts [...] single out as its most impressive feature its representation of movement. Observers frequently spoke with astonishment of the flickering images within the camera [2]

There is an element of enchantment; an otherworldly state to be found when one is encapsulated within a shimmering space, as Stafford states:

the camera obscura's fanciful hyperimages revealed what was "occulted," or invisible, to the unaided senses - including the bizarre contents of the onlooker's imagination. Dreamy images - that are false in spite of their magical vividness - blended with the watery substance of the beholder's reveries [8].

As with Now How Far, a mixed, layered digital soundscape will be incorporated into each installation. Its aim is to play upon the differences between the real and the virtual, and aid the viewer's transcendence into a phantasmagoric space. Temporally, both installations will be ever changing, as airstreams stir clouds, tides propel waves and light alters pixels, yet paradoxically, both will appear seemingly constant due to their repetitive and meditative animation.

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Audiovisual Installation as Ecological Performativity

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Abstract

This paper stems from my practice as a composer and my research as a PhD candidate at the University of Waikato. The majority of artifacts that result from this research are audiovisual installations that explore new relationships from an ecological perspective – that is – the perspective that considers the world to be a network of interconnected and interdependent phenomena. In an attempt to contextualize my research and explore new possibilities for creative practice, I have become interested in a number of theories pertaining to the agency and performativity of living and non-living systems. I present several of these theories within a historical context, and describe a work-in-progress, the audiovisual installation Bridging, and the generative installation Beads that illustrates my evolving practice and ontological notion of Ecological Performativity.

Keywords

Audiovisual Installation; Agency; Autopoiesis; Ecological Performativity; Ontology; Performativity; Cognition; Interconnectedness; New Materialism.

Introduction

As a composer, my creative research has increasingly become a multidisciplinary collaborative endeavor that has developed intuitively over the past 20 years. To foster a supportive discourse with which to reflect on these creative activities and explore new patterns of inquiry and networks of communication, I have been drawn to a range of theoretical texts pertaining to the agency and performativity of living and non-living systems. In this paper I present these various insights within a historical context, and describe a work-in-progress, the audiovisual installation Bridging, and the generative audiovisual installation Beads that illustrates my evolving practice and ontological notion of Ecological Performativity. It investigates the interrelationships between living and non- living systems as form, matter, process and meaning, and their artistic potential for an empathic discourse that extends to include the larger biosphere.

Background

Historically, the notion of agency and performativity evolved from a variety of scientific and artistic research that took place over the last century and now into the 21st century. [1] This work reflects a paradigmatic shift away from a mechanistic, representational model to one of an interrelated, performative network and, in the sciences, includes an exploration of emergent properties, systems thinking, cybernetic theory, chaos theory, complex systems theory and autopoiesis. [2]

Parallel to these noted developments in the sciences, aspects of creative arts also have evolved from a static, representational model to that of a "performative" one. Advances in mechanical and computational technologies influenced this transformation and are well documented in Chris Salter's book, Entangled: Technology and the Transformation of Performance. He writes: "Technology does something in and to the world by modifying existing relations and constructing new ones between humans, tools, processes and the environment which are deeply entangled." [1]

The trajectory of these relations occurred across all areas of creative practice. New paradigms of expression and translation fostered the convergence and synthesis of artistic forms. Within a few decades theatre, dance, literature and music responded to the shift in ontological thinking – one away from representational models to a more performative, time-based and non-linear practice. [3] Salter suggests that "these new relationships and interactions of discrete aspects of experience [opened] deeper understandings of the nature of consciousness and the workings of the mind … the reorganization of human interaction and the reimagination of interrelatedness. [1]

To briefly summarize this shift, we need only look at a selection of fine art works throughout this time period. Picasso's The Old Guitarist of 1904 was completed just one year before Einstein published his "Special Theory of Relativity." This singular perspective painting is a remarkable difference to his Guitar Player of 1910 in which we can see the transformation of a static representational viewpoint to that of a "multipositional dialect of space and time." [3] Kandinsky's Composition VIII from 1928 was completed three years after C. D Broad first proposed his idea of emergent properties: that is, properties that emerge at higher levels of complexity due to the relationship of all parts. The more common belief of the time emphasized the parts rather than the whole. Broad's theory put forward an ecological perspective that later became know as systems thinking. [4] From this as well as from cybernetics theory, Roy Ascott's artistic efforts developed [5]. Ascott introduced cybernetics into art education during the 1960s and believed this theory "opened the door to understanding the nature of mind as a systems phenomenon and became the first successful attempt in science to overcome the Cartesian division between mind and body." [6]

The Santiago Theory of Cognition and the Embodied Mind

It was from cybernetics theory that Humberto Maturana began to develop his theory of autopoiesis–auto(self),

poiesis(creation). [6] He explored this while researching visual perception and the organization of living systems. Here Maturana posed the question, "How do I do what I do as an observer in observing?" [7]

In reply, he proposed a new concept of circular organization claiming that "living systems are cognitive systems, and living as a process is a process of cognition." [7] All of his subsequent research came from this basic epistemological and ontological shift of thinking, which eventuated into the Santiago Theory of Cognition. With this theory, Maturana, along with Francisco Varela, proposed that "to live is to know" and that cognition is a "continual bringing forth of a world through the process of living." [8] The particular world that is brought forth depends, first, on the structure of the organism, and, second, on it's relationship to its environment. [2]

This theory was a profoundly new view of cognition that included all processes of life such as perception, emotion, action, and emergence. It involved the concept of mind as a process, not a thing, and extended the act of cognition to all living systems – including organisms that do not have a brain such as simple-celled organisms. [2] At the time of its introduction, the Santiago Theory of Cognition provided the comprehensive scientific framework necessary to challenge the Cartesian division between mind and body and provided a "new synthesis of mind, matter, and life." [6]

Maturana[1] and Varela, respectively, would expand on this theory of cognition and, in Varela's case, would eventuate into what is now widely accepted in cognitive science as the "embodied mind." [10] Varela introduced this term in the early 1990s with the central thesis that cognition, including knowledge, meaning, and emotion, is intrinsically linked to our body, to the active living of that body, and to the environment in which these activities, or "enactions" take place. [10] Since then, the concept has evolved to include the very structure of human reason as arising from our bodies, brains and bodily experience evoking a quality of emergence and agency.

Current Theoretical Discourse

Currently there is much debate in arts, humanities and sciences about the interconnected agency, or "performativity" of living and non-living systems, and between the human and non-human – so much so that "formerly fast held distinctions between the inert and the active, the human and the non-human and life and matter are cracking." [11]

Noted contributors to this discussion include Chris Salter, who, as previously mentioned, has written comprehensively on the trajectory and development of agency and performativity in the arts. His soon-to-be published Alien Agency: Ethnographies of Nonhuman Performance continues this enquiry by examining "three works in which the materials of art – the "stuff of the world" – behave and perform in ways beyond the creator's intent." [12]

Andrew Pickering joins the discussion with his notion of the "dance of agency." This is Pickering's attempt to move away from the idea that agency is specific only to humans, or to what he refers to as human exceptionalism. He suggests that the world, in all its heterogeneous multiplicity, is full of agency and processes of emergence. By exploring these processes and performative relationships between things, including those beyond the human realm, Pickering suggests that we invite the "possibility of a non modern stance of revealing rather than enframing which, in turn, invites open-ended extensions." [13]

Karen Barad elaborates on the notion of performativity in her substantial book Meeting the Universe Halfway. Here, Barad introduces the term "intra-action" to put forward the idea that "existence is not an individual affair where entities pre-exist their interactions; but rather, an ongoing ebb and flow of agency where individuals and things emerge through and as part of their entangled intra- relating." [14]

Similarly, Jane Bennett's concept of "thing-power" tries to give voice to the energetic vitality intrinsic to matter and the active, earthy, and complex entanglements of humans and non-humans. [15] She fosters the notion of "greater recognition of the agential powers of natural and artifactual things, greater awareness of the dense web of their connections with each other and with human bodies, and, finally, a more cautious, intelligent approach to our interventions in that ecology." [16]

Timothy Morton expands the discussion to include his idea of the "hyperobject", that is, agents or objects "so massively distributed in time and space as to transcend localization, such as the biosphere, global warming, or the sum of all the whirring machinery of capitalism." [17] Morton purposes that these objects are the result of "the mesh"[2] of human and non-human agency, particular those which took place during and after the Industrial Revolution. He further suggests that art in the time of the hyperobject can function as an attunement to the reality of the coexistence of all things on Earth:

> Thus the art in the time of hyperobjects explores the uncanniness of beings, the uniqueness of beings, the irony and interrelationships between beings, and the ironic secondariness of the intermeshing between beings. [19]

Fritjof Capra and Pier Luigi Luisi weigh in with their recent publication, The Systems View of Life: A Unifying Vision. The authors present a coherent systemic worldview that integrates the biological, cognitive, social, and ecological diminishes of life. They discuss the philosophical, social, political and spiritual implications of such a unifying vision in an attempt to overcome, what they define as "a crisis of perception," that is, a human-centric use-value worldview. [2] The broader intention of this publication is to provide an appropriate framework from which to discuss one of the "great challenges of our time – the building and nurturing of sustainable communities." [2]

While all of these concepts and discussions resonate at their own frequency, the fundamental underpinnings are similar: the world is a mesh of agency, and because of this a host of ecological, social, cultural, and political observations and concerns are raised and challenged.

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[1] In the context of this conference, it is of interest to note Maturana's own reflections on technology and art: "As different technologies open and close different relational dimensions, they offer different possibilities for social and nonsocial coexistence, as well as different possibilities for the artist to create the relational experience that he or she may want to evoke. In all cases, though, whatever he or she does, the artist will be a participant creator of some virtual reality that may or not become a grounding reality in the course of human history." [9]

[2] In Morton's writing, "the mesh" substitutes words such as interdependence and interconnectedness. [18]
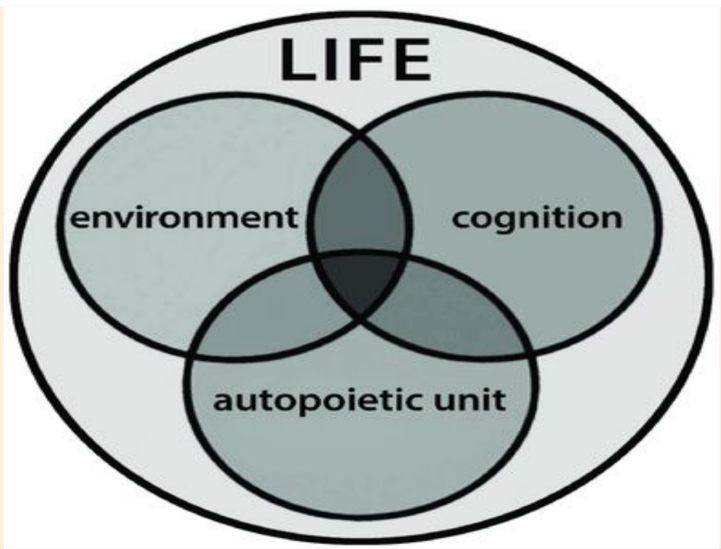
Figure 1: The Trilogy of Life

Ecological Performativity

The intention of my research, or, "mode of artist practice"[3], is to contribute to this discourse in an artistic, experiential, and dynamic way. I do so in an attempt to develop a creative practice that contributes toward an ontology of what I refer to as Ecological Performativity. I introduce this term to bridge my creative research with the ideas outlined above, that is, the ecological perspective of interconnectivity, the cognitive components that include all processes of life, the "dance of agency," the intra- action of living and non-living systems, and the complex systems and entanglements of humans, non-humans, and hyperobjects.

Ecological Performativity has resulted from a series of mixed-media generative audiovisual installations. Similar to other ecologically-grounded creative practices[4], these installations explore the relationships of environment, process and material, and are derived from an intensive data-gathering procedure and immersion within the respective environments. At the same time, by considering the interdependent performative agency of all components involved, that is, the cognition, environment, and autopoietic units (see Figure 1), Ecological Performativity attempts to explore new networks of communication and meaning from a systemic understanding of life.

This concept adopts what Fritjof Capra proposes as the new science of cognition, which unifies mind and matter as being inseparable aspects of the phenomenon of life. [2] Here, Capra speaks to the emergent and agential qualities of living and non-living systems and to the interdependent and fundamental interconnectedness of all levels of life. He does so through a conceptual synthesis of what he considers are the four perspectives of life: form, matter, process, and meaning. [2] In general, form corresponds to patterns of organization, or self-generating networks of communications, of which through process, or reactions, the material embodiment of the form emerges – matter. Meaning, which relates to the inner world of reflective consciousness, is generated by extending form, matter, and process into the social dimension, including "rules of behavior, values, intentions, goals, strategies, designs, and power relations." [2] Human action, then, is understood to flow from the meaning we attribute to our surroundings which, in turn, gives rise to material structures in a process of continual embodiment.

Studio Practice

For the purpose of my creative research, the making and resulting generative audiovisual installations are understood then as "the embodiment of the shared meaning generated by the networks of communications." [2] These networks of communications include the visceral, in-person engagement with the chosen environments, the agency of the collected material and data explored through the development of specially designed computational systems, the subsequent recordings of acoustic improvisations which respond to the collected material, and the cognitive engagement with the resulting artifact, where reflection, contemplation, and consciousness (being a part of the network) in turn become part of the co-evolution of the meaning. This suggests a cyclical aliveness and an empathic discourse[5] that extends to include the larger biosphere, which contributes to the flow of internal and external networks of communication and meaning. The descriptive account of the work-in-progress installation Bridging and the generative installation, Beads will illustrate the creative practice informing the conceptual development of Ecological Performativity.

Bridging

Bridging is the first collaboration between textile artist Stephanie Symns and I, and is the result of a data collection procedure that took place on the Granville Street Bridge in Vancouver, BC, Canada between 2013 and 2014. As an immersive generative tapestry installation, this work, in part, was conceptually inspired by the following quote found in The Sketchbooks of Paolo Soleri:

> Of all things that are man-made, bridges are, with dams, the most "structural," single-minded, and imposing. As connectors at a breaking point, they have a heroic force that is aided by a challenging structuralism. As a strand of continuity in a non- continuum, the bridge is full of implied meanings. It is the opposite of devisiveness[sic], separation, isolation, irretrievability, loss, segregation, abandonment. To bridge is as cogent in the psychic realm as it is in the physical world. The bridge is a symbol of confidence and trust. It is a communications medium as much as a connector. [26]

The initial research began with a series of weavings, designed by abstracting photo images of the Granville Street

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[3] I borrow this turn of phrase from Manning and Massumi in which they claim: "Every practice is a mode of thought, already in the act. To dance: a thinking in movement. To paint: a thinking through color. To perceive in the everyday: a thinking of the world's varied ways of affording itself." Each is a technique, or, springboard that sets in motions "a practice from within."

[4] Terms used to denote other ecologically-grounded
creative practices include: performance ecosystems, ecosystemics, ecoacoustics, ecocomposition, EcoSon, and Sonic Ecologies. [21, 22, 23, 24]

[5] Jeremy Rifkin suggests that empathy is the "invisible hand" that allows us to stretch our sensibility to all life. He proposes that more technologically advanced cultures have evolved into that of homo empathicus, which is ushering in a biosphere consciousness. This evolution has occurred due to the diversity of human interaction, creating a more complex system of communication and emergence [25].

Figure 2: Sample design and weaving (photo and weaving Stephanie Syms)

Bridge. The original image was taken underneath the bridge and manipulated in Photoshop. By posterizing the image to a certain number of layers that later corresponded to weave structures, the image was subsequently mirrored, both horizontally and vertically , to form a singular pattern unit. Of this process Symn's writes: "I am inspired by minimalist architecture and the interrelationship of people, space, and structure. The intention with this series was to create compelling, graphic designs that would make a strong statement with the repetitive use of pattern and geometry" (see Figure 2). [Symns, personal communication]

These would eventually transform into a number of large-sized weavings realized with the use of copper thread (see Figure 3). Coinciding with these weaving developments, a number of audio recordings were captured on the bridge with the use of contact microphones. Attached to the metal components of the bridge, these recordings took place at different times of day and in varying weather. This process yielded a folder of sonic materials influenced by the movement of traffic, the bridge vibrations, and the movement of air through the cylinder components of the bridge.

Figure 3: *Copper weaving (photo and weaving Stephanie Syms)*
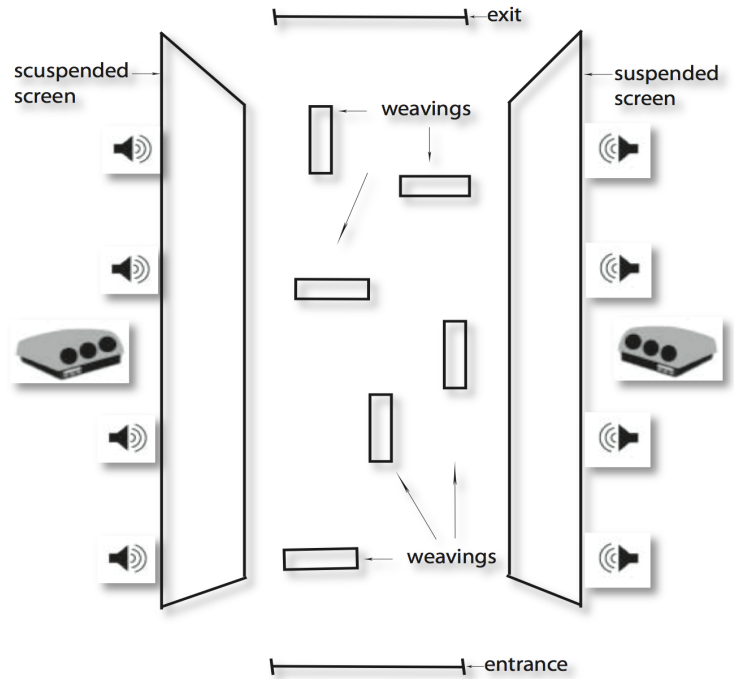
Figure 4: *Installation Layout – Aerial View*
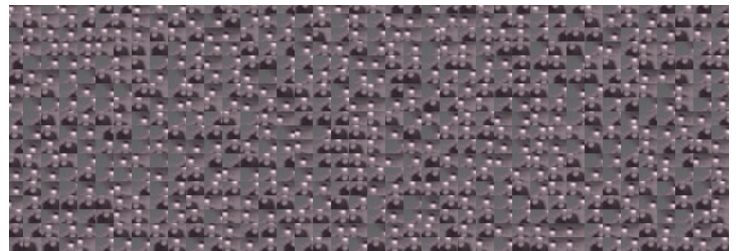
Figure 5: *Image generated from solo pedestrian obtained from Granville Bridge Street webcam*
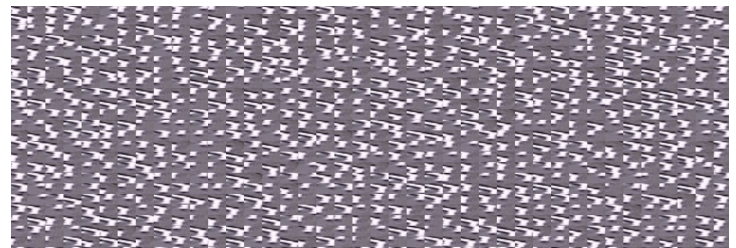
Figure 6: *Image generated from street markings obtained from the Granville Street Bridge Webcam.*

In relating these initial stages of research back to Capra's conceptual synthesis of the four perspectives of life, one could align the impulse to engage with the object as the form through which the process was activated, that eventuated into the matter that stimulated new meaning. Alignment, however, is not the objective, but an exploration of the possibility of different vocabularies and networks of communication available if we were to broaden our understanding of agency and performativity.

The final installation will include six copper weavings with embedded motion sensors, two multi-channeled video projections displayed on large suspended fabric screens, and multi-channel sound, all of which are linked in a generative MAX patch (see Figure 4). The motion sensors will trigger a number of generative agents that will be extracted from the architectural design of the bridge. These agents will cut and multiply visual data streamed from the Granville Street Bridge Webcam and, subsequently will be projected onto the suspended screens (see Figure 5, 6,). With these combined components, the final installation can be considered an immersive space of "emergent collectivities," or rather, "an event-based ecology of experiences" [20] which co- evolves between object and collaborators, material and process, and structure and meaning: a "dance of agency." [13]

Beads

As it was presented at Balanced/Unbalanced 2013 International Conference in Noosa, Australia, Beads is a generative audiovisual installation which features a single-channel video projection and stereo sound. It is the first collaboration between Rene Burton and I and is an interpretation of the ecological landscape through moving image, video tracking, and transcoding. Constructed in the program MAX, Beads uses data collected from the worst maritime environmental disaster to occur in New Zealand. As a self-generative installation, Beads attempts to provide a way of conceptualising the landscape as a record of humanity's impact on the environment. [28]

On October 5th 2011, the cargo vessel MV Rena ran aground on the Astrolabe Reef northeast of Tauranga, New Zealand. The ship carried 1,733 tonnes of heavy fuel oil and 1,368 containers of cargo. During the stormy months to follow, over 350 tonnes of fuel leaked from the damaged hull and over 137 containers were lost overboard. The majority of the pollutants to wash ashore were nurdles – small plastic white beads (see Figure 7). [29]

Figure 7: *Nurdles on Otara Bay (photo Rene Burton)*

Burton set about documenting the effects that the pollutants would have on the shoreline. His documentation process spanned several months following MV Rena's grounding and includes both still photography and video. The footage for Beads was captured on the remote beach of Otara Bay. By placing a waterproof GoPro camera into the nurdles at the tidemark, (see Figure 8) Burton calculated that ten-minute intervals would pass before a wave of significant height

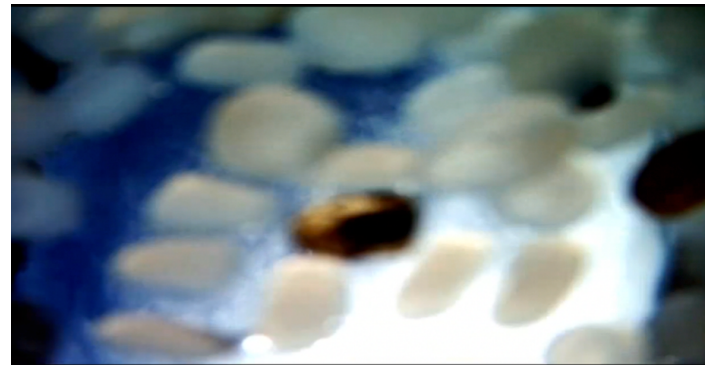**Figure 8:** *GoPro view from nurdles (still from video)*

Figure 9: *GoPro view during wave of significant height (still from video)*

Figure 10: *GoPro view after the wave of significant height (still from video)*
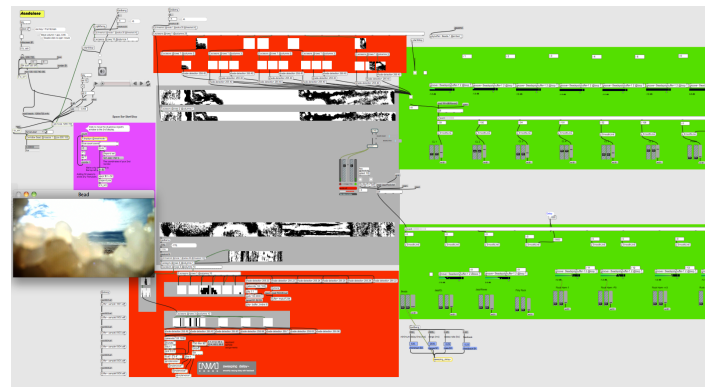

Figure 11: *Beads barcode system*

would wash over the camera and nurdles. "Significant wave height is a meteorological term for the mean wave height of the third highest wave." [Burton, personal communication]

Following Burton's documentation, he suggested that we might collaborate on a project. As collaborators, we have a similar interest in the use of environmental data as creative source material. After reviewing all the source material, the video footage from Otara Bay was selected to explore video tracking as a generative tool.

The architecture of the Beads MAX patch, which I refer to as the Beads barcode systems, relies on Jean-Marc Pelletier's Max externals for computer vision motion tracking. [30] The assets affected by the barcode system includes weather data collected on the day the MV Rena ran aground. This data, supplied by David Johnson of Met Ocean Solutions Limited of New Zealand, includes the numerical data on wave height and the fluctuation of ocean water temperature. This data was then transcoded into volume controls that trigger two barcodes which, in turn, are connected to two separate banks of sonic materials. (see Figure 11).

As described in the Studio Section of this paper, an important component to my research, and to the ongoing development of Ecological Performativity is the inclusion of recorded acoustic improvisations where the performer responds to the collected material. In this instance, contemporary music cellist Peggy Lee of Vancouver, British Columbia provided six pre-recorded cello improvisations. The audio recordings vary in length between 2:25 and 2:37 minutes, in which the movement of the clouds triggers the volume control data. Given the different lengths to the improvisations and the generative motion tracking component, the resulting output is wide- ranging.

Specific to the lower barcode, which is generated by tracking the movement of the waves, is a sampler that contains underwater sonic material of the movement of ocean rocks and of the nurdles. In addition, three percussion tracks were created from the analysis of the movie's audio using Tristan Jehan's MAX object analyzer~. Through the motion tracking of the waves, these sonic elements are triggered with the transcoded weather data.

Similar to Bridging, this project evolved from an initial collection process that subsequently co-evolved from the form, matter, process, and meaning in a cyclical fashion. The notion of agency, performativity, and networks of communication became a multilayered conversation, all of which extend to include the social, political, economical, and philosophical

Figure 12: *Image from the exhibition Unexpected Spaces: November 7-11, 2012 at Auckland University of Technology (photo: Rene Burton)*

domain: functioning, (as Morton claims), as an "attunement to the reality of the coexistence of all things on Earth" [19].

Conclusion

In this paper I have described the work-in-progress installation, Bridging, and the generative installation Beads, which illustrate an evolving artistic practice that I refer to as Ecological Performativity. This research takes into consideration a number of discourses on the subject of agency and performativity in living and non-living systems. I suggest that introducing these conversations into artistic practice can expand our understanding of agency and performativity while exploring available networks of communication. Human activity is placed into a larger environmental context by intersecting with forces greater than those of human design, which provides a multi-layered point of creative enquiry. By viewing the world as a network of phenomena that are fundamentally interconnected and interdependent, the result is a performative engagement and attunement with the world that can function as an aid to the imagination. This, I believe, works towards an artistic philosophy that considers how we imagine the world and how we act in it reciprocally informs one another. [13]

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That Syncing Feeling:
Networked Strategies for Enabling Ensemble Creativity in iPad Musicians

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Abstract

The group experience of synchronisation is a key aspect of ensemble musical performance. This paper presents a number of strategies for syncing performance information across networked iPad-instruments to enable creativity among an ensemble of improvising musicians.

Acoustic instrumentalists sync without mechanical intervention. Electronic instruments frequently synchronise rhythm using MIDI or OSC connections. In contrast, our system syncs other aspects of performance, such as tonality, instrument functions, and gesture classifications, to support and enhance improvised performance.

Over a number of performances with an iPad and percussion group, Ensemble Metatone, various syncing scenarios have been explored that support, extend, and disrupt ensemble creativity.

Keywords
mobile music, ensemble performance, networked performance, group-mind

Introduction

Working with software based musical instruments presents unique opportunities for enhancing ensemble performance by sharing information among the net- worked instruments. In a series of iPad apps designed for Ensemble Metatone, a group brought together to explore iPad and percussion performance through free improvisation, we developed a number of strategies for syncing information across the ensemble of devices to assist the performers to create coherent musical struc- tures and to encourage them to explore a wider range of sonic ideas. While touch-screen musical instruments are becoming commonplace in music education and professional performance, software design for such instruments has yet to take group performance into account to truly support and extend musicians' existing creative practices.

Figure 1: *Ensemble Metatone performing MetaLonsdale*

The apps presented in this paper have been designed specifically for performing free-improvised music by the percussionists in Ensemble Metatone. Free-improvised music has been defined by Stenström as performance "without any restrictions regarding style or genre and without having pre-determined what is to be played" [16]. Mazzola [12] emphasises that free improvisors "have to negotiate (while playing) with their fellow players every single item they bring into play … they generate the music as if partaking in a dynamic and sophisticated game." This is a style of performance where communication between performers affects not just the success of the performance, but the nature of the musical work itself. Borgo reports the free-improvising musician's experience of "group mind" [2], where musicians can react effortlessly to each other due to a certain level of experi- ence and trust with the group's performances. We have found that syncing aspects of performance in our apps can enable aspects of a group mind experience.

