Proceedings of
Computers in Art and Design Education (CADE) Conference
Stillness

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The Biennale of Electronic Arts Perth (BEAP) is proud to host the 2007 Computers in Art and Design Education (CADE) Conference as part of its education programme.

The CADE Conference is a major international event for those interested in exploring ideas which converge at the intersection of pedagogical methods, arts, design, science, and technology.

Over three stimulating days, forty educators, creative arts practitioners and theorists at the forefront of their practice will explore the latest research and technologies. They will discover new professional methodologies for creative arts education as they contemplate the theme "Stillness".

CADE 2007 conference proceedings will challenge and stimulate you to consider the paradox of "Stillness" in the face of emergent technologies.
Foreword

The CADE Conference is a major international event for those interested in exploring ideas converging at the intersection of pedagogical methods, arts, design, science, and technology. This is the first CADE conference to be held outside Europe, and we invite you to join delegates from Australia, USA, Denmark, Canada, United Kingdom, Germany, Turkey, New Zealand, Japan and Italy.

Over three stimulating days, forty educators, creative arts practitioners and theorists at the forefront of their practice will explore the latest research and technologies. They will discover new professional methodologies for creative arts education as they contemplate the theme ‘stillness’. CADE 2007 will challenge and stimulate you to consider the paradox of ‘stillness’ in the face of emergent technologies.

KEYNOTE ADDRESS 1: a discussion reflecting on twenty-one years of change and achievements by the association for Computer aided art and design education (Caade, the precursor of today’s Cade), in which Paul Brown will explore computational aesthetics in art schools.

PRESENTER: Paul Brown (Australia), Professor, University of Sussex; artist/writer
Paul Brown has been specialising in the convergence of art, science and technology since the late 1960s, and in computational and generative art since the mid 1970s. He has exhibited internationally over the past four decades and participated in exhibitions at the Tate, Victoria & Albert, and ICA in the UK; the Adelaide Festival; ARCO in Spain and the Venice Biennale. He is represented in public, corporate, and private collections in Australia, Asia, Europe, Russia and the USA. Paul Brown became the founding head of the UK’s national Centre for Computer aided art and design in 1984. In 1994 he returned to Australia, after a two-year appointment as Professor of Art and Technology at Mississippi State University, to head Griffith University’s Multimedia Unit. In 1996 was the founding adjunct Professor of Communication Design at the Queensland University of Technology.
KEYNOTE ADDRESS 2: an insight into Symbiotica’s Masters in Biological Arts – a course facilitating research at the intersection of art and science.

PRESENTERS: Oron Catts (Australia), Artistic Director of Symbiotica, Artist/Researcher/Curator; Ionat Zurr (Australia), Co-ordinator of Master of Biological Arts, Artist/Researcher/Curator.

The Masters in Biological Arts is an innovative course offered through the Faculty of Life and Physical Science at the University of Western Australia. The course is designed for art practitioners, scientists and humanities scholars who wish to engage in interdisciplinary studies as a foundation for creative bioresearch. Oron Catts and Ionat Zurr specialise in tissue technologies as a medium for artistic expression. They co-founded the Tissue Culture and Art Project (TC&A) in 1996. This project investigates human relationships with different gradients of life through the construction and growth of a new class of object and being – the Semi-Living. TC&A has been exhibited in galleries and museums throughout Europe, North America, Asia and Australia in events such as Ars Electronica (2000), the 2002 Adelaide Biennale of Australian Art, and ISEA.

KEYNOTE ADDRESS 3: a presentation on Cybernetics and Serendipity.