In designing our apps we have followed a "percussionist-led" approach. The artistic practice of percussion is one defined more by interaction - percussionists perform by "striking, scraping, brushing, rubbing, whacking, or crashing any...

available object" [15] - than by particular instruments. For percussionists, free improvisation is often a process of gestural exploration, of discovering new sounds from instruments and found objects and responding to an ensemble. We designed our apps to respond to a vocabulary of touch gestures identified from a set of free-improvisations in rehearsal sessions [11]. Our apps map these gestures to a range of sound material and musical textures. In this way, we maintain a focus on direct manipulation of sounds rather than other paradigms of musical creation such as controlling algorithmic processes or sequencing events [5].

In the following sections we describe the design of three apps developed for Ensemble Metatone, MetaLonsdale, BirdsNest, and Singing Bowls. In each case, we used network connections between an ensemble of iPads using these apps to sync musical information during the performance. These apps were used by Ensemble Metatone over a number of experimental rehearsals and performances where the musicians were interviewed about the group performance experience. We are able to conclude from this feedback that our syncing strate- gies are successful in stimulating cohesive and adven- turous performances, but that the automatic changes in user interface can present musical challenges to the performers. While these challenges can disrupt musi- cal flow, they may be one of a range of interactions that form part of the group mind experience.

Syncing Strategies in Computer Music

In commercial music software there are existing and well-worn standards for sending information between instruments or between performers. These standards generally focus on syncing rhythmic information be- tween multiple sources of sequenced sounds in an ensemble or individual performance. The MIDI stan- dard [13], originally designed as a digital replacement for voltage controlled hardware synthesisers, has been used extensively in software instruments. Its specifi- cation includes two different messages for synchronis- ing performances, MIDI Time Code which communicates a position in time since the start of a performance, and MIDI Timing Clock, which sends 24 messages per crotchet beat and so is dependent on the tempo of a song. MIDI Timing Clock messages are frequently used to synchronise several electronic instruments, function- ality referred to as "MIDI Sync", for example, a drum machine and a sequencer, either using hardware or vir- tual software MIDI connections. A networked version of MIDI exists [9] and is often available in touch-screen music apps.

Using multiple mobile devices at once has become a common practice both in ensemble situations and for individual performers who may want to make music using, for example, both a smartphone and tablet. Korg's Wireless Sync-Start Technology [8] (WIST) software frame- work shares tempo, start and stop commands between iOS devices over Bluetooth in much the same way as "MIDI Sync" while removing the necessity for physical MIDI cables or a WiFi network. Since the WIST frame- work is freely available under a New BSD License, it has been incorporated into many musical iOS apps.

Open Sound Control [6] (OSC) is a general format for sending musical control signals over a network. Un- like MIDI, OSC messages have no set meanings and functionality must be defined by the developer and user. While OSC is used in some commercial software it is mostly used by re-search-situated artistic ensembles for communication between performers and their instruments. For example, cross-artform group, Last Man to Die used OSC to connect MIDI instruments, a heart- beat sensor and a tangible table-top interface to com- puter audio and visuals [10]. The GRENDL [1] system loads and starts a repertoire of computer music com- positions among an orchestra of laptops, while Kapur et al's Machine Orchestra [7] use OSC to transmit a variety of control data between human and robotic performers.

All of these standards and systems introduce a certain amount of computer mediation of musical performance to extend human performers' creativity. The computer can assume the responsibility of keeping time, as in WIST-enabled apps, distribute control messages to multiple musical instruments, as in the Machine Orchestra, or transform gestures between multiple artforms in Last Man to Die.

Our goal with the Metatone apps was to create instruments for use by professional percussionists, and there- fore we felt that we shouldn't try to take responsibility for rhythm or direct control of sound away from the per- formers. We were also concious of disturbing the rela- tionship between the performers, their instruments, and their audience with additional visuals, or sound sources apart from the performers them-selves. For our apps, we developed ways to sync more abstract musical in- formation between the instruments the performers were using. Extending the characterisation of percussive improvisation as gestural exploration of instruments, we propose that if the instruments are dynamic interfaces, with properties and functionality that change through- out a performance, this could enhance rather than dis- turb the performer's exploration. To help an ensemble to reach a state of "group mind", we can create instru- ments that change in sync with each other, affording the performers opportunities to explore new sounds and musical structures together. In this way, we support the ensemble in creating coherent and compelling improvised music without removing their agency for controlling rhythm and pitch, the core aspects of music.

Metatone Apps

Ensemble Metatone was founded in April 2013 to study the performance of free-improvised music with specially designed iPad apps as well as physical percussion instruments in Canberra, Australia. The members of the group (including one of this paper's authors) are trained percussionists and improvisors. Much like a percussion ensemble, the group performs with a large setup of instruments on stage so that each performer can access a number of sounds including one iPad for each player. One loudspeaker is used for each performer and is placed directly behind their setup so that the acoustic and electronic sounds from each musician emanate from the same location on stage. The group also performs iPad-only works without any other instruments as in Figure 1. After an initial series of studio rehearsals with a non-networked app, we began performances with dynamic apps that sync information about the state of the other performers and update their interfaces in response.

Our Metatone apps share information over a WiFi network using OSC messages sent using the UDP protocol. Each app advertises itself on the network using Bonjour (zero-configuration) networking and automatically connects to other apps that it finds. To facilitate using the same networking
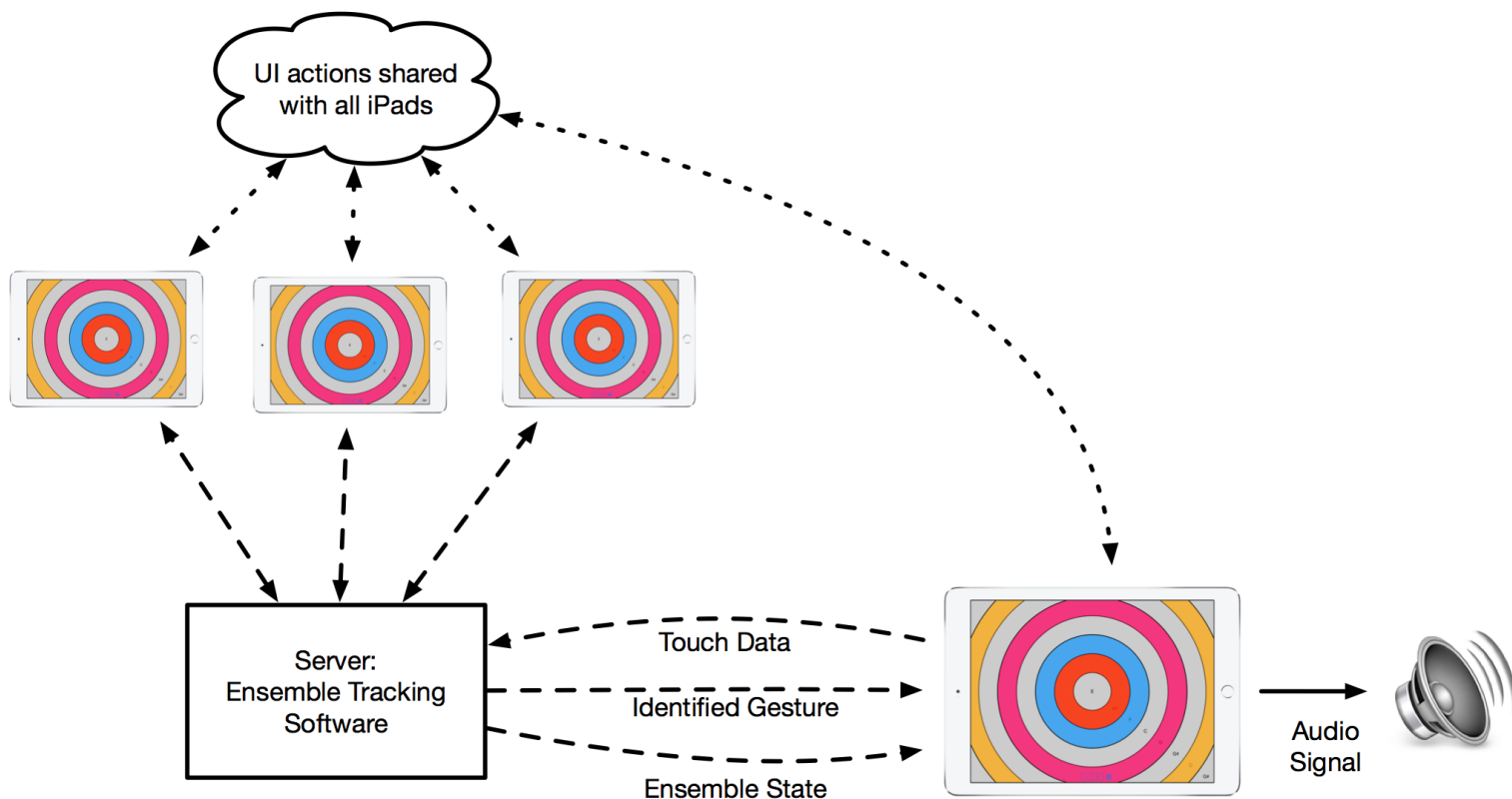
Figure 2: *The network architecture of a metatone performance with a detailed view of one iPad. Each iPad connects to each other automatically as well as to the ensemble-tracking server software. The performers' interaction with UI elements (buttons and switches) in the apps are shared between the iPads. All touch interactions are logged and classified into gestures by the server which returns individual gesture and ensemble state information throughout the performance. Each iPad creates its own sound which is projected from a loudspeaker via the iPad's headphone jack.*

code in all of our apps, the Objective-C OSC library (F53OSC) and network management code was gathered together in one open source project, MetatoneOSC[1] .

We also developed MetatoneClassifier, a server-based, Python application that logs the performers' touch and interface interactions as well as any information shared between the apps. These detailed recordings of per- formances can be used for research and also, as dis- cussed below, for tracking the group performance in real-time and making calculated interventions into the apps' functionality.

All of the Metatone apps use a percussion-inspired interaction scheme that allows the performers to explore field recordings, percussion samples and pure-synthesised sounds through taps and swipes in a performance area that takes up the majority of the screen. Taps produce a short sound with a natural decay (similar to percussion instruments) while swipes produce a continuous sound where volume is controlled continuously by the velocity of the swipe. Pitched sounds are arranged radially with the lowest pitch accessible by tap- ping the centre of the iPad screen and the highest at the corners. The apps use the libpd library for audio synthesis, this library allows the synthesis part of the application to be developed in the Pure Data computer music environment while the rest of the application is developed in Objective-C.

MetaLonsdale

MetaLonsdale (seen in figure 3) was the first networked app developed for the group. Originally produced for a concert in Canberra's Lonsdale St Traders, a collection of galleries, café́s and pop-up shops, the app features field recordings from a busy Saturday at the venue and pitched percussion samples. The app has four UI elements positioned at the bottom corners of the screen to adjust the functionality, sounds, and to view the currently available musical scale. Two switches control a "looping" function, that repeats tapped notes, and an "autoplay" feature that plays soft field recordings continuously. While the app has a library of sounds, only a few are available to the player, a "sounds" button shuffles the accessible sounds from the library.

While earlier prototype apps had allowed access to chromatic pitches, a design goal of MetaLonsdale was to use a collection of scales to produce a sense of harmonic progression in the performance. A cycle of three scales were chosen: F mixolydian, F# lydian, and C lydian #5. Tapping the "sounds" button had a 25% chance of progressing to the next scale in this cycle. Although the performers cannot see precisely what pitch they play, the name of the currently available scale can be displayed for performances where the app is used together with other physical percussion instruments.

For the harmonic progression built into MetaLonsdale to come across to the audience, it was necessary for all the iPads in the ensemble to have the same scale. Whenever one player triggers a change in tonality by tapping the
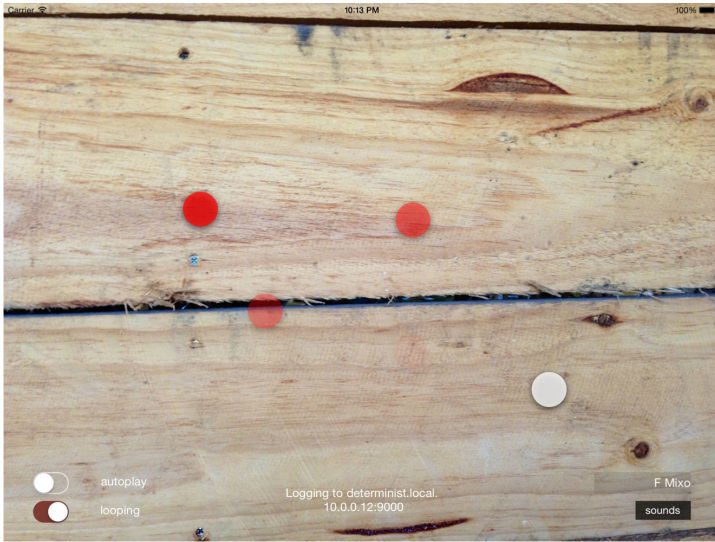
[1] http://github.com/cpmpercussion/MetatoneOSC

Figure 3: *Screenshot of the MetaLonsdale app. The white circle denotes the performer's touch while the red circles are looped notes. The looping and autoplay functions are controlled by switches on the lower left, while the sound and tonality can be shuffled with the 'sounds' button on the lower right.*

Figure 4: *The BirdsNest app features field-recordings and images from a forest in Northern Sweden. Performers create a sonic journey through this forest by exploring the available sound material from the forest floor to a bird's eye vantage point.*

"sounds" button, this is communicated to the whole ensemble. The effect from the performers' and audience's point of view is of a series of synchronous transitions between harmonic material.

The other UI controls of MetaLonsdale are also synchronised between the performers but in a slightly different way. Every time a performer changes sounds, or switches looping or autoplay on or off, this action is sent to every other iPad in the ensemble, but in contrast to the scale changes, which were always applied to the whole ensemble, the other iPads randomly choose to react to looping, autoplay or sounds actions 20% of the time. This partial synchronisation of features has the effect of assigning and reassigning the ensemble into sections as the performers find that their instruments sync up to other members of the group throughout the performance.

BirdsNest

BirdsNest (Figure 4) has a similar interface to MetaLonsdale but uses field recordings and bird sounds from Northern Sweden as the source sound material. This app was originally designed for a (different group's) "Sounds of the Treetops" performance at the Percussive Arts Society International Convention (PASIC) in November 2013. BirdsNest was later integrated into Ensemble Metatone's performances and was used with syncing strategy that is quite different to MetaLonsdale.

The sonic material in BirdsNest is composed to allow each performer to create a journey through fields, a forest, up into the trees, and finally to a bird's eye vantage point of the whole landscape below. Visually this journey is communicated through a series of background images and collections of bird sounds and field recordings from the location as well as sampled percussion instruments such as wood block and xylophone, that complement this musical idea. Within each scene, the performer can shuffle through a subset of the sonic material using the "sounds" button, as well as use the "looping" and "autoplay" features. Unlike MetaLonsdale's

focus on a sequence of scales, BirdsNest is based around a series of sound colours, so the scales are not displayed to the user.

In contrast to MetaLonsdale where the synchronous changes to the app's sounds, tonality, and functions are triggered directly by the user, in BirdsNest, these are controlled by interaction with our ensemble-tracking server application, MetatoneClassifier. This software logs all touch interactions by the performers and classifies them every five seconds as one of nine percussive touch gestures [11] using a Random Forest algorithm [3] from Python's scikit-learn package. The software keeps track of each performer's history of gestures and identifies moments of peak change of gesture among the performers as points where it is likely that a new musical idea has occurred. Each performer's current gesture is returned to their iPad. When a new idea is detected, a message is sent to all iPads in the ensemble.

BirdsNest was our first app to have taken advantage of this system for real-time interaction with the ensemble performers. In solo performance, the forest scenes are advanced using the "sounds" button, but when the app connects to the server, this functionality is disabled. In network-enabled ensemble performances, the forest scene only advances when a "new idea" message is sent by the server. The other app functions are also influenced by the server interactions. Each iPad keeps track of previous gestures used by the performer, and when a performer stays too long on a particular gesture, the app switches one of the features on or off or spontaneously changes sound. The two networked interactions in BirdsNest are designed to encourage performers to continuously explore new gestural material. While it doesn't punish performers who stay on the same idea continuously, it actively challenges them by changing their instrument, confronting them with a new sonic interaction.

Singing Bowls

Singing Bowls (Figure 5) is a ring-based interface for interacting with bell samples. Unlike the range of sounds available in the other Metatone apps, Singing Bowls allows the
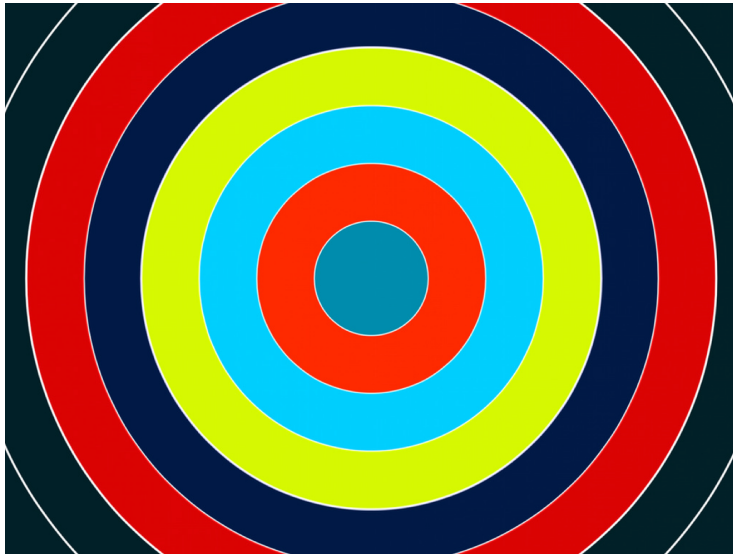
Figure 5. *The minimalist UI of the Singing Bowls app. The available notes are divided by circles. When the performer activates a note by tapping or swirling, it pulses with a colour given by the pitch.*

performers to interact with sounds generated from one bell sample. The app does, however, allow more expressive interactions with this sound where different kinds of touch gestures modulate the sound in a variety of ways.

Similarly to MetaLonsdale, Singing Bowls is based around a series of harmonically related musical scales. At any one time, a selection of three to ten pitches is available on the screen with each pitch represented by a ring and a text label. The pitch "setup", or collection of pitches available on screen, is generated separately by each iPad while staying within the same scale, so although the performers have the same harmonic location they each have a unique melodic space to explore.

Tapping on a pitch ring triggers a short note at that pitch. A swipe sounds the pitch where the swipe began continuously using granular synthesis. The app can play one continuous note simultaneously with up to four tapped notes. To emphasise the different varieties of swirl and swipe gestures that the performers in Ensemble Metatone use, the app continuously calculates the velocity, direction and position of moving touches which affect synthesis parameters. The angle of the velocity vector of a moving touch point is used to modulate the pitch allowing different kinds of vibrato to be created with different movement patterns. The distance of the moving touch from the original touch point controls the degree to which a "crystal reverb" effect is applied to the continuous note, giving the performers a way to control timbre in real time.

The performers are given visual feedback when tapping or swirling in Singing Bowls. While the whole screen is a uniform colour when not played, when tapped or swirled each pitch pulses a particular colour following a system inspired by Roy de Maistre's artworks that relate music and colour [4]. When swirling, the intensity of the colour and speed of pulsing is connected to the performer's touch velocity and position.

Unlike MetaLonsdale and BirdsNest, the Singing Bowls app has no UI elements to change sound or scale. Instead, the app completely relies on the networked interaction between

the ensemble of iPad apps and the MetatoneClassifier server software to present new notes to the ensemble. Each time a "new idea" message is received from the classifier, the app generates a new setup of notes. The app is hard-coded to choose two setups each from a sequence of three scales making six setups available before returning to the beginning of the cycle. Since the iPads all receive "new idea" messages together, they are always in the same place in the sequence. Because each setup is created generatively, the performers continue to see new notes whenever a "new idea" message is triggered, even if the ensemble repeatedly advances through the whole cycle of scales.

Sync Strategies

In the Metatone apps discussed here, we have experimented with a number of strategies for syncing musical information during ensemble performances without disturbing fundamental control over their own music-making. Using a WiFi network as the interface for sharing data, these strategies used both direct connections between the iPads and an indirect connection mediated by our server software. In the following section, we summarise our sync strategies and connect them with experiences reported by musicians in Ensemble Metatone from their rehearsals and performances with the apps.

Tonality (scale)

The MetaLonsdale and BirdsNest apps featured a cyclic progression of scales that advanced randomly as the performers tapped the "sounds" button. If the performers tapped "sounds" approximately uniformly, it was possible that the scales would match up at times, but in practice, some performers preferred to try lots of different sounds while others stayed on a particular set. Our solution was to keep the scale in sync across the group. Whenever an iPad changed scale it would send an OSC message to the other iPads which would update their current scale, no matter which scale they were already on. The result of these synchronised scale changes was that the ensemble's performance followed a harmonic progression, one of the performers commented that "I thought it made everyone sound more cohesive".

App Functionality

Musicians don't generally expect that their instrument's functions would change under their fingers, but this is one of the interactions that we explored. MetaLonsdale had three UI elements, switches for the "looping" and "autoplay" features and a "sounds" button to shuffle the available sounds. With function syncing, when one performer turns looping or autoplay on or shuffles their sounds, a message is sent to every iPad in the group which then choose whether to make a change in response. The rationale behind this strategy for syncing was to stimulate the performers to try new ideas in tandem with others in the group. While these kinds of changes might feel disruptive to the performers, they can also be a fun musical challenge. One of our performers commented: "sometimes it will throw you a curve ball and you're stuck with something you don't want and you have to find a way of making something meaningful of it." On the other hand, the performers were concious of how their exploration might affect others: "I thought I was a bit of a bossy boots … because I kept pressing the change sounds button and then everyone would change."

Gesture Tracking

In performances with Singing Bowls and BirdsNest, the ensembles touch interactions are logged to a server running our MetatoneClassifier application. The server returns gesture classifications for each performer's interaction as well as information about the state of the whole ensemble, and in particular when the ensemble has undergone a significant change in gesture and might have moved to a new musical idea. Our goal for interaction with MetatoneClassifier was to provide interface-free experiences on the iPad apps where new sounds and notes are made available in response to the performers' musical gestures, rather than interaction with UI elements.

The interaction in BirdsNest was designed to change the app functionality when performers stayed too long on particular gestures. While this wasn't intended to punish the performers, they often regarded it as "annoying" and an unwelcome intrusion. In Singing Bowls, the interaction was designed to reward the performers for exploring new ideas. Each time the MetatoneClassifier identified a peak change in gesture, all iPads in the ensemble advanced to a new setup of notes. The performers worked together as an ensemble to trigger this response in the Singing Bowls app, reporting that they were "trying to get it to respond by copying and mimic- ing and getting everybody to change", and that "trying to do that made the piece nicer."

Conclusion

In the apps MetaLonsdale, BirdsNest and Singing Bowls developed for Ensemble Metatone, we experimented with strategies to enhance improvised ensemble performance by synchronising musical information across the group's iPads. Unlike other networked performance paradigms that focus on synchronising rhythm or distributing notes across several performers, our strategies sync the scales available to the performers across the ensemble, randomly match the app's functions, and track their gestural changes to encourage playful improvisations. In this way, we avoid disturbing the fundamental interactive paradigm of direct gestural manipulation of sound, where our group are already expert performers.

So do these syncing strategies help the ensemble reach the "group mind" state? The tonality and function syncing in MetaLonsdale and BirdsNest had a notable effect on the cohesiveness of performances. The performers were aware of the need to react to new settings and of the "bossy boots" effect that their own explorations had on other players. In Singing Bowls, access to new notes and tonalities is received as a reward for interesting ensemble interaction. In all of these scenarios, the actions of the performers were taken out of the performance space and embedded into the instruments so that a musical reaction was unavoidable.

It is questionable whether the kind of syncing described in this paper is always helpful to the players, the "curve ball" situations reported by one performer could be frustrating. On the other hand, a level of disruption to the musical status quo could be warrented if the goal is to create stimulating performances. One musician appreciated this kind of interaction as he tended to "stick on the same thing for 20 minutes so it's good that you changed it."

While Ensemble Metatone may be able to produce successful music with any app, the strategies implemented in MetaLonsdale, BirdsNest and Singing Bowls seem to have allowed them to extend their practices in a way that existing acoustic or electronic instruments cannot. Sawyer [14] points out that the emergence of creativity in collaborative performances cannot be fully explained by individual analysis of the performers. Based our experience with the Metatone apps, we suggest the corollary that systems for computer supported group creativity must support the group activity. That is, the system must enhance the communications, negotiations, and gameplay that marks free-improvisations in order to extend the musicians' feeling of group flow.

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For Grief: A photographic social documentary of funeral directors and their experiences

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Abstract

In many developed countries, death and funerals are often considered a taboo subject which people avoid talking about. "Death" and "dead" are often rephrased as "loss", "gone" or "passed away", and "the deceased" or "remains" are used instead of "dead body" and "corpse". The concept of death is carefully sanitised in our society and we often deny death. This denial can lead to stigmatisation of people who work in the funeral industry because they handle dead bodies and appear to profit from death and grief. Utilising digital still-photography and video interviews, a qualitative photographic field study was conducted with three funeral directors in Queensland, Australia in 2013. The project undertook an investigation of their work and private time to determine whether funeral directors are stigmatised in today's sanitised society. The research showed that the funeral directors have experienced stigmatisation directly related to their occupation, however this stigma has waned as their role in the industry becomes established. The project revealed that over time, this stigma becomes less concerning to Funeral Directors who instead focus on the process of burial and funerary arrangements. Interviews with Funeral Directors reveal rarely discussed side-effects of dealing with their own grief affected by depressing facts of death.

Keywords
photography, documentary, death, denial of death, funeral, taboo, stigma

Introduction

My father used to own a house in Odawara, Japan. Odawara is a small fishing village under Odawara Castle. It is only a couple hours away from central Tokyo, with a beautiful tiny beach which only locals visit. The old two storey house my father used to own was originally a traditional restaurant for Japanese soba noodles, and it came with a deep well which produces beautiful spring water. My father lived upstairs in that house and I stayed there several times to spend some time with my family. Downstairs, which used to be a restaurant, was disued for a while after he purchased it. One day I went to the house to stay with my father and sister when my father explained to me that he was now leasing out downstairs—it was now occupied by a funeral home. He said to me, as if it were nothing really impor-

tant, "It seems that they are quite good tenants with a stable business, if you don't mind the fact that they keep dead bodies there for vigils sometimes." I remember I felt a little awkward about sleeping that night in the house, knowing there might be a dead body downstairs.

I have never been ashamed that one of my father's houses is a funeral home; however, I have never been proud of it, either. I believe I have never mentioned it to my friends. A long time ago when we were dating, I told my future husband about this house, but I was very careful with the manner in which I spoke. I think I tried to talk to him as if this were nothing important and nothing unusual, the same way my father did for me. This was the very beginning of my journey. I started wondering, "Why did I felt awkward about sleeping in the presence of a dead body downstairs?" "What is this, even though we all die one day?"

Research Question and Methodology

I conducted a photographic social documentary research combined with video interviews in 2013. This study reflects on one year of qualitative fieldwork. Three funeral directors from the Gold Coast, Burpengary and Stapylton agreed to participate, and I followed their work and their private lives.

This qualitative field research was aimed at finding out whether funeral directors are stigmatised in our sanitised society. Evidence of the taboos associated with death, along with the notion of denial of death in society is also investigated in order to broadly understand the issue. In construction of the research question for this study, firstly I investigate whether society is in denial regarding the taboo subject of death and funerals. Secondly, I consider how these perceptions influence the public image of funeral directors.

Part 1: Denial of Death in Society

Denial of death and death study
In most societies, as it is in Japan and Australia, death and funerals are often considered a taboo subject which people avoid talking about. "Death" and "dead" are often rephrased as "loss", "gone" or "passed away", and the words "the deceased" or "remains" are used instead of "dead body" and "corpse". However, most people do not even realise how death, as a concept, has been sanitised, and this includes a widespread denial of death. It seems like our society is sanitised quite well, and we don't have many opportunities to see death. Many of us do not die at home any more, and family members do not have to clean the dead body themselves and dig the grave like people used to in the past. This might lead to stigmatisation of people who work in the funeral industry because they are willing to handle taboos, dead bodies, and appear to profit from death and grief.