PRESENTER: Ranulph Glanville, CybernEthics Research, UK, and Bartlett School of Architecture, UCL, UK. Ranulph Glanville studied architecture (spending most of the time working in experimental electronic and electro-acoustic music/performance), followed by cybernetics and then human learning. He has published extensively in all three fields. He has taught in Universities around the world. He currently holds a post as Professor of Architecture and Cybernetics at University College, London, and is an Adjunct Professor and Senior Visiting Research Fellow at the Royal Melbourne Institute of Technology University. He is visiting professor at several Australian and other universities. He was recently awarded a DSc for his seminal work in Cybernetics and Design. He has a small, wide ranging art practice founded in musical composition. His hobby is whichever of his interests he is not currently involved in. He is married to the Dutch physiotherapist Aartje Hulstein: they live on the south coast of England. His son, Severi, works in digital post production.
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Towards other epistemologies of interface culture: the pertinence of emptiness-presence, and void for contemporary technology

Ajaykumar; Goldsmiths University of London

Abstract
This paper considers the pertinence of particular Sanskrit and Japanese concepts and terms in developing new epistemologies of inter-face culture: the significance of emptiness, of intervals, of pauses, of void for contemporary technological practice. It is part of an evolving discussion with regard epistemology by the author, developed through other articles, conference papers, and public lectures/presentations. These have focused on a number of related ideas: relational being, dependent origination, non-anthropocentric being, the being of a space, and the space of being. As readers here may be unfamiliar with the earlier texts, there may be some need here to re-introduce certain themes and ideas to assist flow of readership.

The essay considers a broader history of technology, and the notion of technological practice as ontological practice. It discusses relationships between science, technology, art, architecture, philosophy and ecology that were evolved through the discourses of Buddhism and Tantra. It considers the possibility of earlier ontological and epistemological activity as paradigms for contemporary practice.

The author discusses the nature of inter-active spectatorship which is crucial in such a discussion on inter-face: coining the term ‘a-spectatorial’ with current collaborator, Alok Nandi, to describe the in-habiting of space, the engendering of stillness, that they are aiming to engender in a current practical and theoretical research project.

Keywords
akasha, ‘a-spectatorial’, ma, mu, pratiyasamutpada-dependent origination, sunyata, Tantra.

Introduction
This essay considers the pertinence of akasha, ma, mu, sunyata, and pratiyasamutpada, as well as related philosophical ideas that originated in Asia, to evolve new epistemologies of inter-face culture. Here the significance of emptiness, of intervals, of pauses, of void is considered with regard contemporary technological practice. It discusses relationships between science, technology, art, architecture, philosophy and ecology that were evolved through the discourses of Buddhism and Tantra. The article considers the possibility of earlier technological activity as a potential paradigm for contemporary technological practice. This essay indicates a questioning of the apparent contemporary necessity of ‘inhabiting’ technology.

Akasha is a Sanskrit word that signifies a space that has presence, as well as other meanings, such as ether and sound. Akasha has correspondence to the Japanese term ma, which has multiple meanings and resonances, including space-time, an emptiness that has presence, place, space, interval, time, and pause. Sunyata in Sanskrit means void and has correspondence to the Japanese Zen term mu that also could be understood as void or nothingness. Ma has hundreds of compound meanings, one of which is for an idiot, ma-nuke. In the English language someone who is considered an idiot is sometimes termed, 'empty-headed'. Paradoxically, ma-nuke literally means someone who is too full, someone who has no space. The space or the space-time that I am considering may be a significant one in numerous ways, not least as a place of inter-action, of dialogue, re-generation, or rest. It could be the place between, a place of stillness that stimulates flow. It should be remembered that the Noh actor is metabolically most heightened when he is still.
The consideration of the pertinence and the significance of emptiness, of intervals, of pauses, of void for contemporary technological practice, is a part of an evolving discussion with regard epistemology developed by the author through other articles, conference papers, and public lectures/presentations. (Ajaykumar 2007a; 2007b; 2005a, 37-50; 2005b, 46-60; 2005c) As readers may be unfamiliar with the earlier texts, there may be some need here to present again certain themes and ideas to assist flow of readership.

Discussion with regard akasha, ma, mu and sunyata is of importance with regard the development of a broader history of Technology. Here I am concerned with an ongoing dialogue: a dialogue firstly between Buddhism and science, technology and art; and secondly, a related dialogue between Tantra and science, technology and art. While a number of studies, have written specifically about relationships with Buddhism and science, as I delineate below, discussion focused on Tantra has been limited.