Traditionally, death was not suppressed or denied in our history. Philippe Aries wrote his book The Hour of our death in 1977. He explains that death used to be a more frequent event in history. People died with diseases more often and violence was less controlled. People were familiar with the face of death, and less sensitive about it (1977:28). Death was once tame, and also a social event for the whole community (1977: 559).

However, Ernest Becker (1973) states in his book Denial of Death that "Here we introduce directly one of the great rediscoveries of modern thought: that of all things that move man, one of the principal ones is his terror of death (1973: 11)". This fear of death leads to denial of death in many developed countries and exists in following contexts.

1) Decline of religious influence and rise of individualism

Geoffrey Gorer (1955:51) and Ernest Becker (1973:07) state that influence of religious belief is less prominent in contemporary society, and the belief in life after death does not relieve the fear of death enough in these times. The rise of individualism in the twentieth century also contributed to isolate death from the community.

2) Institutional death

In traditional society, people died at home and family members cleaned the body and dug a hole. Norbert Elias (2001:45-47) points out that a healthier environment and medical improvement contributed to people living longer, therefore the idea of death became distant. Aries (1977:570) also explains that death is now managed by medical institutions and funeral homes, and the duty of family members has become less of a burden. These shifts of society have made death a relatively uncommon event.

Denying Denial of Death

However, some sociologists argue whether denial of death exists in society or not.

Allan Kellhear begins chapter 3 of his book, Social History of Dying as: "What produces more activity from a person: anticipation or ignorance? What produces greater anxiety in a person: anticipation or denial and ignorance? (2007:47)".

He also states "death motivates and activates people like little else because historically biological death has been viewed as no death at all, but rather; the most complicated and challenging part of living (2007: 47)".

He claims that when we acknowledge that death is unavoidable, we might also have "the desire to learn more about it; the desire to prepare for it; and the desire to plan around it".

Kellhear also explains there is no denial of death in society, using these popular materials often used as indications of humanisation of dead corpses and denying death.

Coffin: It may look like furniture rather than a disposal box, however, Kellehear states that this is for a practical reason, the same as 'ornamentalising' or 'beautifying' the dusty playgrounds, old cars or buildings more palatable or acceptable (1984:718).

Embalming: "This 'restorative art' has been cited as being responsible for the practice of creating life-like corpses, another example of death denial. However, this is structurally a carry over, a logical continuation, of the cosmetic industry for the living. The difference does not even lie any more in the surgical intervention of the cosmetic industry for the

living(1984:718)." It is just the fashion option, and an affirmation of economic life.

Funeral flowers and wreaths: "The giving of flowers at funerals was a Middle-Age custom revived in the Victorian Period and has persisted until today as a tribute (1984:719)." Kellhear insists that it is just a custom of gift giving, replacing words of comfort, friendship, or alliance.

Unseen Images

During the field research on funeral directors in 2013, I witnessed the behind the scenes activities of funeral homes. Some of them shocked me, and some also made me wonder why we are not familiar with these images, if there is no denial of death in society. I took a picture of garbage bin at crematorium (Figure 1). I was shocked to see some material which used to be a part of someone's body displaced in the garbage bin. Logically, those metal parts cannot be a part of our ashes and it makes sense that these wastes are disposed of in the bin. However, I felt very uncomfortable seeing this. It reminded me of the remains of Auschwitz victims during Nazi era. Everyone of us, whoever it is, ends up in a same way when it comes to death. This idea made me feel uneasy.

Another day, I attended the funeral and burial ceremony one day with the permission of all the funeral attendants. I captured a few shots and started to wonder around to take more images of the cemetery when it finished. After all the attendants left, a few men and a bobcat approached the burial site, and started working there (Figure 2). There was no sad dramatised music or the solemn rituals. This was the 'real burial' after all the ceremonies were conducted in a calm beautiful manner.

Again, it is logical to think about using heavy machinery to bury the body. However, I was shocked to witness this as I had never seen this before, and realised how much of the 'real' facts of burial are carefully sanitised.

I also captured the storage room at one of the funeral homes (Figure 3). Among all the regular paper work, containers of ashes were also stored very neatly. I felt awkward to see those ordinary objects which we see used in everyday businesses, sitting together with containers of ashes. Those containers were labelled with the names and addresses of

Figure 1: After the cremation

Figure 2: Real Burial

Figure 4: The Cremator

the deceased. There was one container with the hand written note that said 'not paid'.

I also captured the storage room at one of the funeral homes (Figure 3). Among all the regular paper work, containers of ashes were also stored very neatly. I felt awkward to see those ordinary objects which we see used in everyday businesses, sitting together with containers of ashes. Those containers were labelled with the names and addresses of the deceased. There was one container with the hand written note that said 'not paid'.

The process of cremation is not widely known, either. This is

Figure 3: Ashes on Shelves

the cremator with the front door opened for me in order to observe inside (Figure 4). This is normally shut completely during the process. The cremators are all controlled by computers these days. Temperature, oxygen levels, and length of cremation are all well managed (Figure 5). After the cremation process is complete, all the remains are swept into a metal container. When we think about 'ashes', we often imagine just a powdery substance, however, the remains of the human body normally contain many chunks of bones (Figure 6).

When the temperature of the remains are cooled down, they have to be taken away with metal objects, and then the bones are ground down (Figure7). The tools and the actual

procedure vary depending on the crematorium. This man here wears a mask to avoid inhaling the powdery substance. Behind him is one of the cremators they use in this facility.

This is a grinder they use in this facility (Figure 10). Three metal balls are inside, and the drum of this machine turns like a washing machine. These images do not often appear in our society. Information and reality of death are often sanitised carefully.

Death as Information and Death as Pornography

If these images above I captured during the field study in 2013 can be the evidence of denial death in society, how can we explain that we also see images of dead in mass media, such as movies and TV news?

Some like Tony Walter's Modern Death: Taboo or not Taboo? (1991), or Atushi Sawai's Tabood Death Revisited argue that death is both denied and accepted. We see death in the mass media frequently, such as news of natural disasters, death of celebrities, dead people in crimes, or hospital dramas. Sawai explains two different types of death appearing in mass media. One is 'Death as information' and another is 'Death as pornography'.

The first one is Death as information. Death described in fictional productions, such as novels, movies, or TV dramas is often consumed as guideline information of life and death. For example, hospital dramas like 'ER' inform audiences how death appears in medical institutions. Non-fictional entertainment such as news and documentaries also provide information of death. News of death tolls of natural disasters, wars, and victims of crimes are reported in newspaper every day, and deaths of celebrities are often displayed on the front page of some gossip magazines. Many documentaries following cancer patients and capture the vulnerabilities of human beings and how we seek some hope in these tragic situations. These are the guideline of death and often advise us how we should face death and accept it.

Geoffrey Gorer introduced the argument of death as pornography for the first time in his article The Pornography of Death in 1955. In the Victorian era, death was a subject that people talked openly about, and the topic of birth and sex were considered taboo. Now death is suppressed as taboo in many developed countries, and birth and sex are the subjects we talk about in public. Sex is still considered as taboo

Figure 5: Control panel of the cremator

Figure 8: Magnetic Stick

Figure 6: Ashes

Figure 9: Sieve

Figure 7: Masked man

Figure 10: Grinder

subject sometimes, however, it is a part of child education at school now. We can see this 'death as pornography', the pleasure of consuming suppressed taboos, especially in video games in modern society. According to research conducted by Tyson Foster, over 30% of the games released on the first day of the Xbox release and also the launch window in 2001 were related to killing or attacking zombies or human figures. Similarly in 2013, over 30% of the Play Station 4 games released on the day 1 and launch window were in this genre.[1]

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[1] Foster's original research statistics were focused on the presence of monsters or grotesque in gaming. This means some games that involve killing or attacking human figures such as Battlefield 4 were not counted as it's a modern military shooter that doesn't feature any monsters. Therefore, there could be higher number of games released related to killing or attacking. No games in presence of monsters or grotesque figures were free from violence.

Part 2: Funeral directors and their stigma

Seven funeral directors in different funeral homes on the Gold Coast, Tweed Shire, Redland Bay, Burpengary and Stapylton in Queensland Australia were approached for this project. Three from the Gold Coast, Burpengary and Stapylton agreed to participate. I followed those three funeral directors to investigate their work and their private lives, shooting using still photography and interviewing them using HD-SLR video recordings. I also investigated several cemeteries to broaden the visual scope of the industry and its practices. Considering other research such as Handling the stigma of handling the dead: Morticians and funeral directors (1991) by William Thompson and Occupationism: Occupational discrimination in relation to funeral directors (1994) by F. Ozge Akçali, I too investigated whether funeral directors are stigmatised in our sanitised society.

Kim Rodda

The first case study is Kim Rodda. Kim has been in the industry for over 15 years already, and he works at Traditional Funerals in Burpengary, north of Brisbane.

Figure 11a: Kim Rodda

Kim Rodda spoke of some past experiences and mentioned that he recognised this stigma often when he started working
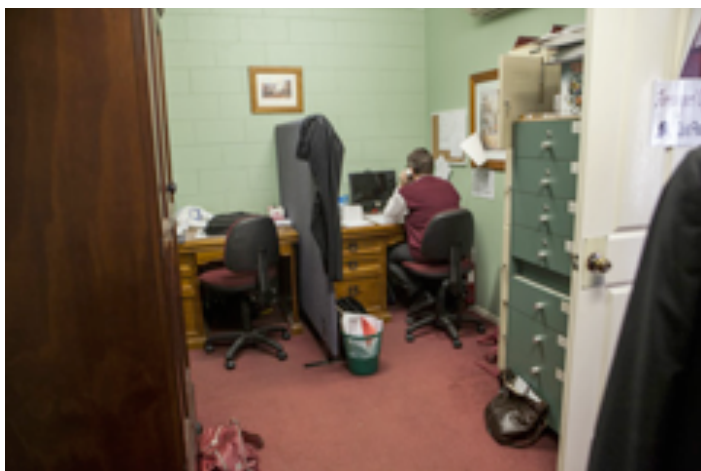
Figure 11b: Kim Rodda working in his office

in the industry. He felt he was alienated in the church that attends. The possible reason for this was also that he kept

Figure 11c: Kim Rodda transferring a coffin

reminding them of the loved ones that they had lost, and he was also invited to share a lot of personal, and sometimes, embarrassing information.

He used to joke about his job when he was asked what he does for living. He often said "I'm actually a male stripper." He often gets two reactions when he reveals his occupation: people asking him many questions, or remaining in complete silence. When he started in industry fifteen years ago, the reaction was complete silence (Figure 11a-11d).

Donna Rostron

The second case is Donna Rostron. Donna found a new office of White Lady Funerals had opened in Ashmore on the Gold Coast, and started working there five years ago. White Lady Funerals is a unique business operated by woman wearing white suits, offering a women's understanding to people who have lost loved ones, while many traditional societies in the world do not accept a female as a conductor of funerals.

Figure 11d: Kim Rodda preparing for a funeral

Donna mentioned that her aunty was not happy when she started the job, because she thought a White Lady Funeral was sexist and racist, servicing only white women.

Figure 12a: Donna Rostron, White Lady Funerals

Figure 12b: Donna Rostron preparing for a funeral

Figure 12c: Donna Rostron working in her office

Donna also said that many people do not respond well when she reveals her occupation to people who do not know her career. Many stop the conversation, or in some cases, some start asking many questions (Figure 12a-12d).

Figure 12d: Donna Rostron, reaching to a coffin

Tim Connolly

The third case study is Tim Connolly. Tim's parents started a funeral business, and he grew up in the industry. He eventually inherited and manages the business, Newhaven Funerals in Stapylton. Tim told me that he did not recognise any stigma from friends and teachers when he was young.

However, Tim says his in-laws showed some hesitation to his occupation when they got married. It was hard to talk with his father-in-law who is an old fashioned Italian and did not like talking about death. Even though many people do not show any negative perspective towards funeral directors, when it comes to their close family members, they reconsider it and change their attitude sometimes. (Figure13a-13d).

Figure 13a: Tim Connolly, Newhaven Funerals

Findings from interviews

Although they all agreed that they have experienced some level of stigma in the past, it was not a big issue to any of funeral directors I interviewed. They all said their stigma has eased over the years. Donna Rostron mentioned the influence of TV dramas such as NCIS or Bones that introduce the interesting characters who deal with dead corpses.

All participants expressed that the hardest thing about being in the industry was not dealing with the stigma, but dealing with their own grief. Working for people at the most difficult time or facing the horrific way that some individuals die is not

Figure 13b: Tim Connolly preparing for a funeral

Figure 13c: Tim Connolly operating a cremator

Figure 13d: Tim Connolly looking at the coffin storage

an easy job, and often they are affected emotionally, with or without being conscious of this knowledge and experience.

Kim Rodda did not take a holiday for a while even though his boss recommended doing so, and he did not realise how much his emotions had been affected until he went to see a movie with his sons. He sobbed and cried watching 'Armageddon'. He says when he watches the movie again, he cannot see any part that makes him cry, and he was definitely affected by his work at the time.

Donna Rostron spoke of an instance where she held a service for a young boy who was the same age as her son who had killed himself.

Tim Connolly does a lot of work for the government which requires him to go to crime scenes or fatal accident scenes and transport the diseased to the morgue. He often has to witness brutal deaths that are sometimes unbearable. He also mentioned it is very hard to face the tragic deaths of some young children.

All of the participants have great support from family and colleagues, although Tim Connolly does not talk about his work to his wife who is a school teacher.

They also admitted that they often find difficulties to talk openly in public about details of their line of the work or their own grief. Denial of death in society suppresses them, and those funeral directors do not want to upset other people who would not wish to discuss death and mortality openly.

Conclusion

Our society in the modern developed countries has both acceptance and denial of death. This causes some stigmatisation of funeral directors; however, it has eased over years. The acceptance of death has increased in this last decade especially, although funeral directors are still stigmatised sometimes and they do not have many opportunities to express their secondary traumatic stress. Even though, all the funeral directors I interviewed seemed to be extremely proud of their job and happy to pursue their career. They feel that they are supporting people and the community during the most difficult times.

This research reveals behind the scene activities of funeral homes, and shows some confronting facts related to death and funerals visually, however, it was carefully yielded in a respectful manner. Feeding pleasure for pornography of death was not an intention, and the visual materials were made to increase public awareness, questioning why we have not seen these images before and why we tend to avoid talking about this topic.

When I show my work, I often witness that people start opening their dialogue about their own death and grief. I witnessed those suppressed stories and emotions needed a place to be expressed.

Should we, or should not we talk about death?

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Cinematic Evolution: What Can History Tell Us About the Future?

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Abstract

Many commentators and proponents of the film industry have called for a review of the cinematographic award asking who is responsible for these images; the cinematographer or the visual effects artists. Theorist Jean Baudrillard said cinema plagiarises itself, remakes its classics, retro-activates its own myths. So, what can the history of filmmaking tell us about the practice of visual effects?

Four of the previous five winners for Best Cinematography in a Feature Film at the Academy of Motion Picture Arts and Sciences Awards (2009-2013) have been films which have contained a large component of computer generated imagery (animation and/or visual effects). Some of these films have moved far beyond creating virtual backgrounds for the actors to appear in. *Avatar*, *Life of Pi* and *Gravity* are examples of films creating whole universes and characters for the actor to interact with.

This paper analyses the use of visual effects in popular filmmaking prior to the use of computer technology for the art. This historical analysis is then compared and contrasted against today's discussion/argument of cinematographic authorship. What did it consist of before the use of computers in filmmaking? Are and will cinematographers always be the authors of the image?

Keywords
Virtual Cinematography, Cinematography, Visual Effects, Cinematographic Authorship

Introduction

Technological developments have been part and parcel of the ever changing face of film-making in Hollywood since the inception of cinema. From the inventions of sound recording to colour photography technological developments have had a lasting effect on the way cinema is made. Although the cinematographer has largely been on the forefront of such developments their role has generally remained consistent over the history of cinema. I will talk about my investigation into the current definition of cinematography which historically relies on the camera as central to the art and practice of cinematography.

This research questions the current definition as an accurate representation of current industry practice based on an historical analysis of the artistic practice of key cinematographers. I will explore the development of cinematographic

mediums and draw on recent examples of current practice in mainstream Hollywood cinema to suggest how the definition of cinematography might be reframed.

Virtual Image Creation: the Cinematographic Argument

James Cameron's ground breaking film *Avatar* was released to record audiences in December 2009. It was a film much discussed by critics and the wider media while it broke box-office records becoming the highest grossing film in history at the time and the first film to gross more than two billion dollars [1][2][3].

The famous film critic Roger Ebert of the Chicago Sun-Times called the film extraordinary and gave it four stars out of four. "Watching *Avatar*, I felt sort of the same as when I saw *Star Wars* in 1977", he said, adding that like *Star Wars* and *The Lord of the Rings*, the film employs a new generation of special effects and it is not simply a sensational entertainment, It is a technical breakthrough which has a environmental and anti-war message [4].

Avatar won the 82nd Academy Awards for Best Art Direction, Best Cinematography and Best Visual Effects, and was nominated for a total of nine Oscars, including Best Picture and Best Director [2].

However, Avatar's cinematographer Mauro Fiore, ASC, didn't step foot on the film's set until Cameron had already been shooting the virtual elements for eighty-five days [5]. Fiore won the Best Cinematography award for a film which he says is about seventy percent virtual; though he believes his work on the live-action component to be the imagery that set the look of the film [5].

The argument itself blew-up in 2012 shortly after Life Of Pi, another huge grossing and largely CGI film, was released. Not only where some critics, one hesitates to call them purists, still concerned with the input of the cinematographer to the overall image but one famous and outspoken cinematographer was furious about *Life Of Pi*'s Best Cinematography Oscar for Cinematographer Claudio Miranda, ASC:

> I don't care, I'm sure he's a wonderful guy and I'm sure he cares so much, but since ninety-seven percent of the film is not under his control, what the fuck are you talking about cinematography, sorry. I'm sorry. I have to be blunt and I don't care, you can write it. I think it's a fucking insult to cinematography [6]

That was a statement from Australian Cinematographer Christopher Doyle, HKSC, now an expat living in Hong-Kong. Furthermore most cinematography associations don't yet recognise virtual imagery; although the Australian Cinematography Society is one of the first and few to have awards and recognition for virtual work [7].

Many journalists and commentators have discussed the possibility for a return to two awards for Best Cinematography at the Oscars as it was in the early days of colour photography when there was one award for black and white and one for colour photography [8][9]. We seem to be at a stage where there is a strong realisation in the industry of the effect of virtual cinematography in filmmaking but an uncertainty of what to do with this virtual image and where it may fit in to our industry structure.

Visual Effects History

An argument could be made that the first films to use visual effects were those made in the very beginning of cinema. Georges Melies is probably the most notable early filmmaker to use visual effects extensively. Most of Melies effects involved the use of dissolves to make people and objects disappear and re-appear and double exposures used as a form of crude luminance key to create floating, bodiless faces. Essentially Melies used stage magic tricks that he refined for cinema [10][11].

However the birth of the visual-effects artist in cinema came in 1927 with Director Firtz Lang's epic masterpiece Metropolis. This film was like nothing else that had been seen before and continues to be a classic of cinema to this day [11]. The filming of miniatures had been done before but the work of Cinematographers Karl Freund and Gunther Rittau was particularly fine on this film. Eugen Schufftan, later to become an Oscar Award winning cinematographer, was credited with 'Special Visual Effects.'

On Metropolis Eugen Schufftan refined a process for compositing impossible shots together which would later be called the Schufftan Process [11]. Schufftan was able to composite actors into a miniature set through the use of partial mirrors making impossible and fantastic scenes for an awed audience. Through this partial mirror, which was positioned at forty-five degrees to the lens, both elements when placed in the correct position and distance from the lens would appear as one.

Eugene Schufftan's role on Metropolis was solely to produce these images therefore Schufftan can be referred to as the first visual-effects cinematographer. His process carried on until the middle of the century when it was replaced by static and travelling mattes [11][10].

Analysing Eugen Schufftan's career following this film it appears that due to his subsequent and notable success as a cinematographer (he won the Oscar for Best Cinematography in 1961 for the American film The Hustler) over a forty year career making films throughout Europe and America, he is and was then a cinematic image maker on the frontier of the art and practice [12].

Schufftan can be thought of as a cinematographer in his own right for the scenes he was responsible for on the film Metropolis. At this time in the history of cinema it was normal for the cinematographer/s to be responsible for any visual effect. Not least because there was no other way to make a visual effect in cinema except with a camera but also because any time a camera was used the resultant image was the responsibility of the cinematographer [13].

Unfortunately not a great deal is known about the exact practice and role of those responsible for the visual effects cinematography at this time because studios went to extraordinary lengths to maintain a veil of secrecy around the actual making of their films so as not to demystify the magic [13].

Visual Effects The Turning Point: 1993-2009

In the decades to follow the last uses of the Schufftan Process and the introduction and popularisation of other processes and technologies for visual effects cinematographers were pushed further away from the creation of such imagery. Processes such as stop motion and matte-painting still involved photography but were slowly becoming independent components of production with which the cinematographer had little contact.

The big shift away from cinematographic involvement came with the first large-scale use of computer generated imagery in a popular Hollywood feature film [14]. The creation of dinosaurs for the now classic *Jurassic Park* embodied this huge shift to a new era of Hollywood filmmaking. For the first time physical visual effects were replaced with virtual creations; creations that the cinematographer did not see on-set during production. Computers were not part of the production process for a cinematographer at that time and were seen as more of a post-production tool, a tool that had nothing to do with the camera which is a key element in the definition of cinematography.

Though this was groundbreaking at the time it was still far away from the authorship discussion of today. There is about fifteen minutes of dinosaur shots in *Jurassic Park*, nine of those minutes use practical, physical dinosaurs in the form of puppets or animatronics while only six minutes in total are CGI dinosaurs [14]. This process and technology replaced a component of puppetry and stop-motion animation but did not alter the cinematography of the film. This type of visual effect was a post-production addition to the film. The film would be shot with the knowledge, based on story-boards, that a dinosaur would be put in frame in post-production [14].

This may have an effect on composition and lighting but not radically change the overall look. The workflow in this era started with an almost entirely finished image to which the CGI team would insert a subject or object. This subject or object would not usually comprise a large component of the frame. The subject or object would also have to be 'matched' to the image which has been recorded by the cinematographer and therefore retain the cinematographer's original look. Todays discussions of authorship began to appear when the next great leap forward in popular cinema occurred; the creation of entire virtual scenes within a live-action film.

Virtual Cinematography: 2009–2014

As I discussed earlier in this paper Avatar was a huge turning point in filmmaking, cinematography and virtual visual effects due to its approach of entirely virtual scenes as opposed to *Jurassic Park*'s insertion of virtual elements, subjects and objects. In fact, prior to 2008 there had not even been a winner for best cinematography that wasn't shot on celluloid emulsion film; an analogue medium [15]. 2008's winner *Slumdog Millionaire* shot by Anthony Dod Mantle, DFF, BSC, ASC was the first winner to be shot using a digital camera.

When *Avatar* won in 2009 with a film that was seventy percent virtually created images discussions of authorship arose [6]. Richard Crudo, ASC, President of the American Society of Cinematographers writes in American Cinematographer Magazine of June 2014:

> If the history of cinematography has proven anything, it's not only that our world is one of steady change, but also that we are adaptable artists who are always embracing the new. Over the past year or two, certain self-interested individuals have been trying to redefine our job title and description to cover the myriad aspects of the hybrid model. That's just nonsense. Everything it entails has fallen under our exclusive purview as authors of the image since the very beginning, and that will continue to be true no matter where the technology takes us [16]

As almost all definitions for cinematography include a camera as central to the art and practice this automatically rules out virtual imagery or CGI as something the cinematographer is responsible for. Though author and cinematographer Blain Brown may disagree:

> cinematography is more than the mere act of photography. It is the process of taking ideas, words, actions, emotional subtext, tone, and all other forms of nonverbal communication and rendering them in visual terms [17]

If this definition can be used then the work of cinematographer Emmanuel Lubezki, AMC, ASC on the film *Gravity* could be a model for filmmaking process and an example of the authorship of virtual imagery. Lubezki, a Best Cinematography Oscar Winner for *Gravity* in 2013, redesigned the entire process of traditional filmmaking procedure by starting with the virtual computer generated imagery and then lighting the live-action to suit:

> Lubezki was deeply involved in every stage of crafting the real and computer-generated images. In addition to conceiving virtual camera moves with Cuaron, he created virtual lighting with digital technicians, lit and shot live action that matched the CG footage and fine-tuned the final rendered image [18]

As with Schufftan an analysis of Lubezki's career and films can show his deep involvement in *Gravity*'s images; a film which is almost entirely virtual. Lubezki's aesthetic is prevalent in all his films but especially those where he has collaborated with Alfonso Cuaron, the Director for *Gravity*, and Terrence Malik, the Director of *To The Wonder*.

One such example concerning Lubezki's approach comes through the element of lighting. *Gravity* was shot entirely in a studio environment and pre-lit in a computer using rehearsed and pre-programmed LED lighting designs that were run by software. *To The Wonder* was shot entirely on location using minimal to no film-lighting fixtures and instead relying almost entirely on natural light. However, Lubezki sees both of these films as having the same 'nuanced' approach to lighting. To explain I will read two short excerpts from articles about the films in American Cinematographer Magazine. The first is about the Terrence Malik film *To The Wonder:*

> On Tree of Life we really tried to do combinations of scenes with light and scenes without, and when you add movie lights they don't have the complexity of natural light. You're putting one light that has one tone and one color through some diffusion, and it doesn't have the complexity of natural light coming in through the window from a blue sky and clouds bouncing green off the grass. Some would call that kind of light imperfect, but it's more accurate to call it more complex. That complexity of natural light and the way it hits the face is amazing, and when you start to go that way it's

hard to go back and light [things artificially]. The less you use artificial light, the more you want to avoid it, because the scenes feel weak or weird or fake [18].

And now this quote about Alfonso Cuaron's *Gravity:*

> Inside the LED Box, the CG environment played across the walls and ceiling, simulating the bounce light from Earth on the faces of Clooney or Bullock, and providing the actors with visual references as they pretended to float through space. This elegant solution enabled the real faces to be lit by the very environments into which they would be inserted, ensuring a match between the real and virtual elements in the frame. For Lubezki, the complexity of the lighting from the Earth source was also essential, giving nuanced realism to the light on the faces. "When you put a gel on a 20K or an HMI, you're working with one tone, one color. Because the LEDs were showing our animation, we were projecting light onto the actors' faces that could have darkness on one side, light on another, a hot spot in the middle and different colors. It was always complex, and that was the reason to have the Box [18].

The Future: A Wider Conceptual Approach

With films like *Gravity* and cinematographers like Emmanuel Lubezki creating new ways for cinematographers to author images and own them throughout the production a new approach may be needed in film schools to tackle the future. Cinematographer Roger Deakins BSC, ASC has been engaged on many animations and credited as an image consultant. These animations, *Wall-E*, *Rango* and *How To Train Your Dragon*, have created striking images for cinema [19][20][21]. I believe it's only a matter of time before cinematographers are expanding their craft into similar narrative imagery such as video games [22][8].

There is only one school worldwide that I can find offering virtual cinematography courses. The Global Cinematography Institute was founded by two famous names of Hollywood cinematography, Vilmos Zsigmond, ASC and Yuri Newman, ASC [23]. Their mission statement is:

> The Global Cinematography Institute (GCI) is devoted to the education of cinematographers and filmmakers as the industry continues to extend into the digital and virtual realms. Along with teaching students concepts and techniques in "Traditional Cinematography", GCI also provides a foundation in subjects such as "Virtual Cinematography", "Previsualization", "Digital Lighting", "Image Management" and more. The goal of the Institute is to take students to the next level and put them in position for meaningful careers in cinematography, present and future.

The Global Cinematography Institute has seen the future in filmmaking and stands to put cinematographers in the driving seat. Cinematographers are not merely camera operators who record an image but artists who take ideas, words, actions, emotional subtext, tone, and all other forms of nonverbal communication and render them in visual terms. This can be applied to our work in the future.

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Seeking the Animation Artist in a Multi-Projection Environment

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Abstract

Animation's linear narrative paradigm screened on rectangular flat surfaces remains paramount in mainstream commercial viewing modes, however the affordances of current technology present alternate opportunities for engaging with animated content.