Towards a broader History of Technology and Technological Practice

A discussion of the relationship between science, technology, art, philosophy dates not from the twentieth century as some would think, but could be charted back at least two thousand years. While Heidegger has discussed poignantly how technology (techne/tekhne) was perceived in Ancient Greece, my concern is to discuss the Tantra that emerged in ancient South Asia, as part of a contribution to a history of technology, and a history of technological practice, ‘technological’ here in the Heideggerian sense. For those not familiar with Tantra, it should be explained that one could conceive Tantra as an integrated approach of science, technology, philosophy, ecology, architecture, and art, to explore ‘being’. Tantra profoundly influenced Buddhism, Hinduism, and Jainism. Tantra places value in all phenomenal activity. While today it is generally discussed in religious and artistic contexts, its contribution to a history of science and technology is generally overlooked. At the same time Tantra evades dogma and totalitarian definition and rather suggests a personal approach to ‘a way of tantra’: a personal dynamic relationship with all other phenomena.

Tantra’s earliest tangible manifestation was as architectural form with rock cut edifices at Ajanta, Ellora and numerous other sites in South Asia, constructed from the first millennium B.C.E. At the time of Ellora constructions, which began later than those at Ajanta, Tantra could be considered science and technology at ‘the cutting edge’ as much as it was ‘cutting edge’ art, architecture, and philosophy. These edifices are significant feats both of engineering as well as of architecture. In the edifices of Ellora, the voids created in the humanly constructed caves were considered a part of the totality of the sculpture, a sculpture that came into being at the moment of spectator inter-action. At this space-time the physical void and the ontological void correspond. Ultimately the architecture at Ellora is defined as not the built edifice only, but rather a dynamic interaction of spectator journeying through a humanly constructed structure in relation to surrounding landscape. The architecture is a being that exists in dynamic inter-relation.

This space in consideration could be a space of presencing beyond the residue of the art object and the technological modus operandi. While these ideas originated in some shape or form in South Asia more than two thousand years ago, they resonate with contemporary ideas such as that of Marcel Duchamp who wrote:

My art would be that of living: each second, each breadth is a work which is inscribed nowhere, which is neither visual nor cerebral. It is a sort of constant euphoria. (Baas and Jacob, 2004)
Another example of integrated epistemology in this period in South Asia is reflection on particles. While particle physics is considered today one of the latest avenues of physics, most of the rational schools of philosophy in South Asia, whether Tantra, Hindu, Buddhist or Jain, discussed the nature of elementary particles. The Dalai Lama, one of the foremost contemporary teachers of Buddhism in Tibet, a Buddhism heavily influenced by Tantra, discusses a Buddhist view of particles as follows:

All the elements in our present universe, even down to a microscopic level, can be traced back we believe, to an origin, an initial point where all the elements of the material world are condensed into what are technically known as "space particles." These particles, in turn, are the state, which is the result of the disintegration of previous universe. So there is a constant cycle, in which the universe evolves and disintegrates, and then comes back again into being. (Rinpoche 2002, 94)

While the details of the ideas of ancient rational schools of philosophy would be considered no longer scientifically valid, they were advanced for their time, and one can chart resonances with modern physics. What is more significant is that in Tantra both science and philosophy were considered integral to a holistic epistemology. Indicative of this is the fact that certain ancient Hindu temples have had at their centre not elaborate sculptures or deities but empty spaces housing only a book of mathematics. The mathematical attempt to understand the universe was considered equally as a philosophical research. I want to clarify here that I am not thinking today of Tantra or Buddhism as a science, nor am I thinking of this science as advanced in comparison to contemporary practice. The history of Tantra and of knowledge is one where at one time it may have been possible for individuals to be polymaths, mastering several disciplines - sciences, philosophy, art, technology. Today the extent of knowledge and information in each discipline and sub-discipline is so great that specialisation is an imperative. However what may be possible is mutual cross-fertilization. While the contemporary physicist Fritjof Capra has charted correspondences, thirty years ago, between ideas in quantum physics and those contained in Hindu, Daoist, and Buddhist philosophical ideas, (Capra 1992) others have been undertaking similar enquiries. Physicist Vic Mansfield has suggested some comprehension of modern physics assists in a more profound understanding of Buddhism; and some understanding of Buddhism could assist in the development of physics research. The physicist Amit Goswami goes further, believing that "all the paradoxes and anomalies of quantum physics can be resolved if we base science on the metaphysical assumption that consciousness not matter is the ground of all being." (Goswami 2001, xi) The ongoing dialogue between Buddhism and science is being developed today also through a number of neurological studies on the effects of meditation on the brain with specific regard to both Tibetan Tantric Buddhism and Zen Buddhism. (Austin 1999; Harrington and Zajone 2006)

Computers and Current Technology
What are the possibilities for mutual cross-fertilization in relation to computer based art?
Technological practice in Tantric terms is considered an ontological practice. Tantra suggests the sacredness of all phenomena. It influenced and was influenced by other philosophic systems such as Buddhism, in which there are several schools which emphasise the principle that all phenomena reveal the true entity of life: the ultimate reality. If all phenomena are considered sacred, can one develop a relationship with computers that perceives them not as dissimilar to popularly conceived 'items' of nature, such as trees, mountains, rivers? If one adopts such an approach to contemporary technology, would one engender changes in contemporary technological processes as well as in hardware as well as in the inter-face? Such a point of view depends not primarily on the creation of objects of technology but on the nature of spectatorship. One has to un-think and rethink subject-object dynamics, and begin to engender processes that inter-relate and enmesh the two. At the same time such a thinking and practice also undermines differentiation of computer technologies from
other technological practices and processes.

As previously discussed (Ajaykumar 2005a) the cyber-designer Michael Heim believes the technology and technological practice of cyberspace may ultimately also be a modus operandus to engender similar ontological centres or, using the term coined by Zen teacher Daisetz Suzuki, 'psychospheres'. (Heim 2002, 286-291): spheres to explore the psyche, to manifest being. Cha-no-yu, perhaps best understood as chado, 'the way of tea', is influenced by Zen Buddhism, with many tea masters being highly trained in Zen. For example Soshitsu Sen XV, the fifteenth head of the Urasenke School of Tea, trained as a Zen Buddhist monk for more than thirty years. Like the rock cut edifices at Ellora, cha-no-yu could be thought of as a multi-media experience. As at Ellora, it is a kinaesthetic experience with a walk through a garden or roji as integral to its experience and presencing. The garden creates a ma of interval, a distancing from the world of the everyday with the world of the tea hut and the partaking of tea. Chado is also a multi-sensory experience involving, taste, sight, touch, smell, and hearing. Most importantly, as an art, cha-no-yu is underpinned by 'conviviality' - it comes into being in a moment of social inter-action. Heim correlates four principle qualities of cha-no-yu (Japanese, trans: hot water for tea), commonly known as the tea ceremony, with features of cyberspace. He suggests that the dynamics of chado may be a guide for developing a sense of place. The four features are wa (Japanese, trans: harmony), kei (Japanese, trans: respect), sei (Japanese, trans: purity) and jaku (Japanese, trans: serenity). For Heim, each relates to pertinent virtual design issues that currently need to be addressed. Wa refers to systematic coherence, currently lacking in the Web. Kei refers to respect of materials used and of the presence of other people. For Heim distance is crucial in engendering respect and he believes that the telepresence of the web in part erodes this respect. Sei manifests in the minimalisms of the tea ceremony, corresponding to the emptiness and minimalism of cyberspace. As Heim acknowledges, the emptiness of cyberspace is increasingly being filled by things such as junk mail. It is a place that is too full seemingly, that has no space, which precludes jaku (serenity). This corresponds to the ever-increasing filling of space in concrete environments.