Viewing works displayed on non-flat surfaces in large-scale environments is becoming commonplace. While many works include elements of narrative, or aspects of visual playfulness and optical whimsy, they do not manage to combine both of these facets into a singular immersive visually engaging storytelling experience.

This paper discusses the development of a 360-degree projection installation in a cylindrical space of looped figurative and pattern-based animation sequences that narrate elements of a short story based on Attar's The Conference of The Birds.

Referencing optical toys like the zoetrope and praxinoscope from an early pre-cinema era, the artists' challenge is to develop a methodology that combines the technical and aesthetic qualities of simple looping animation sequences that both intertwine and interplay in a visual and narrative way, in a seamless immersive gallery style environment.

The investigation looks at the physical science of projection, including the technical specifications, timings and layering required to create a continuous image. It also poses questions of audience engagement and appeal beyond the novelty factor, analyzing a number of recent works in this genre. What are the requisite elements of narrative, visual perspective, timing and pacing and levels of detail for an effective multi projection work? Some answers include a requirement for technical seamlessness, clarity in colour depth, repetition and simultaneity and the presence of narrative artifacts.

Keywords
Multi-projection, 360° curved screen, installation, animation.

Introduction

Situating the artist in animation practice betwixt the parameters of cinema on the one hand and installation video on the other provides fertile grounds for the continuing efforts of theorists such as Paul Wells, Thomas LaMarre and Alan Cholodenko in defining contemporary animation practice. Discussion tends to focus on the physical aspects of the medium such as camera or cinema technology, the frame, the place between-the-frame, and techniques used in creating images. This paper reviews a work-in-progress research project that combines affordances of a cinematic narrative experience with an immersive projection installation created via traditional animation techniques. The process of trying to define this project as not 'cinema' yet not 'art', nor simply 'design' led us to consider the location of the animation artist.

Mark Nash's essay in The Art Of Projection considers the fluid boundaries for modern-day practitioners.

> The moving image is now a key element of contemporary art practice and gallery and museum display…. The moving image has provided a means for artists to develop a 'post-medium' practice, one that moves between media and is not restricted to a particular one. [1]

One of the main factors confining a truly borderless practice remains the structural restraints of the black box / white cube model whereby screen media works are divided along the lines of content. The restrictive divergence is apportioned as either a storytelling and narrative trope or an experiential or experimental aesthetic object. The main obstructive element lies in the existing architecture of display spaces: the black box cinema space has fixed rectangular screens and seating arrangements; the white cube centered on illuminating static works within a rectilinear context. Video installation works have their own luminosity and do not need 'museum lighting' as such. Cinematic works require undivided attention – and comfortable seating for over an hour – which the gallery is not set up to provide. However those limiting archetypes of the physical venue, cultural expectations, aesthetic approaches and technical feasibility are rapidly changing with the advanced qualities of video, digital production, projection and internet and mobile technologies. There is certainly much new technological potential for different approaches to moving-image-art, but these possibilities have not yet been thoroughly plumbed. What is most important now is the pursuit of creating pioneering innovative content.

Christopher Eamon questions the 20th century hypothesis of delineating art versus cinema:

> Then look at video and the changes in the quality of projection since the eighties – if you look at the past forty years, say, … there is an arc to the interplay of the illusionistic and the structuralist, between the cinematic and the focus on the space of the projection over this timeframe. Maybe I'll pose this question to you: is the arc of that story coming to an end or is the film/video as spatial/conceptual practice – the beyond-illusion or beyond-cinema paradigm – still relevant today?" [2]

Our quest is to develop a work that straddles the affordances of both, exploring the opportunity to create an effective immersive animated installation work that also satisfies an audience with a sense of narrative content. The project references Attar's *The Conference of the Birds*, a well-known fable of an epic journey towards truth and enlightenment. The concept alludes to the mandala, the archetype of wholeness. Carl Jung referred to the mandala as 'the psychological ex-

Figure 1. *Shamseh* Mandala Design, Honari 2012.

In expressing the 'totality of the psych', wholeness also implies multiplicity. One would question why we need a multi-screen projection – what are the requirements, how could they best be articulated, and who to?

> We are surrounded today, everywhere, all the time, by arrays of multiple, simultaneous images …. The idea of a single image commanding our attention has faded away. It seems as if we need to be distracted in order to concentrate, as if we… could be diagnosed en masse with attention deficit disorder. The state of distraction ….[is] a new form of attention. Rather than wander cinematically through the city, we now look in one direction and see many juxtaposed moving images, more than we can possibly synthesize or reduce to a single impression. [5]

This state of distraction/attention is fundamental in this particular research project, blurring the margins of the black box/white cube dichotomy. The complexity of the mandalic design, with a constantly moving image requires the viewer to try and pay close attention to the details, while also being somewhat overwhelmed with the intricacy of the whole. It also harkens a sense of playfulness – heeding the era of 19th century optical toys like the zoetrope and praxinoscope, which afford the ability to engage and interact. Practitioners in the 20th century have remodeled and reinvented the hypothesis of these 'toys', creating both intimate and large-scale works for a variety of purposes.

Current Practices

Narrative – a Focus on Stories or Information

A seminal pioneering work was Charles and Ray Eameses' multiscreen installation for the Moscow World Fair in 1959, which consisted of multiple screens simultaneously displaying various iconic filmed sequences of the glories of American life. In setting up this exhibition, there was consideration of Herbert Bayer's 'field of vision'; a roughly 230 degree lateral arc spanning a floor to ceiling depth.

This reflected a similar exhibit devised by the Disney company of the 'Circarama' at the Brussels World Fair in 1958, this time a 360 degree display showcasing the range and scope of the American culture.

The Eameses' were forerunners in creating the multi-sensory immersive experience with another project that included live narration, multiple images (both still & moving), sound (music & narration) and "collection of bottled synthetic odors that were fed into the auditorium during the show through air-conditioning ducts." The aim was to produce an intense sensory environment so as to "heighten awareness". [5]

The production was akin to setting up a circus, with multiple projectors, screens, audio equipment and a circular stage much like a circus ring[1]. This circular presentation and cyclical nature of the work closely resembles the mandala aspect of a zoetrope or other optical toy.

> The idea was, as with 'Sample Lesson', to produce sensory overload. As the Eames had suggested to Vogue, 'Sample Lesson' tried to provide many forms of "distraction" instead of asking students to concentrate on a singular message. The audience drifted through a multimedia space that exceeded their capacity to absorb it. [5]

pression of the totality of the self'. Giuseppe Tucci, an Italian scholar of oriental cultures, in The Theory and Practice of the Mandala said:

> so the mandala is no longer a cosmogram but a psychocosmogram, the scheme of the disintegration from the One to Many and of reintegration from the Many to the One, to that Absolute Consciousness, entire and luminous. [3]

The *Shamseh* carpet design (Figure 1) is one of many initial inspirations for this project, created to illustrate the concept of disintegration and reintegration.

The focus is on the transformation of storytelling and narration initiated by using symbolic visual language in animation. Attar is one the most influential Persian storytellers who used the poetics of prose language to tell his stories. The project also embodies the notion of Sufism, which provides a rich tapestry of ideas dealing with philosophy, psychology, mysticism and ecology. Sufi ideas have influenced various key thinkers through the ages, fostering tolerance, respect and inter-religious communication – vital aspects for a 21st century world.

Locating the Audience

In Man and his Symbols, the last book undertaken by Carl Jung, he quotes Dr. M.L. von Franz explaining "the circle or sphere, as a symbol of the self. It expresses the totality of the psych in all its aspects, including the relationship between man and the whole of nature. Whether the symbol of the circle appears in primitive sun worship or modern religion, in myths or dreams, in the mandalas drawn by Tibetan monks, in the ground planes of cities, or in the spherical concepts of early astronomers, it always points to the single most vital aspect of life, its ultimate wholeness". [4]

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[1] they were close associate of the Ringling Brothers circus at the time

One crucial aspect was in determining the optimal amount of images to show simultaneously. The resolution seemed quite arbitrary in which they considered four to be too easy to comprehend, but more than eight too cluttered, and settled on seven as the ideal between comprehension and perplexity.

Essentially these displays were propaganda in a Cold War era promoting North American triumphant lifestyle.

Similarly, as an advertising piece or promotional trailer, the recent Dreamworks *DragonFlight: The Dragon's Eye View of Berk* installation at the Australian Centre for the Moving Image, involved multiple activities simultaneously displayed in a 180 degree surrounding delivered with four ceiling mounted projectors. The immersion relied heavily on sound, and the use of 3D forced perspective. In this case, the eyes follow the main character as it traverses across and around and into the screen. There is not a lot of peripheral action, though enough to add to the 'distraction', warranting at least two or three viewings to comprehend the whole. Despite the distraction and the spectacle of the wall-to-ceiling screen, it is very much about narrative focus and vicarious enjoyment of being swooped along in a simulated flight.

The iCinema setting has also been explored with Sarah Kenderdine's omnistereographic 360-degree interactive projection environment for the Immigration Museum (Melbourne) displayed from 2008 – 2010.

The Boston Historical Museum also developed an immersive diorama using 8 projectors and individual video files projected in a raised 360 degree screen for informational and education purposes

The main focus is on storytelling and event sequences, with a tilt towards attention through immersion over distraction.

Artist – Focus on Pattern and Form

Mostly site-specific, these examples are situated in churches or planetariums which already have an inbuilt dome. The key element here is abstraction, playing with digitally generated algorithms to create kaleidoscopic beauty. Miguel Chevalier's Roses Digitals displayed at the 2012 Chemins d'art en Armagnac Festival in the 4 metre wide dome of the Aurens Church, Castelnau-sur-Auvignon. Similarly, Anomaly was a collaborative work in the Rochester Museum & Science Centre's Strasenburgh Planetarium at the 2013 fringe festival involving dance, digital video projection, sound and lighting. Paul Grimmer's 2010 Continuum is another full-dome experiential installation in a planetarium, described as "a meditation on notions of beauty, perfection and difference focusing on a body, physically and digitally modified and transformed." [6].

Other site-specific works employ existing architecture with a focus on patterning, often using the inherent edges and extrusions of a building to enhance the images. Another Miguel Chevalier work from 2014 created an interactive generative Magic Carpet on the floor of an unused Morrocan church in Casablanca which treats the audience/participants as elements affecting the image.

Projection mapping on the exterior of buildings is now almost commonplace, many still confined to random colourfulness and/or branding displays similar to the 2014 Colour Me Brisbane events. However festivals like Vivid, Sydney include many works that operate through audience interactivity and site-specific design that provokes an engaged public response.

Rear projection displays using existing window spaces of large scale building is also gaining mainstream popularity with silent, generally non-figurative works shown in public spaces often associated with festivals and events like Zagreb's "Animation goes MSU" in Croatia as part of Animafest.

These site-oriented works offer an otherworldly conception of 'known' spaces, creating an unexpected mis-en-scene for the unfolding scenario.

> As an artistic practice, mis en scene is one of the many techniques that engage the viewer in an aesthetic experience. AsS a concept, it refers to something more adequately indicated as a cultural practice. This practice involves us every day, but more acutely so in confrontation with situations that frame-freeze, so to speak, the mis en scene itself as a cultural moment in which routine if slowed-down, self-awareness is increased, and satisfaction is gained from going outside ourselves. [7]

The focus here is on aesthetics and joyfulness; a welcome unexpectedness in familiar environs.

Technical – Focus on the Physical Medium

Recently there's been a reemergence of sculptural works that mimic the model of early optical toys. These are not site specific, however they are highly technically medium-specific, reliant on a suitable installation space, which includes options for stroboscopic lighting to display effectively. The most well-known of these zoetropes (or stroboscopes) are multiple figurative sequences created as 3D sculpts in a large conical carousel configuration of animated characters from mainstream films including Pixar's Toy Story, and Studio Ghibli's My Neighbour Totoro. The stroboscopes rely on persistence of vision between the flashing light and the space between each figure in the same way that the early zoetropes retained a smoothly flowing perception of movement viewed from the slits in the cylinder reel. Most importantly, the images appear to move forward (or backwards, or towards us) across the field of vision. This requires keen technical geometrical measurement in the placement of each figure in the field or frame, with an incremental shift in successive images. John Edmark's experiments with 3D printing sculpts based on Fibonacci numbers determined that the incremental placements equated to the Golden Ratio or Golden Angle figure of 137.5 degrees, which remains consistent throughout nature [8]. To display these effectively relies on filming the stop motion at specific speeds to capture successive freeze-frames. Beatriz Colomina discusses the reliance on technology to appreciate the viewed experience in the Eameses' works of the 50s and 60s which remains relevant today.

> The film breaks with the fixed perspectival view of the world. In fact. We find ourselves in a space that can be apprehended only with the high technology of telescopes, zoom lenses, airplanes, night-vision cameras, and so on, and where there is no privileged point of view… More importantly, the relationship between the images reenacts the operation of the technologies. [5]

To effectively realize this project requires extensive experimentation in order to get the correct timing and movement for the animated images. The Bird Cycle (figure 2) illustrates an early test in sectioning the circular field and utilizing the Golden Angle increment for apparent forward motion.
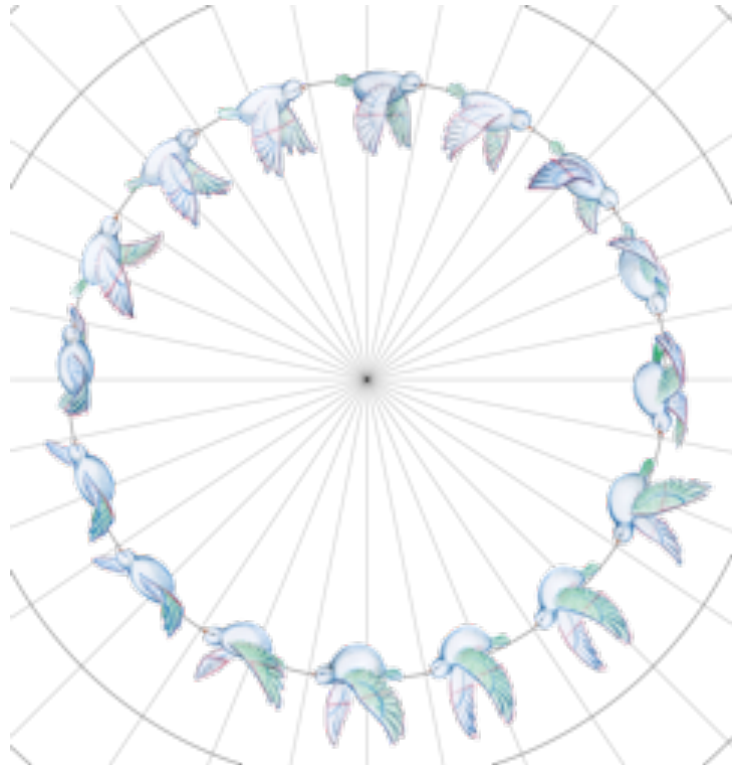
Figure 2. Bird Cycle Test. Honari 2014.

On Looping

Looping actions, interacting with each different element in the image, create mesmerizing sequences. The sheer aspect of repetitiveness triggers a kind of comfort or reverie; a sense of safeness and predictability from the object or plaything, yet at the same time a renewed enjoyment in noticing things slightly missed in the previous viewing. Elizabeth Hellmuth Margulis, director of the music cognition lab at the University of Arkansas and the author of On Repeat: How Music Plays the Mind talks about music and experiments with audience responses to repetition; "A phrase that sounded arbitrary the first time might come to sound purposefully shaped and communicative the second." She refers to the 'semantic satiation effect' where rapid repetition of words incites a kind of cognitive trance.

Referring to the early optical toys, Plateau's phenakistosope (1832) and anorthoscope, Faraday's wheel (1831), Stampfer's stroboscopic discs (1832) Horners Daedalum or zoetrope (1834) and Reynaud's Praxinoscope (1877), Mary Ann Doane considers "the reduced form of seriality of the loop constituted a type of miniaturization of time and movement, its repetition a guarantee of its materiality." [9]

Mieke Bal concurs; "I love the mechanism of the loop. Each time around of any number of minutes is over, I tell myself: "One more time". And it is invariably during one of these repetitions that I become sensitized, because of the repeated seeing to the theatricality of what happens on the screen(s) in relation to the narrative setting. Theater, light and riveting: might they have an intrinsic relationship to each other? And is that the 'message' of video installations?." [7]

It is clear that the Praxinoscope / zoetrope / stroboscope et al have an element of 'story' in them in the form of a gag – the character is doing something, moving somewhere, progressing, but at the same time not progressing. The theatricality and staginess becomes mesmerizing. Following the

action or simple movements, and concentrating all attention on that sequence while also focusing on secondary (distractive) movements is a compelling combination. Situated within a physical 'toy' or environment, it become riveting through its tangibility.

Looping engages two aspects of our comprehension: the narrative and the purely aesthetic. David Herman's 'Basic elements of Narrative' comprise Situatedness; Event sequencing; World making / World disruption; and Experience within the storyworld in flux.

> narrative can be viewed under several profiles: as a cognitive structure or way of making sense of experience; as a type of text, produced and interpreted as such by those who generate or navigate stories in any number of semiotic media (written or spoken language, comic and graphic novels, film, television, computer-mediated communication such as instant messaging, etc.); and as resource for communicative interaction which both shapes and is shaped by storytelling practice. [10]

His hypothesis veers mainly towards comics narrative, however it works as an apt description in the miniaturized world of the narrative Loop. Caracciolo's critique on Herman's text provides and even closer description of the way a loop may be comprehended in terms of audience interaction;

"Narrativity is no pure essence that scholars can capture and study in vitro. There is no single defining quality, but rather a set of features that pinpoint narrative objects because they prompt their interpreters (readers, spectators, etc.) to reconstruct them as narratives. It should be noted that, in Herman's view, narrative "artifacts" (as he calls them) are no more than "blueprints" [11]; in other words, they are incomplete without the reader's (spectator's, etc.) concretization.

For these 3D sculptural artifacts the focus is on playfulness, simulated tactility and z-dimension depth.

Technical Considerations

The dilemma in designing and setting up this project lies in the consideration of available, affordable and effective equipment, space and resources. The most obvious concern relates to the number and type of projectors, the placement of projectors – central or ceiling mounted (the desire is to have these as unobtrusive as possible) and the careful planning required allowing for edge overlap, edging blending, luminosity and depth of throw. A number of other physical situational factors, such as the curved wall and how it will affect the projection throw, and aspects of parallax that might be taken advantage of.

Various new technologies are starting to accommodate these aspects with companies like Matrox specializing in display walls and digital murals, and Nozon developing 360 degree environments for Oculus Rift engagement that accommodate parallax effects. Both developments may auger well for future artist engagement, negating the need for 'old school' projectors, and even 'old school' physical gallery/museum/cinema spaces.

The most pressing problem   encountered in the work-in-progress is in determining the optimum timing and sequencing of the animated images, and effectively integrating and intertwining these into a cohesive holistic mandalic entity.

Technically, the sequencing and timing coincidence across the multiple projectors must be precise, and the software required to run these looping sequences to be reliable and

without end-glitch. Export file sizes and dimensions also pose conundra, allowing for non-rectangular delivery, and precision of image quality throughout.

The other demanding issue is the size of available physical space, how to create the perfect cylindrical 'screen' and how best to accommodate the viewer to enter the space. The scale and scope crosses and confuses the black box / white cube territories in many ways, and the project is intended to be transportable and able to be installed in multiple (suitable) spaces. One solution is to create the circular projection space as a strip curtain (a little like the plastic 'fly curtains' of the 1950s), allowing for easy access into the projection circle at almost any point (Figure 3).
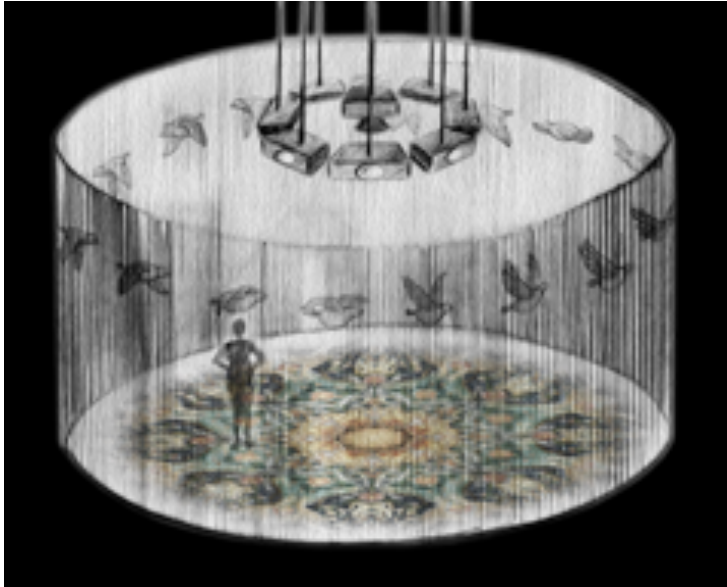

Figure 3. *Fly Curtain* screen schematic

Aesthetic Design

What are the requisite elements of narrative, visual perspective, timing and pacing and levels of detail for an effective multi projection work? Through review and highlighting the affordances of various successful multiscreen installations, we have made a checklist of requirements to accommodate.

- The mechanisms must be technically seamless – we should not be aware of the projectors, the edges or walls, nor the gaps or breaks in the looping sequences;

- It should have an aesthetically pleasing colour depth – which is also not diminished or compromised by the physical space, the projection distance and the quality of the projectors (no fuzziness or wash-out);

- Incorporate elements of abstraction and patterning – creating a riveting experience through sensitized joy of looping;

- Include multiple intertwined images – with shifting focus on up to 7 elements at once, some of which interrelate to each other and forced perspective or a 3 dimensional aspect, with some z-dimension movement; and

- Involve a story or narrative sequence – the characters 'Do' something within each loop (eat a fish, swoop in and out, leap and fall, change shape or form) Pelican & Fish (Figure 4)
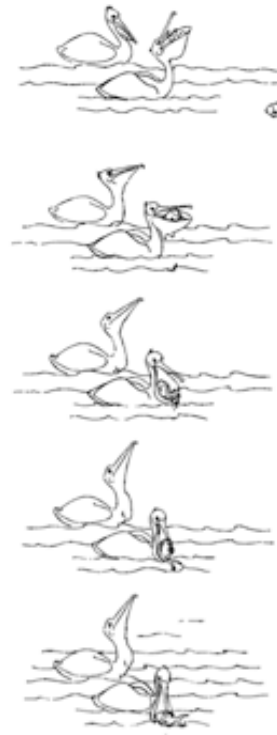
Figure 4. *Pelican & Fish* looping action. Honari 2014

Conclusion

Just as the 16mm camera heralded the revolution in independent filmmaking, and video ushered in the possibilities for artist-videographers, the digital projector plus digital creation tools offer easily affordable, portable and feasible options for immersive works that break the dichotomy of the white cube / black box paradigm of moving image art. This research project is an example of the options available for the animation artist to create a work positioned on the spectrum between Cinema and Art.

For the generalized animation artist of the 21st Century, the hidden algorithms devised by computer programmers have superseded the physical and technical wrangling of rostrum cameras, cels and platen-based timing. For an Artist Animator of the 21st century, concerned still with the perceptibility and physicality of the visual or multi-sensory experience, they must be prepared to explore the cross-disciplinary territory embodied between the black box and white cube. Through contextual review and systematic experiments in the development of this work in progress, we have identified a number of key elements that contribute to joyful narrative engagement for the multi-projection installation audience.

A critical requirement for technical seamlessness is not only performed via the physical hardware and software of the projection technology, but necessary to address in the detailed planning of the actual animation timing and movement. Adaptation of the principles of the Golden Mean assist in measuring increments around the circle or spiral of the mandalic form and precision and accuracy in execution is essential. Associated with the technical element is the need for clarity of image, in both colour depth, and crisp edges, particularly for highly complex or detailed animations. Repetition, in terms of shapes, forms and patterns, plus a looping cycle, add to an altered state of cognitive perception, which has the potential to be a pleasurable manifestation as does processing simultaneous images. Evidence shows that up to

seven concurrent images that also incorporate a sense of perspective or special depth is the optimum; however further experiments and potentially evaluating the outcome of this project may prove otherwise. Embracing a broad definition of narratology, projects that contain action sequences or narrative artifacts help to provide a more literal cognitive engagement for an audience.

These elements help to form a methodological roadmap for the animation artist creating multi-projection works.

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Permitting Chaos as Creative Strategy

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Abstract

The study of creative thinking has much to gain from the field of non-linear dynamics. Chaos theory and complex systems have been shown to afford insight into physical and psychological systems and it is the goal of this paper to look to reinforcing those connections in terms of creative thought processes and creative action. The proposition is made that chaos is essential to the creative process and this is discussed using the dual strategies of generative and exploratory thinking and their place in the edge of chaos dynamics as explored by David Alexander and Gordon Globus. The correlations between psychological and physical creativity are made using the principles of pattern language as described by Christopher Alexander and Nikos Salingaros. This paper argues that the combined weight of these theorists suggest that creativity is influenced by our biologically adapted neurological structures which in turn deeply affect our art and design strategies and aesthetic appreciation.

Keywords
Art, Design, Creativity, Chaos, Complexity, Pattern

Introduction; Physical and Psychological Creativity

The Premise that creativity as not only a human endeavour, but explicitly attributed to natural systems is curious, but also a challenging and empowering idea. Creative thinking may be the realm of humans, but creative process may be something far greater.

The imperatives for a greater-than-human view of creativity, seem to point to universalities that, some argue, appear to be a natural process. Mea M. M. Lowcre, a pseudonym created to author the proceedings of a workshop on creativity in 2013 at Leiden University writes from the standpoint of combinatorial creativity and posits "that the simplicity of combination theory can deal with emergent aspects of creativity that occur in the natural world and in human creativity" [1]. The authors of the creativity workshop support the holistic notion that creativity as a process is not unique to humans and cannot be detached from physical systems. The argument is raised in terms of combinatory theory, that making novel combinations in nature can take place without involving any human agency [1]. Peter Stebbing's and Stephen Gould's concerns point to an awareness of evolutionary systems as a precursor to defining systems of aesthetic organisation [2].

The proposition of Stebbing and Gould is that the evolution of biological systems, whether through pre-adaptation or exaptation, fashions our ability for aesthetic organisation [2].

This in many guises is a common theme amongst some researchers whose neurological standpoint is that our aesthetic preferences are governed by our 'wiring', our inherent neurological structures. Lowcre makes the distinction that "creativity in physical systems is based on coincidence or chaos, but when psychological creativity is based on coincidence in accord with a willful search for connections between (psychologically) remote domains" [1]. If we follow the perceptual paths of the evolutionary biologists, we must begin to entertain the notion that our ideas of creativity and aesthetic organisation are entwined, and informed by physical systems.

Perhaps there is chaos in both physical and human creativity. The structures of dynamic systems at varying scales are chaotically organised, and coincidence or 'chance', plays a role in introducing potential combinations to a system. The very idea that we, as humans are not uniquely creative is in some respects more empowering as it provides that conceptual link to physical systems. We are not unique in that we are only a chapter in a long and developing path of evolutionary adaptations or mutations. What is unique to us as humans is the conscious awareness of when we have stumbled upon something new, and I mean to use the term stumble, because it is I believe, the surprise in the chance find, that brings creativity to our awareness. If we as humans rationally proceed in our endeavours we are no more than formulaic, but we do possess the remarkable potential to understand and implement the chance and chaos unveiled in us and in our world. The idea of agency must therefore be discussed in order to determine what humans bring to creative processes, do we, as humans bring something extra or something else or do we add to the statistical iterations of the ongoing chaotic processes.

The Agents of Chaos

What part do we play as human agents if the evolutionary adaptive systems of nature can be seen to be creative? The proposition put forward by Lowcre is that nature can be seen to be creative regardless of any human agency. Our species exists as a possibility amongst many combinatorial possibilities according to the theories of adaptation, mutation and selection. Humans simply exist as higher order complexities, or creative potentials, we consist of many component parts, a combination of combinations. Lowcre extends the idea of creativity by predicting "that the likelihood of the creative process will increase with interactive collaboration" [1]. This is an incredibly crucial point in unravelling the implications of creativity originating in physical systems, compounding in humans and extending beyond, because it literally just speaks of combinatory possibility.