As cyberspace increasingly seems to have a sense of materiality, perhaps the crucial imperative is to develop individual ability to find a relationality in a conceived space between. The nature of spectatorship, the nature of such experientiality has to change. In such a jungle, whether actual or virtual, is it possible to engender a clearing, an empty space, resonant with what Heidegger calls a lichtung, to enable such presencing? A pivotal idea of Buddhism is crucial here, which is pratiyasamutpada, usually translated from Sanskrit as 'dependent origination'. pratiyasamutpada, has however several renderings in English, which help its comprehension: 'conditioned genesis', 'dependent co-arising', 'interdependent arising'; pratiyasamutpada expresses the idea that no thing or person exists in isolation and is continuously existing in relation with all other sentient and insentient beings in the universe. Emphasis shifts away from individual self to relational being. This crucially impacts on how one conceives the interface. Corresponding with akasha, the term kyo in Japanese Buddhism is used to signify the inter-relation of all phenomena through sound and vibration. Such an idea is critical when considering spectatorship, and how we may describe and define art. The art here is one that is ephemeral and exists nowhere. Rather it comes into being only in a space of temporary interaction, a cyber-caesura, between human (artist and spectator), possible art object, and a wider landscape: a landscape that is social, cultural, and topographic. Here we may move toward a different sense of ecology. This relational being may be thought of as a perpetual presencing: ekaksana in Sanskrit. While here, unlike chado, the social interaction may not be directly with another human being, it is an interaction with other phenomena, all of which in the Tantric, and Buddhist sense are sacred. Here we have perhaps a non-anthropocentric sense of a space of being, and a 'being of a space'.

Afterword

My particular concern in examining ideas such as dependent origination and relational being is
thinking about their value in negotiating not just physical space but cyberspace: the need for emptiness in computer design and technology, design of and for cyberspace, the need to rethink inter-faces. Increasingly also the spatial domains of physical space and cyberspace are inter-mingling and enmeshing, to the extent that in future we will not make distinction as humans experience and journey through either realm.

A current nascent collaboration with Brussels based media artist Alok b. Nandi, entitled _akasha ma ma sunyata, (a_m_m_s)_ is a practical tele-epistemological research to investigate such themes; and probe the possibilities of engendering such interfaces, intervals, spectatorial or 'a-spectatorial' spaces of being, and a being or 'non-being' of a space. This would take place through the creation of interventions in diverse contexts; through conception and design of installations in contemporary galleries as well as in landscapes and environmental contexts; through accumulating traces in publications, books and blogs; using computer technologies as much as elemental processes, and involving kinaesthetic journeys through space-time. 'A-spectatorial' here means a re-envisaging of spectatorship: one that is not about 'looking at' but about inhabiting a space. This conceptual approach allows a re-exploration of the notions of stillness and presence, and the relation between body, time and space.

In the _a_m_m_s_ project, the defining and refining of the artists’ particular collaborative tele-epistemological process - the engineering of a _ma_ of process of working - is as much the research and the outcome as the construction of a gallery installation. The collaborators envisage this to involve a research process of working ‘at a distance’, rarely physically meeting; and including deliberate intervals, absences, pauses, and spaces between our telematic conversation.

This process could allow the collaborators to question the apparent contemporary necessity of ‘inhabiting’ technology.

While I have mentioned mutual cross-fertilisation, on the whole I have discussed how ideas of Tantra and Buddhism may inform science, technology, computer art, and interface design. It should be noted that I do not consider historical concepts of Tantra and Buddhism to be absolute truths. Rather I see both as evolving epistemological processes that are informed by scientific and other academic processes. James Lovelock’ Gaia theory (Lovelock 2000), Lynn Margulis’ evolution of the notion of symbiogenesis (Margulis 1993), Candace Pert's findings with regard neuropeptides (Pert 1997), and Humberto Maturana and Francisco Varela’ conception of auto-poiesis (Maturana and Varela 1980), provoke further speculation on notions of relational being, relational self, and non-anthropocentric being. There is not the time and space to discuss this further here. A subject for a future paper.