It is reasonable to assume that our development, culturally speaking, is a result of our abilities to communicate, share information and ideas, and to be creative as a species, simply by extending the combinatory possibilities beyond the singular human. I do not propose that there is anything new and original in this assumption, it is a simple rational argu-

ment, the important conclusion is that creativity can now be recognised as something far greater than the resultant act of the individual, or the aesthetic considerations of the few. I am, I must note, speaking quite generally about the concept of creativity thus far and must acknowledge the many theorists of creativity and aesthetics in terms of historical, social, political and ethnographic contexts.

I am not offering new definitions of creativity, I am simply proposing variants and inclusions to existing theories. My proposed question is simple enough, what does chaos offer creativity?, and the hypothesis again is easy to follow. If we permit chaos in creative practice, the disciplines of art and design for example, our individual and collective creative potential rise, and the reason this is so, is as a result of the increase in combinatory possibilities afforded by divergence and disruption, and by the recursive nature of the successive iterations of combinatory possibilities.

A hypothesis offered by Lowcre is that mutations of DNA may be the evidence of acceleration of combinatory processes in organisms [1], and as Gould and David Buss suggest, it is not the adaptive processes of evolutionary biology that have profound 'creative' results, but rather the *exaptations*. Gould describes exaptations as an evolutionary process where an adaptation that occurred for one particular purpose becomes useful in another function or purpose. Buss does make the distinction between two classes of exaptation clear, one to refer only to mechanisms that have new biological *spandrels*, presenting useful characteristics that did not arise as adaptations but owe their origin to side consequences of other features [2].

Gould offers a contentious leap as to how to conceive of exaptations and spandrels, which serves to elucidate the role of creativity. Gould uses as an example of exaptation the capacity of the abnormally large human brain to produce speech, something that was not clearly adaptive, but nonetheless useful. Gould's reasoning is that the brain size increased as an adaptation for unspecified reasons in our remote past and the resultant increase in complexity produced many by-products that are not properly considered to be just functions.

Among the many spandrels, Gould cites as by-products of large complex brains, religion, reading, writing, the fine arts, the norms of commerce and the practices of war [2]. It is curious to find the fine arts and religion spoken of in the same sentence as essentially the outcomes of an evolutionary offshoot.

The point I would like to raise here is that the best creative outcomes can essentially arise from disruption as in crisis or error and I would like to offer as such, the idea of fine art, and of aesthetics and the human agency of the creative act to inform the creative potential itself of the spandrel, the presently useful characteristic that did not itself arise as adaptation.

Fine Art vs. Design

There are perceived separations of approach in the disciplines of design and fine art, and that perception commonly seems to relate to intent. By that I mean goal oriented approaches and problem solving strategies as applied to design practice, and freedom of expression and exploration in the fine arts. The concerns of design are often said to revolve around function, and in contrast, the fine arts are per-

mitted the opportunities to explore meaning and its associated aesthetic connections with its audience. These are generalisations of course and there are always examples of interdisciplinary thinking and practice, but there may be some salient features unique to the disciplines that have relevance to approaches in creative thinking.

In evolutionary terms it seems applicable to think of design strategy as an adaptive process. For the most part it is logical, rational and linear, even when approached as bottom up or top down thinking. One way of visualising the design thinking process is in terms of convergent thinking as expounded by Nicholas Roukes [3], or in terms of the exploratory processes of cognitive creativity as outlined in the 'Genoplore' model by Ronald Finke, Steven Smith and Thomas Ward [4]. The creative thinking processes more commonly attuned to the fine arts in Finke, Smith and Ward's, reasoning's are the generative processes. Scott Kaufman highlights the benefits and necessity of the both aspects of the genoplore model. The generative or (divergent [3]) thinking processes are necessary for generating a variety of potentially useful ideas [5]. The distinction that I see between the categories of the genoplore model is that the generative stage need not produce anything of use, it is necessary for pure novelty, distant combinatorial associations and analogical mapping.

The generative stage is fresh and exciting, it is as disruptive as dada. In myself and in my disciplines I see the necessity for both art and design, it makes sense that divergence and convergence or generation and exploration are necessary states to each other. The cycle of generation and exploration are evidence of the brains dynamic and iterative systems.

There is potential in the generative model, I believe, to introduce the concept of the exaptation and the spandrel. It is the role of the arts to challenge and to find exceptions to rules and to introduce new creative pathways as thrilling as surrealism or as dangerous as dada. It is also 'commonly' the role of design to search through possibilities and potentials raised by generative process for function, limitation and 'usefulness', to evaluate from different perspectives or within different contexts, and to interpret from the perspective of the problem to be solved [4].

Kaufman, in his summary of recent neuroscientific studies in creativity makes it clear that the theme emerging from these studies is that, creative cognition relies on both cognitive control and associative chaos [5].

I support Kaufman in his statement that Creative Cognition is 'controlled chaos', because it incorporates both elements of the creative process. The underlying point to be re-iterated if you will excuse the pun, is that the fundamental principles of chaos theory show it as enabling a deeper sense of order, an organisation of higher orders of complexity, a dance between order and disorder, or as John Casti defines chaos theory, 'the science of surprise' [6]. Having introduced the dualistic notions of chaos and control, generation and exploration, divergence and convergence, and offered some thoughts on the dynamics of creativity in physical and psychological systems, it is essential to seek out what is 'surprising' about chaos and in turn its effect on creativity and in particular creative thinking.

If we were to place our mindset, for a moment, outside of our normal physical realm and pretend we had no place and no understanding of what creativity and evolution was, we may see why surprise is a fundamental necessity for the creative act. If we imagine a world founded solely upon adaptive pro-

cesses, we would soon find wherever we looked, evidence of systems that go nowhere, not truly evolving, but stagnant and tending toward entropy. This clockwork universe may function reasonably efficiently and on the surface it may indeed look like our own, but delve a little deeper and it would soon reveal its shallow resemblance. It would appear as a copy of what we know frozen in a moment, it would function in the sense of Nietzsche's hell of eternal recurrence, but it cannot move forward, as it is not a good place to solve problems, and anything resembling creativity within this mechanistic realm would behave far too predictably to quickly adapt to unforeseen circumstances were they ever to eventuate.

Lowcre builds an image of creative evolution from quantum uncertainty to the evolution of complex biological life with the suggestion that the creative possibilities arising from simple combinatory potential accelerate to the highest level of physical creativity in terms of DNA mutation. The prophetic view of this high level of adaptation, and mutation in organisms and particularly humans is that the stage is reached where "the universe consciously reflects upon itself and what it has created. If we regard ourselves as a living part of the universe, through us the universe has found a way to optimize or willfully change a new combination into something else or use it yet in another combination" [1]. This statement may seem 'new ageist' but it is simply an ontological position and the conceptual defence is intriguing when the standpoint is the basic question; what is creativity and how did it arise?

Lowcre's position, that we as humans are reflective of greater creative processes, is an elegant and sensitive placement of the human in a much grander context. This also gives rise to the notion that creativity and consciousness are fundamentally linked.

It seems apparent that any claims that involve complexity, chaos theory and fractals involve the discussion of greater interconnected parts and is never simplistic. This idea that creativity involves chaos and is dynamic and unpredictable, is supported by, amongst others, Margaret Boden who proposes the view that "unpredictability is at the essence of creativity, but cautions that is not enough, that at the heart of creativity lie constraints: the very opposite of unpredictability. Constraints and unpredictability, familiarity and surprise are somehow combined in original thinking says Boden" [7].

The terminology may change from author to author but the two part notion of creativity is a common theme, the question remains though what do we do with this knowledge concerning creativity in art and design. Carl Bovill who published, fractal geometry in architecture and design is credited by his editor Arthur Loeb as being articulate and systematic with espousing the balance between the predictable and the surprise in art and design [8]. Bovill points out that "without the expected there can be no surprise" [8]. It is the potential links between cognition and practice that will be explored later and other architectural theoreticians offer insight as to how this may take place.

Neural Patterns

Richard Taylor, as one of the contributing authors to Organic Creativity and the Physics Within, states that fractal search turns out to be more efficient than the randomness physics exploits in finding novel combinations [9]. The reasoning given is cited in a book chapter by Fairbanks and Taylor on the fractal analysis of a number of search patterns, from human perception to albatross navigation. They conclude; "when searching for the appropriate problem to be solved, or for out-of-category information to be used in solving that problem, a number of search processes in nature have been shown to follow fractal patterns" [9].

In support of the human use of fractal search processes, there is some evidence for perceptual and cognitive search paths that possess fractal structure, that it demonstrates complexity. And if we are looking for the structural correlations between how the brain searches and associates new perceptions with memory, the hierarchical levels of the pattern recognition process offer clues as to the fractal branches and links required for complex perception and reasoning. It could be said that the patterns of neural processes, in this case the search and recognition processes, mirror the structural connections of the neurons themselves.

This proposition has support from some unlikely areas. Nikos Salingaros, a mathematician and architectural theoretician make the claim with Terry Mitiken and Hing Sing Yu, that, "we subconsciously use as a template the ordered complexity of our own mind so as to extend our consciousness outside our own body" [10]. The idea of fractal structure of and within the brain is raised by Salingaros and Taylor as a proposal to extend to areas such as human creativity and aesthetics. The proposal is supported by neuro-scientific studies which speak of biological hierarchy of structural pattern within the brain in much the same way that fractal structure is discussed. David Alexander and Gordon Globus state that the brain is a structured system of hierarchically organized modules. These interacting modules communicate with one another, and in turn these modules contain sub modules which communicate among themselves [11]. This "pattern is repeated at several different levels of scales, culminating in what is a molecular and biochemical fractal of interacting and communication systems" [11].

The proposal again is that if the structures of the brain are complex and fractal in their nature and in their interactions, might not the cognitive processes exhibit similar complex and fractal properties. Alexander and Globus's key points to be raised however are in the particularities of the neural systems as described by 'edge of chaos dynamics', they explain

> complex systems are positioned at the edge of chaos. And that a system poised at the edge of chaos is neither too ordered and thus unchanging, nor too chaotic and so incoherent [11].

Positioning the system at the edge of chaos enables it to have access to either regime. At any given scale of neural organization, the neural system is poised at the edge of chaos. The system shifts subtly either side of the edge of chaos to utilize more ordered or more chaotic regimes and to take advantage of the rich dynamics to be found in the narrow transition between the regimes [11].

E, Harth, as referenced in Alexander and Globus's chapter, likens the shift between ordered and chaotic states in brain tissue to laminar and turbulent flow in fluids [12]. Laminar flow is observed to be predictable and linear, turbulence is unpredictable and satisfies the chief tenet of chaos theory which is sensitivity to initial conditions. Harth points out that in neural systems, the underlying fluctuations in turbulent flow are highly structured perturbations that carry meaning, and are filtered up through numerous scales of neural organisation [12].

Alexander and Globus conclude that the various scales of neural organization are interactive and interanimating each

other with chaos and order, and that in this recursive vision of the brain, the scales are inseparable, the part and whole indivisible [11].

There is much speculation supported by growing evidence that the brains structure can be seen as self-similar and fractal [13][14]. There is support amongst researchers that our neural systems are complex and function at the edge of chaos, and there is argument that our perceptual and cognitive systems mirror the iterative and recursive complexity of the biological structures. The leap I intend to make now, with the aid of architectural theory and pattern language is through a circuitous path back to my earlier proposition: that we must begin to entertain the notion that our ideas of creativity and aesthetic organisation are entwined, and informed by physical systems.

Infinite Pattern

Returning now to Salingaros, who instigates the theory that the built environment reflects structures in human thought, in that it is created by human minds, he, Mikiten and Yu suppose that "fractal structures in nature influenced the development of neuronal mechanisms in evolution that could encode and decode these structures automatically. If true, it is reasonable to suppose that the mind, which uses these mental mechanisms, seeks to shape its environment according to the same rules for structural connectivity" [10].

In an earlier paper 'The Structure of Pattern Languages' Salingaros discusses the language that links patterns together and how it contains useful connective information that helps both to validate the patterns and to apply them [15]. Rather than differentiate between patterns of varying types and classes, as stylistic concerns, I wish to draw attention to the connections and underlying commonalities between patterns of thought and application of pattern as Salingaros has done in defence of the importance of what he believes Christopher Alexander has contributed.

In 'A Pattern Language' [16] Christopher Alexander provides the language (syntax and grammar) to inform the architectural design process and facilitate a human connection with the built environment. For each 'pattern' Alexander describes a recurrent problem in the built environment and then describes the core of the solution to that problem. Each pattern represents a rule governing one working piece of a complex system, no pattern exists as an isolated entity, and all are linked hierarchically in scales. Alexander developed his pattern language as a response to the disconnections observed in contemporary architecture between the human and the product of the human, but warns any user of the language that it is not meant to be fully prescriptive, but rather instructional and adaptable.

Alexander's pattern language has correlation to the neural processes described previously. What is particularly of note is how Alexander's theories of pattern languages have influenced software engineering, computer science and interaction design to name only a few disciplines, thus verifying the strengths of using pattern language and pointing to its inherent connections to internal patterns.

It supports and fosters creativity, perhaps because it is as branched as neural structures. Anyone utilising the language can start the process from any part of the problem that is understood, and work toward unknown parts. This is where it mirrors cognitive process, Salingaros concludes his paper by stating that patterns provide a necessary foundation for any design solution to connect with human beings [15], my addition to that argument is that patterns connect to patterns, the patterns of action, of physical process, have reference to the patterns of perception and interrogation. Whatever the language we create is, inclusive of its own grammatical rules, it is the connection to memory and association that is more important to us for its recursive dialogue than the product of using that language.

If we are responsive to our creative processes, the aesthetics of what we do, what we make, whether it be artwork, design object, furniture or building it will have reference to our own processes of thought. Alexander himself speaks of this point quite eloquently in the 'Nature of Order' when he makes the introduction to complexity, "all the well-ordered complex systems that we know in the world and that we view as highly successful, are generated structures" [17]. Christopher Alexander speaks of generation as intrinsic to us as humans and our place within complex biological systems. In general he says, a complex object (or system) may only be successful if it is generated, and flows from living process [17].

Through a circuitous set of associative processes we have again arrived at the concept of generative processes. I would like to conclude that for creativity to flourish and be attuned to physical and psychological processes we permit chaos. Granted we must be aware of and responsive to processes in tension, we may prepare constraints as in the rules of pattern language, but we must be open to responsive dialogue between generative and exploratory modes of thought. Our creative processes require a balance between the expected and the surprise in art and design. There is however a great creative challenge and that I believe is a commitment to the continuing development and critique of grammatical systems in art and design that are better informed by patterns identified in our neurology. I would like to believe that the study of creativity and aesthetics has much to be informed by research into the dynamic processes of chaos and complexity.

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Using Digital Technology in a Fine Art Practice

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Abstract

The rapid changes in digital technology have led many artists across all creative platforms to incorporate digital media to their practices. In this paper, I demonstrate how fine artists can successfully employ computer programs and digital tools in their practices by referring to the works of Shirin Neshat and my own studio practice. In particular, I will evaluate and explore the efficacy of using a data projector and its desirable visual effect outcomes in body projection through discussing a body of my recent works made during my candidature at Queensland College of Art in 2014. Furthermore, this paper also highlights the assistance of Adobe programs in generating ideas and compositional provisions for non-digital painting purposes.

Keywords
Visual practice, projector, Adobe, photography, painting.

Introduction

At the turn of the twentieth century, art entered a new era of artistic mass production. Whereas the previous age was an era of artistic mass consumption, in our present time the situation has changed and there are two primary developments that have led to this change. The first is the emergence of new technical means [digital technologies] for producing and disturbing images, and the second is a shift in our understanding of art, a change in the rules we use for identifying what is and what is not art — Groys [1]

Although the application of computer and digital art usually relates to design and applied art practices, multidisciplinary artists today are able to accelerate their visual practice by employing a digital medium. With the new possibilities that a digital tool such as a data projector provides, the visual artist may appear as both creator and subject of his/her practice. For my body of work illustrated and discussed here, I rely on the projected digital images of traditionally made paintings. These images are projected on the human body (often my own) as a non-digital organic matter, and then, once again, are captured with a camera and synched back to the computer. The creative process that these final photographs have been through is intriguingly shaped by the interchanging phases from physical to virtual. At first, traditionally made acrylic-based paintings were photographed and transferred onto my computer for digital manipulation. Then, the digital images were projected onto a human body via a data projector, and consequently the projected shapes on human skin were photographed and synched back to computer as digital images. As the creator of the piece, I am simultaneously the painter, the operator, the photographer and the model. The

final phase of production occurs when the final images are printed on paper and exhibited as real tangible artifacts.

Digital media has undoubtedly changed the traditional artist's relationship with their created artworks. In his perceptive article "The virtualization of art practice", Simon Penny proposes that artistic methodologies are imposed by mechanistic ideologies on the non-mechanical sub- consciousness of artists. Penny concludes that: "If the traditional intelligences of artistic practice are worth preserving, artists must develop a sophisticated understanding of the nature of their practice with respect to digital tools" [2].

Inscribed images and texts on human bodies play an important role in the works of exiled photographer/video Iranian artist Shirin Neshat (whose work I will expound on later in this paper). Likewise, in my practice, the projected images of photographs and details of mythological painted motifs draw the viewer's attention to the complex questions of cultural identity and displacement issues. As a diasporic Iranian artist, I use body projection to integrate my personal views of home, identity and gender into my work. This body of works hugely relies on digital devices; namely, a computer, a projector and a digital single-lens reflex (DSLR) camera to capture the final effects. In the following sections, I will describe the creative process of this series and will discuss on the effectiveness and usability of the mentioned devices to achieve preferred visual outcomes. Furthermore, I will also illuminate part of my studio practice that employs computer programs in the preparation and creation process.

Body Projection Series

The human body stands as a metaphor for identity and its perpetual connection to time and space. By using the female body, including my own, in my creative practice, I aim to raise questions around issues of gender, culture and displacement. My research is particularly concerned with Iranian diasporic identity. Therefore, these bodies are immersed in a variety of images that represent cultural and psychological norms of displaced Iranian women. Personal photographs and paintings are the main resources for the pictures I choose to project on bodies, since they represent mythology, nostalgias, and cultural complexities (Figure 1).

After completing my acrylic and oil-based paintings, I photograph them and then select particular patterns, figures and shapes to digitally prepare them for the purpose of projection.

In my studio, I use a laptop computer to synchronise the images to the projector. This allows me to control the position of images and to quickly change the pictures when necessary. When working with a projector, certain adjustments result in different outcomes. These usually include the link between the distance of the device and the subject or screen, and the scale of projected image. As the space between device and screen increases, the projected image scales out and since most of the projectors don't have wide zooming options, a ratio of 1:1.2 being most common,

Figure 1. Sara Irannejad, digital photograph, 2014.

Figure 2. Sara Irannejad, photomontage, 2014.

putting the device in a proper distance to the subject is important for achieving the anticipated projection size. Furthermore, setting the brightness of the projector to a certain amount is key to having a brighter or duller projection. It is also noteworthy that the brightness of projected images depends on the amount of ambient light in the room and the quality of images themselves. This is when photo-editing programs such as those in the Adobe suite become practical. Such programs are the best tools to prepare images for the purpose of projection. In fact, in my studio research, I benefit from the vast possibilities and endless openings that these tools provide me; from the modification of colour and brightness to the juxtaposition of elements and photomontage.

As seen in Figures 2 and 3, the surrealistic themes are made by the functions offered in the Adobe suite and in combining of different individually taken photographs with other visual elements.

Contrast is another factor to consider when preparing the images for projection. Usually, the quality of projected images relates to both the model of the device and the images' attributes. Typically, the higher the contrast is, the sharper and clearer the projected images are, as the dark colours look darker and light colours look lighter. Therefore, to attain a desirable projection quality, a number of technological factors and settings need to be considered. However, the quality of final works relies on yet another important device, which records and captures all this together and makes the final

outcomes accessible for further digital showcasing, printing and so on: a DSLR camera.

To shoot pictures of the prepared arrangements, I put my camera on a tripod, change the settings properly and have it shoot subjects against the screen while they are immersed in projected patterns and images. As mentioned before, I am both the photographer and photography subject in many of

Figure 3. Sara Irannejad, photomontage, 2014.

my works. In such cases, an incorporating relationship forms between me as the model who poses for the camera and me as the eye behind the camera. In a way, I am looking at myself from an outside view, in order to explore a certain identity I am representing. For many Westerners, the stereotypical expectation of the appearance of Iranian women is to see them at least partly veiled or traditionally clothed in a way related to their Iranian culture.

Many westerners usually are surprised when they meet Iranian women who are indistinguishable from Western women in terms of clothing and appearance. Featuring me standing unclothed in front of the camera, without any prescribed hairstyle or gesture, my photographs aim to dismantle such generalised social norms and expectations. This is to reject identifying and categorising myself with a conventional identity. The interchanging positions of me as a photographer and as a model invites the viewer to question the psychological side of a diasporic woman and her identity in terms of her feelings, memories and culture instead of any oversimplified distinctiveness.

New York–based Iranian artist Shirin Neshat uses herself as the subject of many of her photographs. Questioning sociopolitical Islamic norms and the situation of Muslim women in Iran, her Women of Allah (Figure 4) was the outcome of her short trip to Iran in the very first years following the Islamic revolution; the years of Islamic dictatorship and war. This body of works, which shaped and shifted her creative career, showcased Iranian Muslim women wearing veils, their face and bodies filled with text inscription and images.

As a renowned video artist and photographer, Neshat uses all sorts of digital media in her creative practice. While she usually manually adds her handwriting in ink onto her large digitally printed photographs, many of her recent works are created by utilising digital tools such as computer and projector where a pre-existing particular image or symbol was needed. In such cases, the images are added either later to the photographs by using computer programs or projected on the body parts at the time of taking the pictures. The growth of digital photography itself and the endless world of computer media has had a great impact on Neshat's creative process. For instance, if we compare her early works of 1993 to 1997 when she produced her Women of Allah series, with the later video works, such as Women without Men in 2009 and then her new series of photographs Book of Kings in 2012, not only do we notice a significant transformation of excellence in terms of visual representation and properties of the works, but it also helps us to trace the progress of digital cameras and computer technology. Digital photography as Roy Ascot suggests, has a complex link with the virtual world of computer — a hyper-media kingdom where advanced means of storage, construction and combination of data coexist with the concurrent sensory and semantic modes of sound, video and text [3].

In 2012, Neshat exhibited a new body of works, Book of Kings. With a look at the political complications in the Middle East and the traditional gender roles in Muslim societies, these recent photographs draw visitors' attention to the ancient historical and cultural power of these regions in contrast to the recent situations.

This series of photographs juxtaposes the graceful elements of the ancient history and today's complex identity of Iranians by bringing ancient heroes and their poetic and perfect ethos onto the contemporary world and its political issues [4]. She first has exhibited them at Gladstone Gallery in New

Figure 4. Shirin Neshat, *I'm its Secret* (from *Women of Allah*), 1993, Fuji colour print.

York in January and February of 2012. The body of works comprises a series of black-and-white photographs showcasing men and women and their body parts. Verses from Persian classic and contemporary literature, and images from Persian manuscripts narrating stories of war and killing cover these photographs. These images belong to lithographs and paintings from well-known eighteenth- and nineteenth-century Persian manuscripts.

In the exhibition's press release it is said that "These texts and illustrations—drawn from Shahnameh as well as from contemporary poetry by Iranian writers and prisoners—both obscure and illuminate the subjects' facial expressions and emotive intensity, intimately linking the current energy of contemporary Iran with its mythical and historical past. In this arresting body of work, Neshat returns to the confrontational nature of her iconic Women of Allah series, while re-focusing on themes of revolution and the bold-faced defiance of youth." [5]

Lithographic illustration is synonymous with Iranian literature owing to the stereotypical character of popular literature with its repetitive scenes of battle and amusement [6]. The images of lithographs in Neshat's photographs, illustrate the mythological stories of Shahnameh (The Book of Kings). Written in the eleventh century by poet Ferdowsi in more than 60,000 epic verses, Shahnameh is the most complete source of Persian mythology and plays an important role in constructing Iranian identity.

Digitally manipulated images in Neshat's Book of Kings play a powerful role in signifying the messages behind the photographs. By narrowing the selection of illustrations to war scenes and highly saturated red colour (evocative of blood), Neshat draws viewers' attention to the recent political incidents in the Middle East, global thinking of terrorism and ethnicity. Undoubtedly, photography is a strong medium to connote issues of identity, society and cultural history. At the same time, Neshat's works' visually appealing outcomes, soft light and shadows on the human skin and high contrasts

indicate the artist's wise and professional use of this technique (Figures 5 and 6).

In my practice, I explore the relationship of Iranian diasporic identity and ancient Persian mythology. Broadly speaking, Iranian identity is a mixture of ancient Persian culture and those of post-Islamic times that were intermixed and refashioned during the centuries after the Arab's invasion of Iran. In Iranian classic literature, dislocation is seen as a dark and depressing experience. According to Abbas Milani, the "variegated connotations and denotations of Ghorbat [and Mohajerat], the common Persian words for exile, suggests the culture's troubled relationship with the exilic experience" [7]. While acknowledging the undeniable difficulties of displacement, I would rather perceive displacement as a unique, inspiring and challenging experience, and a displaced person as being a strong contestant with heroic charisma. The female figures of my photographs are both strong and emotional. They surely carry scars of troubles and nostalgias but are willing to let the past go and move forward to a brighter future (Figures 7 and 8).

Both Neshat and I rely on digital photography and enhance our practice with visual and digital effects. Digital technologies allow me to control and adjust light, contrast, and even the colour of the projected images and final photographs. In these works, I intentionally used a variety of pattern and

Figure 6. Shirin Neshat, *Divine Rebellion* (from the *Book of Kings* series), 2012, digital photograph.

shades to indicate the hybrid identity and emotional and psychological patterns of my diasporic subjects (Figures 9 and 10).

Applying Adobe Programs

Today, with their fast-developing capabilities, Adobe suite programs provide every possible creative aspect to the world of art. From comprehensive editing, filtering and sketching options to making highly technical multimedia works in sound, film and animation, artists of all disciplines can benefit from utilising digital mediums in their creative practices. While such technology may not suit artists working with traditional media, certainly it can lead to a breakthrough in their practices. Since embarking on my undergraduate studies in graphic design and illustration, I have used Adobe programs in many design and animation works (Figure 11).

In recent years, my concerns have been linked to the complexities faced by diasporic communities, including sociopolitical issues, as well as still being informed by the mythologies that shaped my youth. I have found that other platforms of visual art, such as painting and photography, provide more openings into my practice in expressing my concerns. However, this does not mean that I have completely separated myself from design and its related digital components. In fact, I still quite often employ computer mediums such as Adobe programs in my new studio practice. For example, when I need to generate an idea for a new painting, I use design software to develop my sketching and find a desirable composition layout by playing with and replacing the elements that would be embedded into my painting later (Figure 12). This way not only accelerates the creative process but also improves my perception of the final work. Another example would be when a certain type of design or image is required to be further collaged into the painting. There are many instances where I may need to use a certain

Figure 5. Shirin Neshat, *Bahram* (from the *Book of Kings* series), 2012, digital photograph.