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**Biographical Notes**

Ajaykumar is an academic at Goldsmiths University of London; a member of TrAIN, research centre in Transnational Art, Identity and Nation, of the University of the Arts, London; an artist; a curator; and co-director of the shapes-design studio, developing furniture, lighting, and gardens. His practice-as-research and published theoretical enquiries are trans-disciplinary, intermedia, and single form, spanning the artistic disciplines of: internet art, video art, combined media installation, film, site-specific art, environmental art, performance/live art, design, architecture, creative writing, dance, theatre; as well as the disciplines of philosophy, science ecology, education, cultural policy. Underlying the diversity of disciplines, are specific inter-related thematic and formal concerns:

- Spectatorship, play, and co-creativity;
- The sculpting of space and interrogation of notions of ‘non-anthropocentric being’, ‘relational being’, ‘the being of a space’.
- Dynamics between science, art, architecture, technology, philosophy, and ecology: reflecting on relations between human and environment.

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‘Dynamic Stillness’: Imaging Stillness @ The Dead Sea. A Bringing Together of Performance and Heideggerian Philosophy

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Abstract
The Dead Sea project of imaging stillness involves digitally capturing Martin Heidegger’s concept of ‘stillness’ which in ‘The End of Philosophy and the Task of Thinking,’ becomes the ‘stilling of stillness’ and the ‘place of stillness.’ (Heidegger, 2002b, 68) To image dynamic stillness I dwelt forty days and forty nights (June 3–July 13, 2007) in the Judean Desert, the place of the Dead Sea; this dwelling was hosted at Metzoke Dragot, a desert guesthouse high (111 meters above sea level) in the Judean Mountains. The crucial and enduring part of this dwelling is three daily visual and audio recordings of sunrise, high noon, and sunset. The recordings deploy Gilles Deleuze’s key technique of the time-image (the crystal-image) and three film techniques of the movement-image: the perception image (gaseous perception and liquid perception) and the affection image (any-space-whatever).

Key Words
Stillness, digital philosophy, walking, water-on-in-water, presencing

Dynamic Stillness Resting
The Dead Sea project of imaging stillness involves digitally capturing Martin Heidegger’s concept of ‘stillness’ which in ‘The End of Philosophy and the Task of Thinking,’ become the ‘stilling of stillness’ and the ‘place of stillness.’ (Heidegger, 2002, 68) I went to a geographical heart of stillness to practice and document the dynamic of stillness. Inspired by Australian aqua artist Sarah Jane Pell’s bringing of deep aquatics to artspace, I retool Heidegger’s action of ‘thinking’ taking it to the Dead Sea, the lowest point on earth reaching 417 meters (1,373 feet) below sea level. The Dead Sea is also one of the oldest places in the world.

Time slows in the Judean Desert/Dead Sea. In this resting resides stillness. Rest, ‘the stilling of stillness’ … is always more in motion than all motion and always more restlessly active than any agitation.’ (Heidegger, 1971, 204) The ‘stilling of stillness’, like ‘the place of stillness,’ ‘gathers in itself what grants unconcealment.’ (Heidegger, 2002b, 68) ‘Unconcealment is ‘thought as the opening of presence’ (Heidegger, 2002b, 69) ‘The quiet heart of the opening is the place of stillness from which alone the possibility of the belonging together of Being and thinking, that is presencing and perceiving can arise at all.’ (Heidegger, 2002, 68) In his mature work ‘Time and Being,’ written as a lecture three and a half decades after Heidegger’ signature work Being and Time, ‘Being means the same as presencing.’ (Heidegger, 2002a, 2) ‘To let presence,’ ‘to unconceal,’ ‘to bring into being’ are interchangeable. (ibid., 5)

Art, for Heidegger, is the highest form of techne, that is, of bringing forth. What is brought into being is a truth as something new. In Heidegger’s own words: ‘The truth that discloses itself in the work can never be proved or derived from what went before… What art founds can … never be compensated for and made up for by what is already at hand and available.’ (Heidegger, 1971, 72-3)

To image the dynamic stillness I dwelt for forty days and forty nights (3June-13July, 2007) in the Judean Desert, the space of the Dead Sea; this dwelling was hosted at Metzoke Dragot, a desert
guesthouse high (11 meters above sea level) in the Judean Mountains. Metzoke Dragot is located on the only entrance to the Judean Desert from the Dead Sea area.

The crucial part of this dwelling is four performative activities: daily video visual and audio recordings of sunrise, Dead Sea water at high noon, and sunset and the action of walking on water in the water of the Dead Sea. The later action is a homage to the performative work of Aquanaut Dr. Sarah Jane Pell.