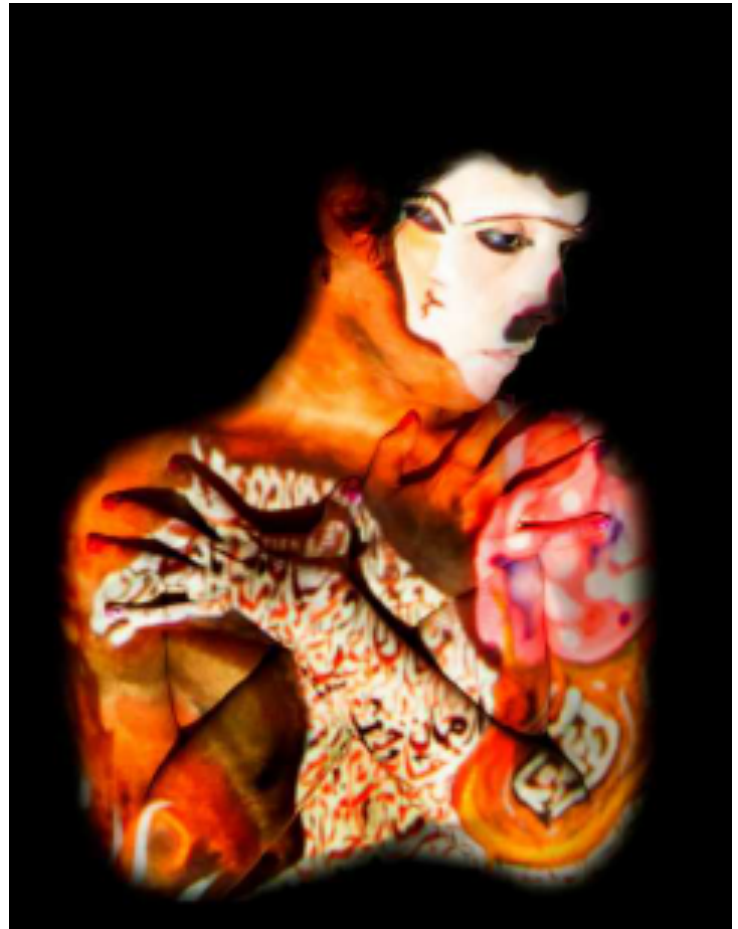**Figure 7.** Sara Irannejad, digital photograph, 2014

Figure 9. Sara Irannejad, digital photograph, 2014

Figure 8. Sara Irannejad, digital photograph, 2014

Figure 10. Sara Irannejad, digital photograph, 2014

Figure 11. Sara Irannejad, digital sequences for animation *U-turn*, 2008

Figure 12. Sara Irannejad, digital draft. 2014

symbol or photo into my painting. In such cases, I typically use Adobe programs to render and adjust that image for this purpose and later on use its print version either as a collage or to be transferred using traditional techniques. In Figure 13, I have used design software to outline the kangaroos and then collaged the silhouettes in a repeating form. Furthermore, in this figure, the image of the demon mimics its original Persian manuscript image source as it is a particular icon in Persian mythology (Figure 14).

In his article "Computers and visual art", Franke asserts that: "There is no doubt that some phases of art-creating processes can be mechanised and automated. If we set aside the mystic aura, the essential task in producing a work of art consists in designing a composition from basic elements-shapes, sounds or words. The sole condition that these elements must satisfy is that they have to be visually or aurally perceptible" [8]. By comparing my computer-generated sketches (forming layouts and preparing visual elements for the purpose of producing non-digital painting) with those that are hand drawn, I have explored that the computer makes the image far more visually tangible since most of the visual aspects could be under control.

Most of my paintings draw their inspiration from Persian miniature painting in terms of their symmetrical layout and the repetition of some elements. In Persian painting, space is very controlled (i.e., there are strict formal elements that need to be adhered to) and the pace of creation is slow and measured. Each step leads to another, so a final image is built up by following certain steps. Hence in many cases, digital sketching and drafting before creating physical painting help to have a virtual visualisation of the final work. It also facilitate with the mathematical measurements that are vital for producing symmetrical layouts (Figures 15 and 16).

Justin Marshall, a traditional ceramist, writes on how he uses the computer in his practice in the article "Computer technology and creative practice": "As an artist/craftsperson rather than an industrial designer, 'designing through making' is central to the creative process. Rather than working towards fixed final outcomes as many industrial designers do, my works evolve through my engagement with the materials, processes and technologies. Therefore this software was not investigated as a passive tool for modeling pre-existing designs, but as a medium with which one actively experiments.
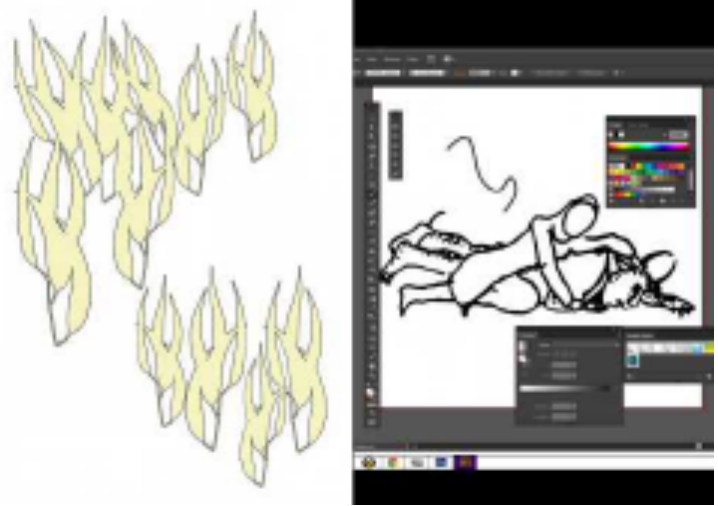

Figure 13. Sara Irannejad, *Battle with Div,* 2014, acrylic on board

Figure 14. Unknown artist, early 19th Century Lithograph from the Book of Kings, Iran

It was considered as an integral part of the creative process of developing new forms and surfaces, not simply a means to a pre-defined end" [9].

Conclusion

As pointed out in this paper, utilising digital media in visual practice not only accelerates the creative process, but also opens new and vast openings that feed into and enhance the quality and exceptionality of visual outcomes. With everyday life increasingly relying on digital technology, it is inevitable that art be influenced and enhanced by it too. Though digital tools can still have their own restrictions, an artistic point of view can push these boundaries and bring up the questions of innovation and simplification into multi-disciplinary practices. For me as a practicing artist in both areas of digital and traditional media, digital tools and computer programs facilitate the demonstration of the multi-layered aspects of my mind.

Acknowledgements

Figure 15. Sara Irannejad, digital draft, 2014.
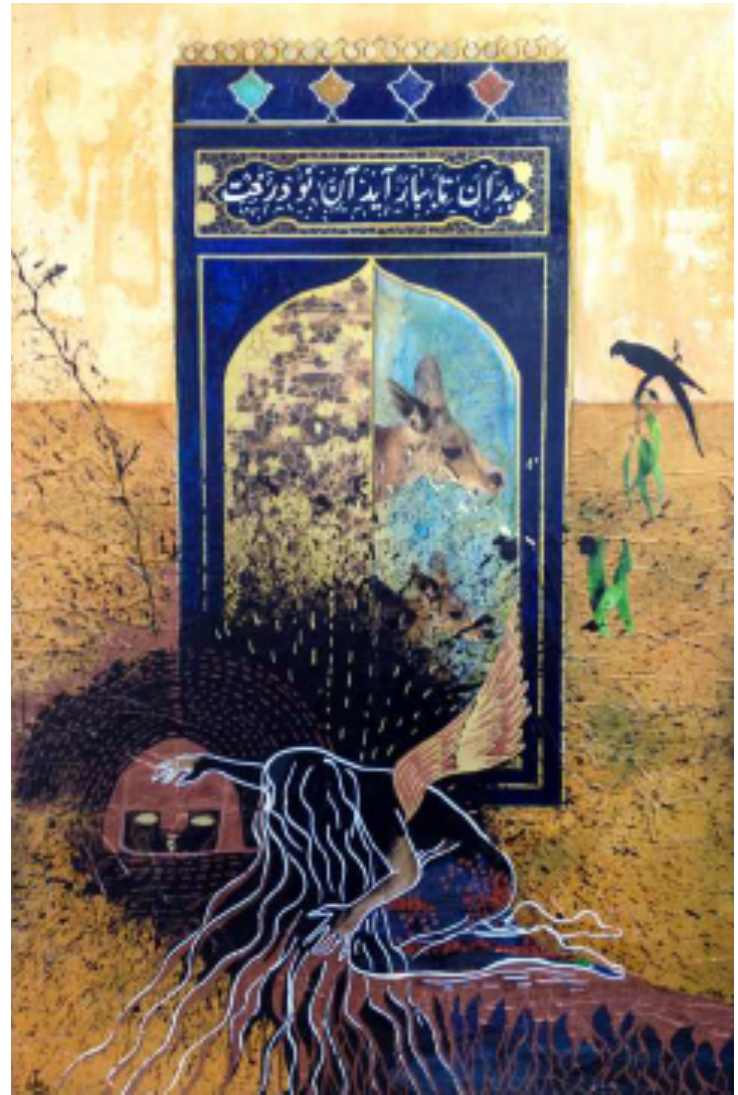
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Papers Reviewed by Abstract

Digital Futures: Exploring the Role of Technology in Community Empowerment, Social Activism and Cultural Change	Leah Barclay
Desktop Video Production for Research and Teaching	Matt Hitchcock & Paul Draper
Art-Engineering Collaboration	Natalie Lloyd
From Photo to Photo-Realistic: Digitising the Planet	Thomas Verbeek
There's an App for That! Using Mobile Devices to Improve Audience Engagement	Glenn Luttrell
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Trialling Second Life Machinima to Promote Discussion and Support Learning in the Australian Sugar Industry: Stakeholder Responses are Encouraging	Cliffe, Stone, Coutts, Mushtaq, Reardon-Smith, Farley, Doyle, Lindesay, Loch, Hasset & Jacobson
Generative Methods for Music Video Composition	Julia Stefan
Time in Media Programming	Andrew Sorensen
Kallawaya Ronda - Brisbane	Gerardo Dirié

Digital Futures: Exploring the role of technology in community empowerment, social activism and cultural change

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The advancement of digital technology in the last decade has truly cultivated a paradigm shift in how artists interact in both physical and virtual worlds. These changes have evolved creative possibilities and enabled access to a global audience. As technology propels our increasingly visually dominant society into the future, the value of our auditory perception is often neglected. Listening provides more information about our surrounding environment than any other sensory perception. In a world where the dramatic ramifications of climate change are becoming a reality, this research explores the possibilities of acoustic ecology and digital technology in community empowerment, social activism and cultural change.

In a recent addition of Musicworks, Joel Chadabe stated that the current artistic practices of electroacoustic composers are rooted in the idea that new technologies, unlike traditional musical instruments, can produce sounds used to communicate core messages, including information about the state of our environment. He claims that we are all participating in the emergence of a new type of music accessible to anyone, which can be used to communicate ideas that relate more closely to life than those communicated through traditional musical forms. He believes we need to think of ourselves as "leaders in a magnificent revolution rather than the defenders of an isolate and besieged avant-garde" [1].

Through a series of case studies, this research reflects on four electroacoustic music projects completed through the author's doctoral research. The projects were created in cultural immersion, ranging from the centre of the Amazon rainforest to exploring significant rivers in India, Korea, China, and Australia. The findings and observations from each project highlighted the value of creating electroacoustic music in community engagement and using multi-platform digital dissemination of the resulting experiences. This resulted in the development of the Sonic Ecologies framework, a practice- led methodology that explores the possibilities of electroacoustic music composition in ecological crisis. The creative projects introduced in this paper are ultimately acting as a catalyst in reconnecting to the environment through digital technology and sound.

[1] Chadabe, J. "A call for avant-garde composers to make their work known to a larger public," Musicworks, 2011. 111: pp. 6.

Leah Barclay is an Australian composer, sound artist and creative producer working at the intersection of art, science, technology and the environment. Her work has been commissioned, performed and exhibited to wide acclaim across Australia, New Zealand, Canada, USA, Europe, India, China and Korea. She has been the recipient of numerous awards and has directed and curated intercultural projects across the Asia-Pacific.

Barclay creates complex sonic environments that draw attention to our ecological crisis and endangered ecosystems. These works are realised through immersive performances and multi- sensory installations drawing on environmental field recordings, data sonification, multi-channel sound diffusion, live performers and ephemeral projections. Her practice-led PhD at Griffith University involved site-specific projects across the globe and a feature length documentary exploring the value of creativity in environmental crisis. She is currently based in Australia working on a series of new commissions including the opening ceremony for the 5th IMC World Forum on Music, the interactive installation Vedic Remnants and The DAM(N) Project, a interdisciplinary venture exploring global water security through the lives of displaced communities in the Narmada Valley of North India.

In 2013, she Co-Chaired the Balance-Unbalance International Conference in Australia, a major event designed to use art as a catalyst to explore intersections between nature, science, technology and society in a changing climate. In addition to her creative practice, she serves in an advisory capacity for a range of arts and environmental organisations, including Ear to the Earth (New York), InterCreate (New Zealand) and as the Vice President of The Australian Forum for Acoustic Ecology. She is currently the Artistic Director of Biosphere Soundscapes, a large-scale interdisciplinary art project connecting the soundscapes of UNESCO Biosphere Reserves across the world. http://www.leahbarclay.com

Desktop Video Production for Research and Teaching

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We will present the preliminary findings of an investigation into the use of video documentation at the nexus between professional artistic practice, research and university teaching. We present the tracking of a series of research and teaching confluences where video materials have been used to document and communicate techniques and understandings. These case studies are unpacked to show hoe the use of video materials supports the nexus between research and teaching and techniques and tips for the efficient production and distribution of these materials is discussed. This work builds on the ongoing work of the authors into the development, deployment and curation of multimedia materials for academic activities.

Matt Hitchcock and **Paul Draper** work in the Music Technology area of the Queensland Conservatorium Griffith University. They are each practicing musicians, active researchers and passionate about music learning and teaching. They each have a strong history of innovation in the use of technologies for music making and education.

Art-engineering collaboration

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The current transformation of the hub of engineering at Curtin, into a Living Laboratory by installing Internet-accessible sensors throughout the building during semester 1, 2014 is underway. A creative multi-disciplinary project with a team comprising academics from Engineering and Art is to be implemented in 2014 in parallel and integrated with the Living Laboratory project. It is our team's vision to create media rich online resources – centred around the chemical, mechanical, electrical and civil dimensions of the Engineering Pavilion – that will expose students to professional practice and the development of engineering judgment through technological and/or virtual environments linked with the physical environment of the Pavilion. The opportunities opened up by the Engineering Pavilion Living Laboratory project will enable us to enhance students' exposure to professional practice and to help develop their engineering judgment. Many aspects of professional practice and judgment could be included: safety training and awareness, installation and commissioning of equipment, predicting responses of materials in situ, understanding dynamic behaviour, estimating quantities, awareness of the size of equipment and structures, performance and design standards . It is believed that there will be scope for engineering and art students themselves to develop material as part of their course units, especially the engineering final year capstone projects, engineering and arts research-based units, and visualisation technology units. This project and its development of media rich resources and interactivity of technical and visual displays for student use and learning , is anticipated to lead to develop greater multidisciplinary collaboration between Engineering and Art. It has the potential for evolving multidisciplinary research initiatives. At this stage of planning and imminent implementation, the Engineering-Arts implementation team welcome creative input to explore the possibilities and expand the potential of this collaboration.

From Photo to Photorealistic - Digitising the Planet

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Areo is a photorealistic rendering research company that has been digitising the planet since 2006. Based in Dunedin, New Zealand, Areo has produced multiple award-winning computer games by recreating real life (3D) environments. It is the accuracy of these "real-life" environments that has seen the company develop photogrammetry software for industry, enabling surveyors, miners, architects, engineers and planners to understand their subject in greater detail. This presentation is a live-demo technical showcase of Areograph technology and its application in the industry, spanning forensic crime scenes, heritage building reconstruction and drone planes mounted with cameras for aerial surveying.

Thomas Verbeek is a Masters student researching computer graphics at the University of Otago, New Zealand. He works as a software developer and 3D artist for a photorealistic rendering research company called Areo (www.areo.co.nz). His personal website is www.thomasverbeek.com

There's An App For That!...
Using Mobile Devices to Improve Audience Engagement

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The ANU's College of Asia & the Pacific is working to improve audience engagement for attendees at lectures, seminars, conferences and other events by using the mobile devices that attendees are already bringing along. This presentation will discuss the different methods and tools that were used at our annual Asia Pacific Week conference in July 2013 and how we brought these tools together using the Guidebook Event App. The methods and tools fall into three categories:

1. Multimedia and interactive content for presenters

2. Interactive tools for the audience such as "Poll Everywhere" and "Google Moderator"

3. Social media interactivity through Twitter and Facebook

The presentation will discuss the lessons learned from exploring each of these methods and how we plan to use those lessons in the future.

Glen Luttrell is the Technical & Logistics Coordinator for the Digital Learning Project at the ANU's College of Asia and Pacific. Glen has brought nearly 20 years of IT support experience and translating the technical to the everyman, to the his current role of bridging the gap between teaching and the technical - facilitating the use of new technologies in the teaching and learning experience. He is currently coordinating content production and translation for one of the ANU's first EdX.org MOOC's – "Engaging India" set to launch in March 2014, as well as numerous other projects to enhance the College's use of Moodle and other learning technologies.

User Experience Design for Hyoomans

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Users are terrible at using software. They make mistakes, press the wrong buttons and touch everything in the wrong order. The interesting challenge for developers and researchers is making sure users don't notice how terrible they are by crafting resilient, intuitive and non-offensive software experiences. This talk gives you a run down of why User Experience Design should matter to your project and why it's important to think about it BEFORE you start developing. It covers the basics of User Centred Design and User Testing as well as highlights some of the common usability traps people fall in to when developing software. By the end of the talk you should have an understanding on how to approach the creation of new interfaces and how to iterate and design Hyooman proof apps.

Trialling Second Life machinima to promote discussion and support learning in the Australian sugar industry: Stakeholder responses are encouraging…

Neil Cliffe 1,2, Roger Stone 1, Jeff Coutts 3, Shahbaz Mushtaq 1, Kathryn Reardon-Smith 1,2, Helen Farley 2, Joanne Doyle 2, Janette Lindesay 4, Adam Loch 5, Amanda Hassett 6 and Noel Jacobson 6.

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Well-designed and facilitated participatory learning processes focussing on stakeholder discussions can lead to significant learning, skill development and decision-making outcomes in industries such as agriculture. Virtual World machinima, which simulate farmer discussions, have significant potential as an alternative information delivery method in agriculture extension environments, where funding and policy support is declining and access to high speed internet is increasing globally. This research trials and evaluates a Second Life machinima designed as a discussion support tool for improved climate risk management in the Australian sugar industry. The machinima set and characters were developed to represent a typical farming situation and farmer personalities with specific attributes that would make it contextually relevant for the target farmer group. Major set elements included a farm house, machinery shed, tractors, a cane harvester and a sugar cane crop as backdrop. Other elements such as tools, tyres, a fridge and a farm dog were included to provide minor details in support of major design elements. Scripts for the machinima avatar conversation were written in an idiom which attempted to characterise the vernacular used by the targeted farmer group. The informational content of the machinima script considered the use of seasonal climate forecasts in cane harvesting planning and decision making.

A pilot evaluation of the machinima, using semi-structured interviews (17), was conducted with canefarmers (7), extension officers (6) and Canegrowers organisation representatives (4). Interviewees were asked to respond to questions around key attributes of the machinima design and the informational objectives of the avatar conversation, with comments coded thematically. Interviewees were also asked to rate the value of the tool in 'supporting canefarmers to take some action, small or large, in relation to the information presented'. First impressions of the machinima were largely positive. Most interviewees identified readily with the characters and settings depicted in the machinima, and related the animation to a typical canefarmer shed meeting. Key messages identified by interviewees were consistent with the informational objectives of the script; although, some felt that the message could be better targeted to farmers with a higher level of understanding of climate and production risk. Developing scripts appropriate to the target topics for discussion appears to be critical in ensuring audience engagement with the machinima. The pilot evaluation indicates that machinima could provide useful support for discussion and decision-making around climate risk as well as other significant industry issues.

Generative Methods for Music Video Composition

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In this paper I propose the design of a system for dynamic real-time editing of music video sequences on the Internet, utilising probabilistic parameters and algorithmic decision-making for progression. I will explain how these processes give music videos the potential to be different every time they are accessed, and provide users with an enhanced viewing experience and creators with a new tool for video composition. As the advancement of online technology influences the ever-changing habits of media consumers, user uptake of new technologies suggests that is entirely possible to transition away from video's prevalent mode of presentation as a linear sequence of shots. Factors such as viewer engagement and usability drive the need for ongoing exploration in the use of video for entertainment, information and advertisement. The production of a music video with generative methods is described as a semi-automated process, whereby human tasks are not to be replaced by computational execution, but are shifted to become increasingly conceptual. A framework for this novel mode of video composition is outlined and a creator's transformed experience when using such a system is described and compared to traditional methods of editing.

Time in Media Programming

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Change is a central tenet of time-based media. Human beings are naturally predisposed to ascribe temporal structure to this change. And yet for millennia the idea that time exists as a universal property has been increasingly called into question. In this talk Andrew will briefly discuss the notion of time, why concepts of time are so important to digital media practitioners, and why media programming is fundamentally impacted by our formal conceptions of time.

Andrew Sorensen is a computer scientist, computational artist and active performer and composer of electronic music. Andrew's interests lie at the intersection of computer science and creative practice – particularly the development and application of programming languages in computational arts practice. Andrew often builds his computational works live in front of an audience, developing software as an integral part of a performance. Andrew has been invited to perform throughout Europe and Asia and is the author of the Impromptu audio/visual programming environment.

Kallawaya Ronda – Brisbane

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In this Artist's Talk, the composer refers to creative strategies, inspirational resources, pedagogical approaches and health and ethical concerns related to the electroacoustic work and collective dance Kallawaya Ronda (2011). Commissioned by the National Institute of Creative Arts and Industries of The University of Auckland, and presented for the first time at the Australasian Computer Music Conference of that year. The project responded to the environment of an academic conference by giving access to participants to an experience that is unifying, sensually stimulating, while facilitating a momentary displacement of the ego. Kallawaya designates traditional itinerant healers amongst the Kallawaya culture in Bolivia. This association to healing practices guided relevant decisions during the gestation of the composition. The work combines transformations of samples from tarka flutes along with live tarkas performed by guests from the audience.

Participants to conferences are usually bound to low physical activity during such events. Thus, in Kallawaya ronda – a multi-channel surround sound composition – the composer invites a dozen participants from the specific conference to be placed within a circle of 8 loudspeakers. The participants are quickly guided to memorize and play a short melody in the tarkas (a set of traditional Andean wind instruments) and to move sideways in a gentle, enticing alternating foot pattern that makes the circle move clockwise while electronic sounds traverse the performance space in various surrounding trajectories. Kallawaya ronda gives to the participant access to the exploration of physical and mental health effects of low impact choreography, breathing techniques, instrumental performance and body correlation while experiencing a composed surround electroacoustic work in a group situation. As the round gains intensity, the performers are gradually led to reduce the size of the circumference, challenging them to calibrate smaller movements and coming into closer proximity to the other participants. The round concludes with a compact group of people standing still and listening in an exalted state to the last sounds from the loudspeakers. The composition and performance blends practices ranging from Indigenous American round dances, naturopathic strategies in the use of breathing – here mediated by the performance of a short, mnemonic melodic pattern – traditional instrumental performance, and the use of digital technologies allowing for a mesmerising experience of sound spatialisation of related sound materials and the body in motion.

Born in Cordoba, Argentina, composer **Gerardo Dirié** is an accomplished conductor, performer, and educator. He works as a senior lecturer in music at the Queensland Conservatorium Griffith University. As a composer, he has had many acclaims and performances in the United States, Latin America and Europe. In July 1994, he was a prize winner in the National Tribune of Electroacoustic Music in Argentina. As a result, his piece Tu casa o este océano was selected for performance at the 1994 International Tribune of Electroacoustic Music in Paris and at the International Tribune of Composers (UNESCO) in Finland. His choral work Canto de Amores Entre Ausencias won the Honorary Mention in the NISSIM ASCAP International Composition Competition in 1993. In 1991, 1992, 1993, 1995 and 1996 he was distinguished with the Standard Awards from the American Society of Composers, Authors and Publishers for the performance of his compositions. This included the performances of Puerto de Cántaros by the Cosmopolitan Symphony Orchestra with Tania Leon conducting, in Town Hall, New York; Two Impromptus for two pianos, in Caracas, Venezuela; El baile del quinto día for solo violin in Spain; and a retrospective concert of his music for soloists and live electronics performed by The Hueco Ensemble in Manhattan. During the most recent years his music has also been performed in India, Malaysia, Turkey, Colombia, Venezuela, Belgium, Germany, and Denmark.

Exhibitions

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Ex Vivo 01 – 03		Tyson Foster

Tears of the Sun

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This exhibit is a single mission from an upcoming larger video game. The format is a slow paced military giant robot simulation game. The proposed mission will demonstrate rescue and security concerns (looting, banditry, evacuation & disaster relief) during a global warming induced hurricane and related flooding scenario in a built up area.

The larger game is being designed to engage 35+ year old males who are resistant to considering issues of climate change to do so in a way that provokes their interest and thought without being triggering barriers to learning. It is being designed to walk the player through the consequences of global warming during the latter half of the 21st century. The player takes on the life of a member of the military & security forces, piloting a giant robot style fighting vehicle. Enrolling at 16 years old in 2050, the player will live the experience of securing anticipated security hot spots over the following 50 years. The player is drawn into the world by sitting in their giant robot cockpit (consisting of up to 3x computer monitors, 2x iPads and special flight controllers) to undertake their missions.

Gordon Moyes is one of Australia's leading video game developers. Having worked more than 15 years on major projects in Brisbane, Los Angeles and Boston, he has recently turned his focus to academia where he now leads the Bachelor of Games Design for the Griffith Film School, Griffith University. Commercial credits include Producer of Destroy All Humans! 2: Make War not Love, Programmer for 1997's Dark Reign: The Future of War, Director of the adorable iPhone title Cluck It!, and numerous titles in between. Research interests include using video games for subtle ideological re-alignment, with a current focus on global warming. Works such as My Mechanical Romance — highlighting the absurdity of preventing giant robot marriage — have been exhibited at the Queensland State Library, and the precursor to this exhibit, Winds of War — exploring scenarios of energy security in a post peak oil, global warming affected world — was recently exhibited at Crane Arts, Philadelphia.

Generative Jewellery

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The physical forms in the exhibition are the result of generative design, in particular they are variants and permutations of fractal forms principally the Julia set. The forms represent the boundaries of manifestation in physical and structural terms. They are at the edge of physical realisation though the processes of additive fabrication and investment casting and constitute in material terms, evidence of the present boundaries of transformation of digital to physical processes. The works are intended to exist in the form of wearables, as objects of contemplation, it is desired that the response to them is lived and their inherent complexities permits extended haptic and visual investigation by both the wearer and the observer.

Daniel Della-Bosca teaches Digital Design at the QCA, Gold Coast campus. Working in fractal mathematics with the Iterated Function System, fractals can generate elegantly complex three-dimensional form that can be easily assimilated and acknowledged by the viewer. His research interest is in the relevance of mathematics in understanding the natural world.

Previs Production in the Digital Art Zone

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Previs (previsualisation) is a virtual representation of a shot, usually performed in 3D software, as a moving image. It could be described as being the blueprint of a film. The Previsualization Society provides the following definition:

Previs is a collaborative process that generates preliminary versions of shots or sequences, predominantly using 3D animation tools and a virtual environment. It enables filmmakers to visually explore creative ideas, plan technical solutions, and communicate a shared vision for efficient production.[1]

The benefits of utilising previs in film and animation production are well-recognised, and it is now used in most feature film production.[2] Increasingly, it is being implemented in student productions also, and it is my involvement in the production of a short film for the Griffith Film School that has led to the creation of this previs work.

The process of creating the previs revealed a challenge that many other amateur and student filmmakers would doubtless also encounter: how or where to acquire the necessary 3D assets (character models, props and environments) to populate the 3D previs scenes. In feature film production, the budget covers the modelling of these assets by the previs department. For the amateur filmmaker however, the resources of money, time and/or modelling expertise for asset acquisition is often absent.

This was the dilemma that I encountered when faced with the construction of previs for the GFS short film project mentioned above. Fortunately, I was able to find a solution in an apparently overlooked and much-maligned source: DAZ 3d. This is a 3D software program that in its early years was directed at beginner/self-learner 3D artists. The DAZ3d web site provided users with an extensive online content marketplace of rather poor-quality 3D assets that could be used to populate DAZ3d scenes. The artistic outcomes from this product tended to look inept and in the eyes of the wider 3D community, users of the product and the product itself were subsequently branded as woefully unprofessional.

However, time has moved on, and while the unprofessional tag may still remain, the inferiority of the DAZ3d product has not. On visiting the DAZ3d web site late last year, I was pleasantly surprised to find a huge range of high-quality, low-priced assets in its online marketplace. All of the characters, props and environments that I could possibly need were available there, and best of all, these could be exported from DAZ3d in a format that I could use in my 3D program of choice, Autodesk Maya.

The 3D previs footage that was subsequently created demonstrates the outcome of this solution, and it is hoped that other filmmakers and educators may benefit from being made aware of this option.

Louise Harvey is currently a full-time lecturer in 3D animation and modelling at the Griffith University Film School in Brisbane Australia. After completing a doctorate in Visual Arts (animation) in 2007, Louise has worked on a number of Australian live action and animation productions, including the film Australia and the animated TV series Animalia. Her roles on these productions have included Visual Effects Coordinator, and Previs (previsualisation) lead artist.

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[1] The Previsualization Society n.d., Previs Documentary – Part 1, viewed 20 May 2014, http://previssociety.com/previs-documentary-part-1

[2] Harvey, L. 2010, Designing efficiency: the benefits of previsualisation in film and animation teaching programs, Edulearn 2010 conference proceedings, Barcelona.

Heroine with a Thousand Stories

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These photographs showcase body projection on diasporic Iranian women. The human body stands as a metaphor for identity and its perpetual connection to time and space. By using female body, including my own, I aim to raise questions around issues of gender, culture and displacement. My research is particularly concerned with Iranian diasporic identity. Therefore, these bodies are immersed in a variety of images that represent cultural and psychological norms of displaced Iranian women. Personal photographs and paintings are the main resources for the pictures I choose to project on bodies, since they represent mythology, nostalgias, and cultural complexities.

The title of this series The Heroine with a Thousand Stories draws its inspiration from Joseph Campbell's renowned book Hero with a Thousand Faces, a remarkable work in comparative mythologies and also from the infamous ancient book One Thousand and One Night. In these works, I intentionally used a variety of images and colours to indicate the hybrid identity and emotional and psychological patterns of diasporic Iranian women.

Sara Irannejad is a QCA Fine Arts research candidate. Currently she is exploring mythology and diasporic identity through body projection, painting and installation. In 2009, Sara has left her home country, Iran, in order to get away from autocracy and censorship that has limited the art practitioners. She first resided in the US while studying Master of Studio Art at Boston's School of Museum of Fine Art. In 2011, Irannejad was granted an Exceptional Artist scholarship award from this school. In 2012, She chose Australia as her new home and has lived in Brisbane as a practicing visual artist and designer since then. Irannejad won many awards during her 11 years of creative practice, with the most recent Start your studio Scholarship awarded by Jasco LTD., and sponsored by Winsor & Newton and Liquitex Australia. Irannejad's work has featured extensively in numerous group exhibitions worldwide including the 40x40, Brunswick Street Gallery, Melbourne (2014); Gather Festival, St. Ita school, Brisbane (2014); One Globe, one Flag, ADGI, Jakarta (2007). Selected solo exhibitions include: Surrounding Tales, South Bank institute of technology, Brisbane (2012); Myths and Fantasies, Gallery 360, Boston (2011); Imaginary Beings, Seyhoun Gallery, Tehran (2009).

Not So Soon

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It was a cold winter morning. I picked up a phone call from my mother and she said she had been diagnosed with stage four ovarian cancer. It was just over six years since she had had a mastectomy for her very early stages of breast cancer. I googled 'stage four ovarian cancer survival rate' straight away and it said there was only a ten percent 5-year cure/remission rate.

Since Mum lost her husband three years ago, she has been saying that she does not want to live for long, "Five years, if I get five years, I don't need any more". It was really hard to listen as a daughter who loved her so much. I sometimes cried and begged her not to say such horrible things. However, it didn't change her at all.

Although Mum still says that all she wants is five years, now she has decided to apply chemotherapy after the doctor told her that she would not live a year without it. However, one afternoon, I found out that she was still smoking. I cannot explain how furious I was at the time. "Taking chemotherapy and still smoking? Do you want to live or kill yourself? Why would you suffer this much to go through chemotherapy if you wanna die? Don't you know how serious this situation is now? You have only ten percent chance to live five years!" She made some silly excuses. A few days later, I found Mum was still smoking.

Mum became really weak and fragile after a few months of chemotherapy. Her skin colour became dark, her nails became black, and she lost most of hair including her eye brows and eye lushes. She had pins and needles in her hands and feet all the time, and could not even walk on the tiled floor as it caused pain. She started using a walker to perform some easy house duties and for going out. She could not sit up and play with her laptop computer anymore like she used to do all the time. All she could do was hold an iPhone and play games. 'It's good to play games all day. That way I don't have to think about anything. I would start crying otherwise'

It struck me, all of sudden. I realised how horrible an experience she had gone through. How hard her life has been. I thought I knew it, but I didn't really understand it until she had become this weak. It must have been tremendously hard for Mum to face the harsh reality. Probably, that is why she tried to avoid facing it, saying 'I don't want to live for long', smoking, and playing games all day.

It is easy to say that Mum is silly. But this is the way she tries to 'live'. Even though I still cannot agree with the smoking, I should be kinder towards her effort of denying the reality that death is approaching fast.

Now it's been a month after Mum completed her course of chemotherapy. She seemed to be regaining her strength day by day. Much of her hair started growing back as well. Once, the cancer showed how fragile the human body is, however, now mum is proving how resilient life can be.

Yoko Lance is a Doctor of Visual Arts candidate at Queensland College of Art (QCA) Griffith University and currently working for the Nichigo Press, the largest circulating Japanese newspaper published in Australia. Yoko studied a Bachelor of Communication with two majors in 'Communication & Media Study' and 'News & Magazine Photography' at Griffith University on the Gold Coast, and also completed her internship with the local newspaper, the Gold Coast Bulletin. Yoko also graduated a Bachelor of Digital Media with Honours in ePhotojournalism at the 2nd oldest art school in Australia, Queensland College of Art (QCA) at Griffith University, and her social documentary research project, 'For Grief' was awarded for the 'Excellence in Research'. Yoko won the Australian Postgraduate Awards scholarship and now extending her research in social documentary photography at Griffith University as a Doctoral candidate, and freelance for select clients. Yoko is also a proud mother of three daughters.

Dis/close

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Digital Video — 4.23min — 2014

Dis/close poses questions: what is fact and what is the distortion of truth?

An evocative yet simple short video, Dis/close portrays a solitary figure being slowly revealed from the blackness only to have his image coloured, distorted and blindfolded in the dark. This work aims to discuss the relationship between the individual and the constant manipulation of facts by the media and governing political powers, which appear to conceal and blindfold the populace.

In silence, through a game of reveal and conceal, the environment and the appearance of an individual is transformed through digital drawing exposing the head of a man in disquiet contemplation. The hand drawn, pixelated lines consistently uncover, redefine and blur what is actually available to us.

Through the process of drawing as enquiry I identify and investigate the interconnected experience of human engagement. Using the Tagtool (live digital drawing and animation device) I aim to translate those elements into a drawn video work that allows an authentic process of collaboration and improvisation.

The outcome, a strange, poetic intervention of the digital drawing that uncovers, confuses and transforms an isolated man. It is hard to look away from this compelling and mesmeric work.

Kellie O'Dempsey is currently completing a Doctorate in Visual Arts at Queensland College of Art, Brisbane. Describing her work as a Performance Drawing practice O'Dempsey aims to enable an inclusive form of cultural interaction via interdiciplanary performance and play. Hybrid in form O'Dempsey's practice incorporates projection, video, collage, architecture, gestural line and digital drawing. Investigating notions of transformation and the uncanny she collaborates with performers combining hand drawn marks with digital projection and live animation. Experiential and emergent O'Dempsey invites the audience to engage directly engage with the visceral process of making. Performances include; Art after Dark, Pier2/3 18th Biennale of Sydney, Mutable+Luminous–MONA FOMA, Hobart, Tasmania and The Firehouse, Brooklyn, New York

Ex Vivo 01 – 03

Tyson Foster
Griffith Film School
Griffith University

Ex Vivo 01 - 03 is an exploration into gesture, organic motion, geometric transformation in 3D space and algorithms.

Working with 3D real-time technologies and procedural generation techniques, Ex Vivo 01 - 03 aims to create abstract digital sculptures that explore the link between the unique materiality of virtual form and anatomical deformation derived from the natural world. This is created with a desire to challenge the ideas of representation and realism in 3D graphics.

Characters are developed through experimental techniques to demonstrate new capacities of software to develop and visualise these abstract yet inherently familiar forms. The tension that exists between organic motion and the heft and precision of sculpted hard surfaces is visually exciting. This aesthetic has unique challenges, such as requiring the form to hold references to physical properties like the mass and inertia while using references to organic mechanics of motion and gesture.

Performances / Compositions

Shifting Nature	Leah Barclay
Four Short Cantatas in Emotional-Sonata-Form	Jesus Lopez-DoNaDo
Ibis	Josten Myburgh
Intelligent Tracking	Jayashree Panjabi
Folding Time: Research into Transduction in Collaborative AudioVisualism	Scott Baker & Lloyd Barrett
Crustacean Caquaphonics	Matt Hitchcock & Toby Gifford

Shifting Nature

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Shifting Nature is an environmental sound installation based on field recordings made during Leah Barclay's Sound Mirrors project, in which she travelled through Australia, India, Korea, China and Brazil capturing the sounds of significant rivers and collaborating with their surrounding communities. The source materials range from hydrophone recordings of the Amazon River Dolphin in central Brazil to pilgrims chanting at dusk on the banks of the Pamba in southern India. Shifting Nature explores rivers as the lifeblood of communities and underscores the value of listening in our current state of ecological uncertainty, weaving diverse cultural and natural soundscapes into a dense and unpredictable sonic environment.

Shifting Nature was recently featured at the 5th ICM World Forum on Music in Brisbane and ISEA2013 (International Society for Electronic Art) in Sydney, Australia.

This work can be installed in a discrete location during the conference, and the installation is flexible to available space. Shifting Nature can also be presented as a live immersive performance. All of the technical requirements can be provided by the artist.

Leah Barclay is an Australian composer, sound artist and creative producer working at the intersection of art, science, technology and the environment. Her work has been commissioned, performed and exhibited to wide acclaim across Australia, New Zealand, Canada, USA, Europe, India, China and Korea. She has been the recipient of numerous awards and has directed and curated intercultural projects across the Asia-Pacific.

Barclay creates complex sonic environments that draw attention to our ecological crisis and endangered ecosystems. These works are realised through immersive performances and multi- sensory installations drawing on environmental field recordings, data sonification, multi-channel sound diffusion, live performers and ephemeral projections. Her practice-led PhD at Griffith University involved site-specific projects across the globe and a feature length documentary exploring the value of creativity in environmental crisis. She is currently based in Australia working on a series of new commissions including the opening ceremony for the 5th IMC World Forum on Music, the interactive installation Vedic Remnants and The DAM(N) Project, a interdisciplinary venture exploring global water security through the lives of displaced communities in the Narmada Valley of North India.

In 2013, she Co-Chaired the Balance-Unbalance International Conference in Australia, a major event designed to use art as a catalyst to explore intersections between nature, science, technology and society in a changing climate. In addition to her creative practice, she serves in an advisory capacity for a range of arts and environmental organisations, including Ear to the Earth (New York), InterCreate (New Zealand) and as the Vice President of The Australian Forum for Acoustic Ecology. She is currently the Artistic Director of Biosphere Soundscapes, a large-scale interdisciplinary art project connecting the soundscapes of UNESCO Biosphere Reserves across the world.

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Four Short Cantatas in Emotional-Sonata-Form

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Four short cantatas in emotional-sonata-form, is a performance to support the project: Fisher discriminants as a framework for Plutchik's emotional theme annotation in music composition. This ongoing doctoral project at the Queensland Conservatorium is a compositional workflow aimed to guide composers to discriminate or favor certain music themes and selected musical features as they relate to the composer's previous emotional responses to these themes. This workflow applies Plutchik's emotions classification framework. It also utilizes Fisher discrimination as an statistical tool in a two fold manner: (i) to guide the classification of themes as per the composers perceived emotions and (ii) to discover prevalent musical descriptors.

Four short cantatas in emotional-sonata-form is composed of four movements:

I.   joy versus sadness;

II.   anger versus fear;

III.   trust versus disgust;

IV.   surprise versus anticipation

The four cantatas total to a 16 min long composition in which the sonata-form is explored by using emotion prevalence rather than more traditional variation tools, i.e. dynamics, key modulation, tempo, etc. The piece is composed of five subsections as per the traditional the sonata-form

(i)   introduction;

(ii)   exposition;

(iii)   development;

(iv)   recapitulation.

Here the idea of sonata-form is extrapolated to populate the four classical sessions with contrasting emotionally annotated passages. Aesthetically, the piece is conceived for virtual choir over 8 ambisonics channels with concomitant live electronics via 4 surround channels spatially distributed in real-time by the performer within the modular synthesizer.

Jesus Lopez-DoNaDo is a doctorate candidate on music composition at the Queensland Conservatorium Griffith University. He works at the crossover of emotional psychology, music composition and computational intelligence. In his doctoral thesis he is exploring ways to generate a compositional framework guided by individuals' emotional responses.

Ibis

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In the improvisation "Ibis", I perform very still music, working with quiet events being passed around by microphone (for saxophone), no-input mixer and pickups on guitar, and exploiting the different means of sound transmission offered by these means. Inspired by Ryoji Ikeda, the approach to improvising in this case uses sounds in 'raw states', which in Ikeda's case refers to sounds such as sine tones, white noise and digital clicks. In my performance, the sounds transmitted through the microphones, pickups, instrument and microphone cables and pre-amps remain in their unprocessed 'raw state', being transformed only by moving them around, compressing or expanding them in time or using them to produce digital noise artefacts. Through this each component in the setup becomes an instrument, allowing the unique signature of the gear to be pressed onto the music and used as a device to direct, influence and ultimately produce the composition. The aesthetic result is sparse, artificial and delicate, and resembles some sort of electronic landscape more so than a carefully structured composition, enticing (but not persuading) the audience to hear it in this this way through a patient pace of development.

Josten Myburgh is a 19 year old third year student composer at the Western Australian Academy of Performing Arts. He has studied under Perth-based composers Lindsay Vickery and Stuart James, as well as Domenico Sciajno from Palermo, and his eclectic compositional output includes notated chamber ensemble works, sound art installations, improvisation systems, lengthy works for electronic playback and collaborations with video and contemporary dance artists. As a student Josten has been recognised as one of the top 100 students out of 25 000 in terms of academic achievement at his university, and is a member of the Golden Key International Honour Society. As a performer, Josten has premiered works by Alvin Curran, Lindsay Vickery, Cat Hope and Freya Zinoffiev, and has toured internationally with Decibel New Music Ensemble, performing the music of John Cage and Giacinto Scelsi, as well as a program of Australian works featuring his piece "UNAWARE_". He currently works as a curator for Tura New Music's 2014 "Club Zho" series, as well as performing regularly as a solo performer, with improvisation duo Mr Government, and as part of Decibel.

Intelligent Tracking

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Intelligent Tracking is a 13 minute video on the work of Dr Tim Molteno who heads the Physics Electronics Laboratory at the University of Otago, in Dunedin, New Zealand. It looks at three state-of-the-art technologies he has developed in the area of satellite tracking. What started out as a project to track the movements of endangered species has now developed into technology that may help increase yields in the sheep and cattle industries in New Zealand. The video uses long-form documentary story-telling techniques including digital animation, to make cutting edge and somewhat complex digital technology more accessible to a general viewing audience.

The subject of the video work, Dr Tim Molteno, has a Ph.D (Otago) in nonlinear dynamics and topological analysis of chaotic systems. He then undertook postdoctoral work at the University of Toronto in nonlinear systems, including granular flow and spatio-temporal chaos. He later worked in Boston for Sapient Inc, a high-tech consulting firm, on large data systems for the oil and gas industry, and then for a startup on real-time analysis of video and images. The main focus of his research is the development of new techniques for measurement, and the implementation of these techniques in novel devices that not only make new kinds of measurement, but also quantify the uncertainty in those measurements.

Jayashree Panjabi began her career as a presenter on the children's series Playschool, but after two years opted to move behind the camera where she spent nearly a decade as a producer/director with Television New Zealand before leaving to begin a freelance career. She joined Natural History New Zealand (NHNZ) in 2002 and for eight years worked exclusively as a senior producer in the international arena, making series and one-off documentaries for international clients such as Discovery Channel, Animal Planet, NHK and National Geographic. She then went on to Beyond Productions in Sydney where she worked as a writer and post-producer on the series "Taboo" for National Geographic. Her latest work documentary work has been as a series producer with Rock Wallaby Productions in Doha, Qatar making a series for Qatar's National Day. Jayashree currently works as a business manager for the University of Otago in Dunedin, but she still finds time to make short documentaries on leading scientists at the University.

Folding Time:

Research into transduction in collaborative AudioVisualism

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Folding Time is a processual work designed as a study into collaborative transduction of audio and visual elements. Starting with simple waveforms and TV static a complex feedback network is initiated where a synchresis of sound and image generates and evolves the performance in emulation of a natural ecosystem.

The transductive synchresis is demonstrated and perceived as occurring in 3 main ways:

- direct: sound to video / video to sound

- indirect: sound as data modulating video / video as data modulating sound

- causal: through a process of contextual suggestion, performative tropes and prepared supplementary AV material

Despite utilising current accessible technologies Folding Time draws influence from historic live mixed media performances by Alvin Lucier and Woody and Steina Vasulka. We also acknowledge a debt to Rudy Rucker, who lead us to critical work on feedback networks by Peitgen, Jürgens and Saupe(2004).

Scott Baker is a Multimedia artist from Melbourne, Australia and has over 20 years experience working across the areas of installation art, experimental music, video and illustration. For the past several years he has been exploring synaesthetic modalities with the audio-visual project Abre Ojos. Combining vintage analogue electronics with 21st century digital technology the Abre Ojos project is designed to provide experiences using sacred geometric animations and audio frequencies. The project has released multiple DVD's and has been performed live around the state and nationally including performances at Eclipse Festival 2012, Rainbow Serpent, Federation Square and the Tote Hotel. Scott is also a digital media, screen and graphic design teacher at Swinburne University of Technology in Melbourne. Abre ojos is an old Spanish sailors saying meaning "open your eyes", "look out" there is danger all around. http://abreojos.net

Lloyd Barrett has over a decade history with experimental music in Brisbane. He was an active member of the curatorial team involved with Small Black Box and the Audio Pollen radio show / performance series. He has performed, exhibited and presented at Liquid Architecture, Electrofringe and What is Music festivals along with numerous Room40 events at the IMA and Brisbane Powerhouse. He is a music technology lecturer at Queensland Conservatorium Griffith University and is conducting PhD research into audiovisual performance which has informed the development of this work. http://secretkillerofnames.net/

Crustacean Caquaphonics

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Crustacean Caquaphonics is an immersive surround sound composition (in HD 7.1 format) created from underwater recordings of the Mary River in Queensland. The piece includes hydrophone recordings in their original form, electronic transformations of these source sounds, and purposefully designed synthetic sounds inspired by the sonic characteristics of the wild sound elements.

Many people experience the aquatic environs of the Mary River, however mostly from above, either walking, picnicking, swimming or boating. It is rare indeed to experience the unexpected and deeply complex sounds of the river life - fish, turtles, shrimp, and a menagerie of invertebrates. It is a rare glimpse at an active world most of us will not experience, treated as a rich tapestry of sound in its own right as well as the base inspiration for immersive musical treatment.

The composition seeks to retain the essence of the sonic qualities, the timbres, sound shapes and textures contained in the original recordings, and to juxtapose real, surreal and imaginary sounds in various ways designed to alternatively highlight, obfuscate, or fuse the sonic 'grains' of sound. Subtle rhythms and micro-melodies present in the source recordings are explored and expanded, with variations created through editing and synthesis techniques.

The musical work is acousmatic in the sense that the sound is heard without seeing the originating cause. Further, the composition draw on electroacoustic concepts of playing with source bonding. Smalley defines source bonding as "the natural tendency to relate sounds to supposed sources and causes, and to relate sounds to each other because they appear to have shared or associated origins" (Smalley, 1994, p37).

A core aspect of this composition is the inclusion of sounds that are electronically generated or rendered, and recorded sounds that are manipulated with the intention to obscure or transform the sonic characteristics (and artefacts) of the sources.

These compositional and manipulative devices are seen to have a close relationship with electroacoustic music where the sources are "unveiled by the composer and are discovered (or not) by the listener in the course of the work, and within that single work there may be a great variety of source-cause shadings and strategies" (Smalley, 1994, p40).

The composers have also embraced principles of acoustic ecology that are divergent to electroacoustic music, where Schaeffer's original goal of removing all sense of the physical source of a sound is downplayed (Truax, 1995).

For createworld 2015, the work will be performed as an acousmatic piece using a standard HD 7.1 speaker array. The work is 16 minutes long.

Smalley, D. (1994). Defining timbre — Refining timbre. Contemporary Music Review, 10(2), 35-48.

Truax, B. (1995). Sound in context: Acoustic communication and soundscape research at Simon Fraser University. Retrieved January, 15, 2004

Matt Hitchcock's research focus is to examine how sound art, composition and production interact with our perceptions of space, time and place. This is exploring sound creation, temporal location of sound, spectral location of sound, spatialisation, the layering of complex sonic elements to create sonic topologies, the interactions and forces of multiple topologies, and the relationship between the listener and the overall sonic context. These issues are being explored with an emphasis on how composers and musicians can employ music technologies to augment and enhance the spatial presentation of music and sonic art.

Toby Gifford is a music technologist, sound designer and musician with a broad array of research interests including human / computer interactions. Of late Xxxxx has been researching in bioacoustics and acoustic ecology, with a particular focus on river sounds and the possibilities of passive acoustic wildlife monitoring in river systems.

Workshops

Quartz Composer 101	Scott Baker
How Do I Game Design	Paris Buttfield-Addison, Jon Manning & Tim Nugent
Sonification: Can Bloogle Resonators Enhance Representation of Time, Space and Culture through the Person-Environment-Occupation Model?	Sandra Kirkwood
The Psychology of Embodied Creativity: Preparing the Creative Space before Approaching the Digital Space	Simon Thatcher

Quartz Composer 101

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This is an introduction to Quartz Composer for new or novice users showing the basics of patching through to output choices and integration with other applications such as Final Cut Pro. Starting with a basic demonstration of how the modular environment of Quartz Composer works the workshop will progress into the creation of a Quartz file addressing all f the elements listed below. A small section of the workshop will look at the process of collecting raw material using a digital still camera and finding public domain video from sites such as http://archive.org and then processing them with Apple Motion. A demonstration of simple video loop making techniques, basic image manipulation and formatting (codec, frame rate and dimensions) for optimising performance will also be included.

Scott Baker has almost 20 years experience as a multi-media artist working across the areas of installation art, experimental music and interactivity. For the past five years he has been exploring synesthetic modalities with the audio-visual project Abre Ojos. Scott has extensive Mac OS and application experience across the creative fields.

How Do I Game Design?

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While video games are the most glamorous of the electronic arts, splashy graphics and amazing sound isn't the defining feature of games. Rather, games are games because they are the world's only interactive medium. Good interaction needs to be designed, and the master crafters of engaging interaction design are game designers.

In this workshop, you'll learn how to apply the art and science of constructing enjoyable, engaging games. This is entirely non-electronic; we're not talking about programming, game engine development, or how to approach a publisher with your totally rad idea about how you can have, like Mario only there's explosions. Instead, we'll be taking a deep dive into game design theory. Everything you'll work on will be done with pens, paper, and human brain-meat.

This workshop is based on the Mechanics-Dynamics-Aesthetics framework (as devised by LeBlanc et al), and is based on a series of small exercises in which participants rapidly iterate on game designs. It's designed for interested students of game design, teachers seeking an interesting perspective on creative computing, and enthusiasts looking to understand how games work.

Topics covered in this workshop include:

- Why games work, and how to analyse and build engaging experiences

- The Mechanics-Dynamics-Aesthetics framework: what it's good for, and how to use it

- How to deconstruct a game and understand what makes it fun

- How to modify an existing game and know what you're doing

Paris Buttfield-Addison and **Jon Manning** are co-founders of Secret Lab, a mobile game development studio based in Hobart, Tasmania, Australia. Both are also a PhD candidates at the University of Tasmania (UTAS) and co-authors of "Learning Cocoa with Objective-C Third Edition" (O'Reilly Media, 2012) and "iPhone and iPad Game Development For Dummies" (Wiley, 2010). They are currently co-writing "iOS Game Development Cookbook" (O'Reilly Media, ~2014) and "Mobile Game Development with Unity" (O'Reilly Media, ~2014). Secret Lab has built 100s of mobile apps for people around the world, including "Meebo" for iOS, Android, and BlackBerry (Meebo, Inc; Mountain View, CA; acquired by Google in 2012); "Play School Art Maker" for iOS (2011), "Foodi" for iPad (2011), "Good Game" for iPhone (2012), "Play School Play Time" for iPad (2013) (Australian Broadcasting Corporation); "National Science Week" for iOS (2012-2013); and many others.

Tim Nugent is a PhD student in the field of mobile awareness at the University of Tasmania, currently investigating how people can better share information in busy environments. He has been doing iOS development for several years as well as having presented iOS and mobile talks at several AUC /dev/world/ and CreateWorld conferences as well as mobile research papers at the Australian Human Computer interaction (OZCHI) conference twice.

Sonification: Can bloogle resonators enhance representation of time, space and culture through the Person-Environment-Occupation Model?

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In this workshop, participants are encouraged to create their own sonifications with bloogle resonators in a dynamic social context. The significance of socio-cultural representation will be demonstrated in relation to musical performance on bloogle resonators in educational, occupational therapy, and creative arts practice contexts.The Person-Environment-Occupation Model (P-E-O) has been a catalyst for numerous applications to enhance peoples' occupational performance. The P-E-O model was developed by Canadian occupational therapists, Mary Law and colleagues in 1996 as a transactive approach to occupational performance. Research indicates the usefulness of the P-E-O model for representing change over time at identified points across peoples' lifespan. However, this workshop considers whether the P-E-O Model could be represented in an alternate way, through acoustic sonification with bloogle resonators. The following paper describes in some detail the ideas addressed in the workshop.

Abstract

The Person-Environment-Occupation Model (P-E-O) has been a catalyst for numerous applications to enhance peoples' occupational performance. The P-E-O model was developed by Canadian occupational therapists, Mary Law and colleagues in 1996 as a transactive approach to occupational performance. Research indicates the usefulness of the P-E-O model for representing change over time at identified points across peoples' lifespan. However, this paper considers whether the P-E-O Model could be represented in an alternate way, through acoustic sonification with bloogle resonators. Methods of literature review and activity analysis are used to introduce the potential for sonification of the P-E-O model through researching musical performance on an easy-to-play instrument known as a bloogle resonator. The significance of socio-cultural representation is discussed in relation to musical performance in educational, occupational therapy, and creative arts practice contexts.

Introduction

The Person-Environment-Occupation Model was developed by Canadian occupational therapists as a useful tool for explaining concepts of professional practice to others (Law, Cooper, Strong, Stewart, Rigby, & Letts, 1996). The Model is represented by the authors as a visual diagram that shows the interconnectedness between people, environments and occupations. The visual diagram of the P-E-O Model assists therapists to achieve the best fit by working with clients to influence relationships between the person-environment-occupation components. Since the model was developed by Mary Law and colleagues in 1996, therapists have applied the Model extensively to working with people with a disability, but the visual nature of the diagram has never been questioned in the research literature. This study is intended to scrutinise whether the concepts of the P-E-O Model could be demonstrated through non-visual modalities, such as through sounds – a process known as sonification. Literature review will reveal more about sonification and whether it has potential to represent broad concepts of time, space and culture that people encounter in contemporary material world and virtual contexts. My working hypothesis is that the nature of the visual diagram of the P-E-O Model may limit conceptual understanding; and that representation of the P-E-O Model in an alternate way may enhance representation of time, space and culture.

At this early stage of research I have chosen to conduct an activity analysis of playing a simple musical instrument, known as a bloogle resonator, to explore representation of the P-E-O Model concepts through sound. This is an innovative study because the use of musical instruments for dynamic modelling of occupational therapy concepts was not found in OT Seeker, a database which lists research that forms an evidence-base for occupational therapy practice. The findings of activity analysis with bloogle resonators are discussed to determine potential application to occupational therapy, creative arts practice, and professional education. Because the research is still under development, recommendations are made for further experimentation with sonification as a way of representing conceptual models. The methods are not yet in use with client groups for therapy, but techniques of sonification are being developed in workshops with musicians, artists and professional colleagues.

Background and History

As a musician, my creative practice intersects with my vocation as an occupational therapist and the principles of "doing, being and becoming" (Wilcock 1999, Kirkwood 2011). Action learning philosophies are well known to many disciplines. Aristotle spoke of praxis in Poetics 6 with the meaning of 'action' (Belfiore 1984, Aristotle 1996). Capitalising on this thinking, action learning philosophies have been espoused by educationalists such as, Friedrich Fröbel, founder of the kindergarten movement in Germany in 1840, followed by the progressive education precepts of John Dewey, Rudolf Steiner, and Maria Montessori. The post World War One development of the profession of occupational therapy was founded on the moral value of being actively engaged with daily routines of meaningful activities to promote adaptation and well-being in mental health hospital facilities (Meyer 1922/1977). "Arts and crafts activities constituted the main tools of occupational therapy practice from the beginning of the profession until about the 1960s" (Schmid 2004, 80).

Mary Reilly, occupational therapist stated the hypothesis on which our profession is founded… "That man though the use of his hands as they are energised by mind and will, can influence the state of his own health" (Reilly 1962, 2). This highlights how peoples' active participation is thought to be connected with their state of health. The primary role of occupational therapists today is "working with people and communities to enhance their ability to engage in the occupations they want to, need to, or are expected to do, or by modifying the occupation or the environment to better support occupational engagement" (World Federation of Occupational Therapists 2010, 1).

The P-E-O Model grew out of multi-disciplinary approaches of trying to influence peoples' behaviour by altering aspects of the social and physical environment, rather than trying to cure or repair individual body structures and functions (Bronfenbrenner 1977, Kielhofner and Burke 1980). Ideally, occupational therapists support and enhance peoples' occupational performance in home and community settings. However, occupational therapy is often provided in clinical facilities that are sanitised and removed from the client's usual socio-cultural environment. The application of the P-E-O Model therefore becomes problematic in these settings which are devoid of the usual inter-personal relationships and consequences of actions. The tendency to simulate, rather than perform daily living tasks in home and community settings makes it difficult to predict how people will function when they are discharged from a health facility. Safety is now a primary consideration, with less emphasis on action learning through creative activities and collaboration with others. "Since the 1960s, the use of arts and crafts as therapeutic activities has diminished in practice and professional education"(Schmid 2004, 80).

A secondary benefit of this study is that it analyses the value of identified creative arts activities within occupational therapy practice to build understanding of concepts (Peloquin 1989, Schmid 2004). Critical discussion has occurred over the use of music in occupational therapy, but there has been no consensus because there is large variation in musical competence of therapists, and in some centres music is performed by specialist music therapists or others for diverse reasons (MacRae 1992). Occupational therapy specialisation in music has been applied to certain areas, such as with people who have a learning disability (Williams 2013), and for engagement with music heritage and culture (Kirkwood 2008). Occupational therapy students are encouraged to explore emerging roles as part of their professional practice education. The innovations discussed in this paper may be relevant to the development of emerging roles and creative arts practice within and beyond the occupational therapy profession (Thew 2011).

Methodology

The purpose of this study is to explore musical performance of person-environment-occupation transactions on an easy-to-play musical instrument, known as a bloogle resonator.

This study uses activity analysis and literature review to explore the key research question "Can bloogle resonators enhance representation of time, space, and culture through the Person-Environment-Occupation Model?"

The method of activity analysis has been used extensively throughout the history of occupational therapy (Creighton 1992). The person and situation-specific parameters vary

Image 1: Bloogle resonator. Photograph by author, 2013.

from one individual to another, but a single activity has been selected for the purposes of this study — musical performance on a bloogle resonator, also known as whirly tube, sound hose, or corrugaphone. Bloogle resonators were chosen because they are easily accessed, inexpensive, and can be played by most people with minimal tuition. A workshop was held on August 10, 2013 with four professional colleagues to analyse the capacity of bloogle resonators to represent people-environment-occupation transactions over time, space, and in reference to identified cultural situations. Activity analysis involves describing the capacity of the instrument for musical expression and the different ways that it can be played to achieve particular ends.

Musical experimentation with bloogle resonators will help to determine if sonification is useful for representation of the components of the P-E-O model. If the findings of this study reveal that sonification can enhance conceptual representation, then this supports active engagement of stakeholders in new forms of creative collaboration within occupational therapy, creative arts practice, and professional practice education. In this study, 'stakeholders' refers to all people who have an interest in the research including clients, therapists, educators, researchers and creative arts practitioners.

Literature Review

Person-Environment-Occupation Model

The P-E-O model was originally represented by the authors as a two-dimensional Venn diagram (Law and Cooper et al. 1996). The three inter-locking circles reveal the extent of the interdependence of transactions between people, their environments and the occupational roles that they carry out as part of everyday living (see Figure 1). The degree of overlap of the three circles represents the goodness-of-fit for occupational performance which is adjusted through adaptation to life circumstance (Law et al. 1996). Theoretically, when the overlap between the P-E-O components is greatest, this constitutes better occupational performance; but this needs to be more thoroughly evaluated on a case by case basis because there is great variation in how the model has been applied in case studies (Strong, Rigby et al., 1999). Literature review reveals that there has been very limited application of the P-E-O Model to culturally diverse scenarios.

Figure 1. Person-Environment-Occupation Model

The authors also included a three-dimensional diagram of the P-E-O model that is a tube which is divided into cross-sectional views at particular intervals throughout a person's lifespan to show varying degrees of overlap or 'goodness of fit' between person-environment-occupation over time (Law et al., 1996). The three-dimensional modelling is useful because it provides a temporal dimension which represents change in a persons' occupational performance throughout their lifespan (see Figure 2). The concept of time is represented as linear in this model, which has social-cultural implications that is relevant to the discussion presented later in this article. It appears that the visual model was developed by therapists as a conceptual representation which was intended for application to an unlimited range of practice scenarios. The question needs to be asked, whether visual representation is the most appropriate form of modelling.

Visualisation is predominant in the conceptual diagrams used in health research literature in general. It is customary to represent conceptual models through tables, histograms, pie charts, bar graphs that are readily accessible in computer software programs and easily published. For example the Periodic Table of Visualization Methods shows numerous diagrammatic ways of representing theoretical concepts (Lenger and Eppler 1977). A visualisation method is defined by Ralph Lenger and Martin Eppler (1977, 1), as "a systematic, rule-based, external, permanent, and graphic representation that depicts information in a way that is conducive to acquiring insights, developing an elaborate understanding, or communicating experiences."

A conceptual model is able to represent the current understanding of a process of interest but this is influenced by cultural understandings and perceptions (Dayé and De Campo). Models generally facilitate communication between people of different disciplines. Four stages have been identified in the process of constructing conceptual models (Pickett and Cadenasso 2002). Firstly, the components of the model such as specific people, environments and occupations are identified and described or recorded. The characteristics such as the geographical location, the identity of the people or virtual communities, and the designated time period are defined in order to apply the appropriate spatial and temporal scaling to the model in which peoples' occupational performance occurs. Once this information is constructed and possibly mapped on the P-E-O Model diagram, it is then possible to articulate the possible interdependence between components and to identify constraints on behaviour of the system. The metaphor of an eco-system is sometimes used, but may not be applicable in all cases. The therapist monitors how changes in the P-E-O transactions influence a person's occupational performance to achieve goodness-of-fit between components.

Visual representation of data has limitations. Marshall McLuhan, Canadian philosopher of communication theory stated that, "…the medium is the message…that the personal and social consequences of any medium …is introduced into our affairs by each extension of ourselves, or by any new technology" (1964, 7). Alternatives to visualisation are sought through this study of sonification of the P-E-O Model transactions. There may be additional components that become evident through activity analysis of playing bloogle resonators – part of critical reflection on my creative practice. Of particular interest are time, space and culture – since these factors have been described as relevant to sonification in the social sciences (Dayé and De Campo 2006). Christian Dayé and Alberto De Campo (2006, 353) state, "Our basic assumption is rather that the predominance of the human eye has obscured the perceptual capabilities of the other senses. As a consequence, they are hardly ever used in research."

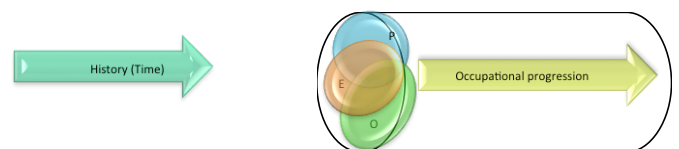### Visual Form of Bloogle Resonators

Figure 2. Three-dimensional diagram of P-E-O model showing occupational progression over time

It is serendipitous that the tubular form of bloogle resonators coincides with the 3-dimensional visual representation of the P-E-O model. This facilitates explanation of the model by showing that the length of the tube depicts the persons' occupational progression and career development over time. The model could be simulated visually by entwining three bloogle resonators to demonstrate the close inter-relationship of the person-environment-occupation components, but the plastic corrugated walls of the resonators do not allow shaping of the components which would change throughout the length of the tube. Construction of bloogle resonator tubes with more flexible materials would allow the P-E-O transactions to be physically demonstrated in accordance with change in the shape of components over monthly, yearly, seasonal, or with random occurrences according to the timescale adopted. Contrasting colours for the three tubes are important for distinguishing each of the P-E-O factors and stakeholders may have particular colour preferences as part of the artistry of their creative practice. The design of the bloogle resonators can be customised through colour choice if they are purchased off the shelf, but other features would need to be tailor-made through an individual design and manufacture process. Visual artists may assist creating a better creative product.

Sonification

As discussed, the visual form of bloogle resonators is somewhat useful, but there are greater possibilities for modelling through using them as a musical instrument which emits whirring sounds when rotated – while holding one end in the hand. Bloogle resonators can create individualised musical soundscapes through a process of sonification which will be explained further from review of literature.

Sonification is an interdisciplinary practice defined as, "the use of non-speech audio to convey information" (Kramer and

Walker et al. 1999). More recently, sonification has been defined, "when sound is used as a medium that represents more than just itself" (Grond and Hermann 2012, 213). Stephen Barrass (2012a, 178) however, avoids the term 'representation' by introducing the concept of 'usefulness' into his definition: "Sonification is the design of non-verbal sounds to convey useful information." Barrass (2012, 178) states that, "Usefulness allows multiple sonifications of the same data for different purposes and provides a basis for evaluation, iterative development and theory building." This design theory is helpful because it distinguishes between information and data and introduces functionality into the discussion. There are a wide range of applications of sonification in the literature that ranges from literal representation of data, more accurately termed 'audification'; to representation of concepts or data through sound art, improvisation and musical composition which has varying degrees of aesthetic appeal. My method of performance resembles Stephen Barrass' (2012b) definition of 'acoustic sonification:' "Acoustic Sonifications are physical objects designed to make sounds that convey useful information about a dataset of some kind. Unlike other sonifications, they do not require a power supply, and the sounds are interactively produced in real time through physical interaction with an object."

Australian music therapist, Alan Lem reports using a form of computerised sonification with adult clients with physical disabilities (Lem and Paine 2011). The video examples by his co-author, Garth Paine show how sound technologies are responsive to peoples' physical movements, thereby encouraging further musical expression. Algorithms that produce the sounds are activated by various measurable factors such as range of motion and intensity of response (see http://vimeo.com/2329210). This technological application is a way of translating clients' body movement into musical composition that is more complex than the commercially available counterpart, the Soundbeam. Soundbeam is an electronic musical response device which provides literal sound response to body movement in front of a beam (see http://www.soundbeam.co.uk/).

The Jambot computational music agent is another interactional music system. It has been designed for real-time musical improvisation and refined through mediation between imitative and intelligent actions (Gifford and Brown 2011). These technological systems of improvisation are potentially beneficial for people that have physical disabilities or communication disorders which prevent them from conveying useful information through traditional musical instruments. Toby Gilford and Andrew Brown state that the findings of their research may contribute to understanding human-computer non-verbal communication interfaces, which means this has potential as a form of sonification as well.

Technological devices with multiple perspective hierarchies have been developed for constructing relational diagrams in audio which apply to model-making: "Overall, all participants were able to use the auditory interface to construct full diagrams that properly represented the systems they were asked to model" (Matatla and Bryan-Kinns et al. 2008, 102). Matatla and colleagues discuss the aspects of sonification that facilitated ease of use for understanding how devices work. These examples of technological devices from the literature reveals that research on sonification has generated a plethora of complex technological solutions before exploring the more basic responses that are possible from using simple musical instruments to convey useful information. Another key finding is the importance of the role of listeners

in deriving meaning from sounds through creative inferences they make in the act of listening. Sonification relies on peoples' perception. The "act of listening to music involves simultaneous changes in variables such as frequency, amplitude and spectral distribution and integrating them into a comprehensive mental image" (Ben-Tal and Berger 2004, 230).

Andrea Polli (2012) reports that multiple identities and similarities can be represented through sonification and listeners identify patterns and detect trends which they prioritise for listening. Engaged creative listening allows processing of multiple strands of information at the same time. The temporal nature of sound makes it useful for sonification of time-oriented data which reveals recurrent patterns and trends. For example, sonification has been used effectively for representing change in annual weather patterns, and the temperature and salinity of the ocean at various depths (Polli 2012). Lorella Abenavoli (2012) reports on digital sonification methods for scaling and amplifying the seismometer-recorded vibrations and fluctuations of the Earth's internal movements that are usually inaudible and too slow to be apprehended by the human ear. The scale modelling brings sonification of time and space together in aesthetic representation of the "Pulse of the Earth" that can be appreciated through the senses of touch and hearing. Sonification is commonly used in health practice through instruments such as the stethoscope, to listen to the functioning of body organs that are not visible (Dayé & De Campo, 2006).

Various forms of sonification have been described by Barrass (2012a, 180):

- Sinification – numerical increases in data result in increase in frequency of a sine-tone

- MIDIfication –Various electronic orchestral instruments play notes at different volume levels, according to categorical changes in the data.

- Musification – The narrative qualities of music are used to provide sonifications related to affect, valence, arousal, or other dimensions of experience.

- Vocalisation – Vowel and other vocal sounds are synthesised to vary in response to quantitative and qualitative data.

- Iconification – Aspects of a variable may be performed through sounds that are related to the context, such as the sound of rain chosen for representing the degree of annual rainfall.

- Stream-based – Granular synthesis techniques allow variables to be separated spatially into figure-ground sounds, which reveal particular features.

Findings of Activity Analysis: Musical Performance with Bloogle Resonators

Musical performance with four professional colleagues was carried out in a conference workshop on 10 July 2013 at Queensland College of Art. This demonstrated that the first possibility of the use of the bloogle resonator is to make sounds by rotating it in circles above the head. This requires a firm grip and stabilisation of the trunk and shoulder girdle for coordination of rotator cuff, arm and hand muscle actions. The faster the bloogle resonators are rotated the higher the pitch of the tone they emit. Participants were able to

easily demonstrate playing three different tones, which allows each of the different components of the person-environment-occupation to be represented by a team of people. Various postures were adopted for playing the bloogle resonators and this can be incorporated into choreography of dance and physical activity routines. Because they have the element of fun, bloogle resonators may encourage people to join in expressing themselves through spontaneously, using ad lib vocalisation and physical actions to express emotions and ideas. Participants were encouraged to move around and use this body in space as they played the instrument. This stimulates the visual, auditory, vestibular and tactile senses which may heighten participants' level of cognitive arousal or alertness. The heightened physical activity resulted in reports of increased heart rate and respiration which may have value for incidental exercise.

The sonic potential of bloogle resonators lies in being able to use the following musical elements to depict features of time, space, and culture. The elements that can be varied with bloogle resonators include:

- Rhythm, sound and silence, repetition
- Volume or amplitude
- Pitch / frequency
- Quality of sound (timbre)
- Spatial location
- Body movement and coordination (physical activity)

Most importantly, music-making occurs over time and this is regulated by duration of phrases, repetition tones in rhythmic patterns, and choice of tempo or pace. This allows sonification with bloogle resonators to change in correspondence with variation of P-E-O components over time. The result is a kind of storytelling sequence, in which the bloogle resonator becomes an extension of the arm that helps participants to express themselves through gestures, sounds and silences. The movement occurs in a position and through a space that is related to the spaces used by other participants. This makes it possible to enact a time sequence of events in relation to position in space. The musical expression can thereby incorporate a multitude of person-environment-occupation transactions that can be compressed in time.

Bloogle resonators take minimal skill to play, so people can improvise musical tones to match verbal descriptions or stories which they wish to tell. This form of musical improvisation has aesthetic features which participants can strive for in the artistry of their storytelling, musical composition and choreography. A feature of musicking on bloogle resonators is that it allows people to adjust through the pace (tempo), rhythm, and cycles of their performance or and silences that they adopt. This gives a sense of control for sonic modelling that is capable of abstract ideation of cognitive and theoretical concepts. Participants were able to choose body actions and sound patterns that best communicated the concepts that they wished to convey. In the early stages of becoming familiar with bloogle resonators, participants just played around to experiment with what is possible. Symbolic representation may develop with further practice, and this could relate to cultural traditions understandings of time and more freedom in moving about to express oneself through gestures. Because sonification is a non-verbal form of communication, participants are able to represent emotions that they may not be able to fully explain through language. The act of performing music facilitates expression of an inner world which gives access to projection of feelings and abstract ideas. Musical performance is therefore an effective way of representing perceptions and attitudes toward person-environment-occupational transactions as they change over time. The audience interprets the meaning of the performance through their own perceptions and associations, thereby creating personal meaning. In tribal cultures, all people are involved in music making through playing instruments, song and dance (Blacking, 1973, 4).

Qualities of Musical Expression

Most people have access to low-technological music-making devices and could participate actively in dynamic modelling of person-environment-occupation transactions if they were given the opportunity in a suitable location. Using bloogle resonators to represent P-E-O concepts through musical performance has advantages over pure audification of computerised data because music-making is physically active, engaging, creative and interactive. Musical performance is sensitive to changes in dynamic relationships and transactions between people and environments that are situated in real time, or in virtual spatio-temporal contexts. Social participation allows musical relationships to develop over time in environments within or outside of healthcare institutions. People can design soundscapes through recording tracks and building up electoacoustic compositions layer by layer – resulting in sonic polyphony. Expertise in musical technologies and sonification devices may be required for more complex modelling. Innovations in cymatic synthesis are available at Stephen Barrass' website (see http ://stephenbarrass.com/). William Duckworth's (2005) describes virtual musical interactions online which are interactive. Social networking produced new dimensions for the I-Orpheus opera performed at Southbank, Brisbane on 31 August, 2007 (see http: //www.billduckworth.com/ iorpheus07).

There are some layers of musical expression that may not be able to be achieved through simple musical instruments, such as bloogle resonators. For example, musical performance, costumes, stage design and dramatisation in opera can express emotions, such as love, rage, sorrow, and repressed feelings or conflict. A variety of musical devices are used, such as melodic invention for 'word painting;' which means to use melodies or harmony in a way that evokes the meaning of the word, or associated feelings. Melodic descending phrases may be suggestive of sighs. Melodic tones can be played in succession to express emotions, especially when chromatic harmonies are used. If musical tones are played simultaneously in chords this provide accompaniment to melodies that can be harmonious or dissonant. A cadence brings a section or piece of music to a close through ending with a final rhythmic or harmonic gesture. The closure may release tension of emotion when the dissonance resolves and moves by step to the tonal centre. Most of these more complex expressive devices require a wider range of musical instruments and expertise.

There are unlimited possibilities of interlocking musical elements which are coordinated simultaneously, or in asynchronous relationships with body movements. Ethnic groups exploit these possibilities through performance of corroborees or other cultural traditions.

Socio-cultural Considerations

Culture and historical traditions affect the sonic representation of person-environment-occupation transactions through music-making. Bloogle resonators may look like plastic toys, but they are not inert because they have potential for socio-cultural representation. This is evident in the YouTube video-recording of Canadian astronaut, Don Pettit playing what he calls "the didgeridoo," in Science off the Sphere: Episode 9 Electric Didgeridoo (American Physical Society, 2012).

In this video, Pettit plays the vacuum hose in a similar way to the blowing a didgeridoo – which looks similar to a bloogle resonator. Aboriginal peoples in Arnhem Land, Northern Territory are credited with developing the use of hollowed out logs for didgeridoo performance as part of their traditional song and dance customs (Neuenfeldt, 1997). The video performance evokes association with Aboriginal musical heritage and culture through the using the term 'didgeridoo' for the vacuum cleaner hose. Pettis is concerned with demonstrating principles of physics for a science lesson, but does not explain the socio-cultural links with intangible cultural heritage of Indigenous Australian peoples. He describes his performance as "being a musician," and tries to dress accordingly by re-designing his space uniform, which many people found humorous, according to comments posted on the YouTube site: "These videos are hilarious and amazing" (see http://www.youtube.com/watch?v=bAsjjotsz-jA).

Using the vacuum cleaner hose for music-making inadvertently translocates the traditional Aboriginal use of the didgeridoo through virtual technologies to the context of the International Space Station – a small multi-cultural community of people orbiting the Earth. It is commonplace for people to play didgeridoo-like instruments in non-traditional Aboriginal contexts on the Earth (Neuenfeldt 1997). The interpretation depends upon peoples' past history of listening and their socio-cultural associations – influenced by their memory and previous people-environment-occupational transactions. It could be argued that this example of teaching and learning about physics occurs in a new cultural context that has not yet been negotiated with Traditional Aboriginal culture bearers, but now that may be possible through email and Twitter communication.

A contrasting musical example is Astronaut, Chris Hadfield's original composition and performance of the "Is Someone Singing (ISS)" song which was recorded on the International Space Station and synchronised with a musical performance by the Wexford Gleeks school choir and a Canadian rock band (Chris Hadfield and Barenaked Ladies, YouTube 2013). The song was commissioned by CBC Music California and The Coalition for Music Education in partnership with the Canadian Space Agency to advocate for music education in Canadian schools (Grossman 2013). Through global social networking, people were able to voice their opinions about this collaborative performance through tweets. Peoples described the personal significance of the performance through You Tube feedback: "This is the kind of stuff that pulls folk together from all over the globe." "I don't usually cry, but I did for this." "This is one of the most beautiful things I've experienced." "God's gift!" "I'm feeling patriotic." "Awe inspiring." This online communication generated new potential for musical mediation of culture which is an aspect of people-environment-occupation transactions in the new dimension of extra-terrestrial music encounters. Numerous people stated that it brought them to tears, or to a new realisation of the connectedness of the human race on Earth and in space. Some comments were removed, so it is not possible to evaluate the full impact of the musical performance on people-environment-occupation component transactions globally. Further research is needed to prepare for future applications of music and sonification technologies to new geographical locations as people spend more time travelling and living in space. There is possibility for using the P-E-O Model more broadly than was originally envisaged by the authors in 1996. There is value in looking for new ways to represent P-E-O transactions and music-making hold unlimited potential.

Discussion

The brief account describes some of the possibilities for musical composition and improvisation on bloogle resonators to represent P-E-O model transactions. The skill level of the performers may affect how effective the musical performance is, but bloogle resonators are easy to play and access. Bloogle resonators are limited in their musical expressiveness due to the physical properties of their construction. A wider arsenal of high-technology and low-technology musical devices could be used for more expressive sonification in future research.

The interdependence between people-environment- and occupation is clearly demonstrated in performance of traditional Indigenous Australian song and dance traditions in corroborees. The context and social relations determine the meanings and associations of performance on bloogle resonators, and even a didgeridoo that was made from a vacuum cleaner hose. Various musical cultural traditions could be explored to systematically evaluate their potential for shaping and supporting peoples' rendition of person-environment-occupation transactions. Further research is required to determine which sonic modalities of expression are most useful for artistic practice, therapy and education which to date has relied so strongly on text and visual diagrams in Western societies. Performance ethnography has been described as an educational method for exploring and enacting social relations, cultural connections and political factors (Alexander 2005, Denzin, 2003). This opens channels of communication for negotiating musical culture and heritage in different contexts. Bloogle resonators are a simple instrument to use for experimentation, but a wider range of musical instruments, song and dance may facilitate better understanding of the P-E-O model. In conclusion, this study has confirmed that creative arts practice and sonification technologies may have application to modelling person-environment-occupational transactions.

Recommendations for future research and practice

In the future, it is important to consider the potential of sonification and musical collaboration in various contexts to advance teaching and learning objectives. Song and dance can be used to facilitate social relationships of people from diverse cultural backgrounds, and people connected through remote and virtual information communication technologies. The socio-cultural impact of digital music technologies need to be carefully considered, and possibly negotiated for use in teaching and learning programs. Bloogle resonators and didgeridoo-like instruments have wide-ranging potential to extend socio-cultural relationships and to represent concepts

or models. The significance of sonification lies in the potential for stakeholders to participate and to share ideas through an active learning model-making process in a suitable, supportive environment. This creative collaboration builds capacity for relationships that enhance environmental and social awareness, thereby promoting changes in social and cultural practices (Polli 2012).

Sonic modelling may result in a richer inter-disciplinary blending of art and science. Suzanne Peloquin (1989, 219) states that, "The art of practice in occupational therapy is intrinsically centered on relationships, on the qualities that make relationships meaningful and on the meaning of occupation in a life." There is a role for occupational therapists to use participatory music-making in their practice to enhance meaningful representation of concepts, along with the benefits of music-making that have been described in research literature (Williams 2013, McDonald and Kreutz et al. 2012). Artists can contribute to design and adaptation of musical instruments to improve capacity for musical expression and sonification. Occupational therapists, musicians, designers and creative arts practitioners have a role to play in improving the design of bloogle resonators. Music educators may also assist in developing peoples' musical skills so they are better able to represent person-environment-occupation transactions. A wider range of musical instruments and sonification methods are recommended to provide greater choices in musical performance. Further exploration and activity analysis of a wider range of sonification modalities is suggested for future research.

Conclusion

Answering the question posed, bloogle resonators have some capacity to represent time, space, and culture through the Person-Environment-Occupation Model, but further practical research is needed to maximise musical expression of personal P-E-O scenarios in relation to context. In summary, there are at several possible uses of bloogle resonators that can contribute to model development and action learning in arts, education and occupational therapy practice. Bloogle resonators can be used for musical expression, and increasing peoples' level of engagement with physical and creative activities which stimulate sensory-motor responses and facilitate interactive communication. The second use of the instrument is for visual modelling of the Person-Environment-Occupation model. Finally, it has been demonstrated that bloogle resonators are not just inanimate objects, but signifiers of intangible musical heritage and culture. Musical performance on bloogle resonators therefore can have multiple meanings. A new musical performative environment has been described on the International Space Station which challenges occupational therapists to explore the old and new spatio-temporal dimensions of dynamic modelling with respect for cultural diversity on the Earth, and even in extra-terrestrial musical encounters of a teaching and learning kind.

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The Psychology of Embodied Creativity: Preparing the Creative Space before approaching the Digital Space

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Anyone working within the creative industries would be aware of the challenges that occur when working creatively within a digital arts space that's often time-limited. Similarly for any digital artist, the experience of a creative block can become a difficult transition to work through. Consequently, there appeared to be a need in the professional community to design and implement an experiential based workshop that both provides a theoretical overview on the psychology of creativity but more importantly experiential exercises that can allow for one to safely develop their own relationship with the creative process, even at times of stress and creative blocks.

This theoretical and experiential workshop is designed to assist participants to safely explore ways of tapping into the creative process in addition to discovering ways of nurturing and protecting that process. The workshop is intended to give one an experience of creativity as it is felt in the body, before even approaching the keypad. Whilst it is experiential in nature, it also includes important conceptual and referential information about the creative process. Topics include: where creativity can be found in the body, ways to access, nourish and protect one's creative self, creativity as an opportunity for self-awareness, the destructive side of creativity, mindfulness and embodied approaches to creativity, the role of convergent/divergent reasoning within the creative process.

In addition to a theoretical discussion on the psychology of creativity, three experiential introductory exercises are facilitated that borrow from mindfulness and other body-oriented modalities. The workshop functions best at a running time of 90 minutes. It has been successfully facilitated for groups as large as 90 and intimate as 20. No resources are required other than the usual equipment necessary for the projection of slides.

Simon Thatcher has been practising as a Psychologist since 1996 in a variety of public and private settings. During the past seven years, alongside his private practice, his provision of consultancy services to various creative agencies in the advertising industry led to the identification of the need for, and development of, creative- based self-care workshops. His additional qualifications in body and somatic psychotherapy complimented further the design, structure and facilitation of strategies to assist those working with the creative process. It remains clear to Simon that the creative process and developing a felt sense within the body cannot be separated. To date, this experiential based workshop on the Psychology of Creativity has been successfully implemented for in both Sydney and Melbourne companies such as Lion Nathan, Unilever, Nestle, Naked Communications and the 2013 national ASPAH (Australian Society for Performing Arts Healthcare) conference.