**Philosophical Methodology: Taking Deleuze and Heidegger**

‘Dynamic Stillness’ combines the *techne* of digital photography with the handicraft of philosophical thinking, allowing the artistic endeavor to bring into being a materiality of the concept of stillness. *Techne*, as used by Heidegger via the Greeks, refers to ‘letting something appear, within what is present’ (Heidegger, 1971, 157).

It is my commitment that radical new theory must operate in fidelity with previous thinkers work redefined, rethought and reworked on a number of planes at once in order to produce a new singularity. Taking, then, is used as developed by Gilles Deleuze, that is, taking a philosopher from behind, relocating his/her philosophical concepts in a way that does violence to the original thought but not so much violence that it eradicates a connection with the original thought. (Deleuze, 1991, 8)

Philosophy, says Deleuze, is the activity of creating concepts; its aim is to take us from the perceptible to the imperceptible. Deleuze holds that a concept is always signed by its philosopher-creator. In his works on cinema, *Cinema 1: The Movement-Image* and *Cinema 2: The Time-Image*, Deleuze shows that philosophical concepts are like sounds, images and colors. These are the images of thought.

Taking the radical claim of Deleuze that concepts are like sounds, images and colors as offering a possibility for performative philosophical practice and taking Heidegger’s repeated claim that the artist functions ‘almost like passageway … for the work to emerge’ (Heidegger, 1971, 39), the project of dynamic stillness simply allows the camera as tool and the techne of digital photography to let stillness appear.

‘Dynamic Stillness’ deploys the key technique of the time-image (the crystal-image) and three film techniques of the movement-image: the perception image (gaseous perception and liquid perception) and the affection image (any-space-whatever). Each repetitive time duration shot (between 2 minutes 40 seconds and 3 minutes 10 seconds) of sunrise and sunset captures the same with a difference crystal-image of the sun’s singular daily movement. The actual image is the recorded daily event that recalls the virtual image of past and future sunrise and sunset. The direct image of time captured again and again over a duration of time, 40 days to film the repetitive shot, shapes time as a two-way mirror that splits the present into two directions, ‘one of which is launched towards the future while the other falls into the past. Time consists of this split, and it is … time, that we see in the crystal.’ (Deleuze, 1989, 81) What is let presence in the time-image of the two events of daily singularity is stillness as the actual/virtual core of time.

Sunrise and sunset are shot stationary from two selected vantage points high in the Judean Mountains above the Dead Sea. Sunrise is shot from a mountain cliff at Metzoke Dragot; sunset from the top of a mountain at Wadi Darga. Sunrise and sunset are perception images ‘from the point of view of another eye … the purest vision of a non-human eye, of an eye which would be in things.’ (Deleuze, 1986, 81) This is the anonymous, unidentified viewpoint of the camera, what
Deleuze calls gaseous perception, the pure vision of the non-human eye (ibid, 80-82) in which the videographer and the camera function as a medium for the object, facilitating the vision of matter. The daily high noon shot of Dead Sea water, 90 seconds in duration, combines the key feature of the affection image, ‘any-space-whatever,’ with a second defining aspect of the perception image, liquid perception. Images flow together in liquid perception. ‘[W]ater is the most perfect environment in which movement can be extracted from the thing moved, or mobility from movement itself.’ (Deleuze, 1986, 77) The shot of Dead Sea water is taken from ‘any-space-whatever’ in the water of the Dead Sea. A handheld camera 30 second motionless shot of the water’s stillness (extracting non-movement from the thing, water, moving) is combined with a 60 second walking-in-water meditation shot. The latter mobility from movement juxtaposes the motion of the Dead Sea with the movement of the camera capturing what Heidegger identifies as the resting of stillness.

These film techniques developed from Deleuze are used to reveal Heidegger’s unsigned concept of stillness concealed in his signed concept of Being. Human beings experience Being in time and in the stillness of time. The resting of stillness in the repetitive events of sunrise, noon and sunset brings forth the simplicity of Being.

Heidegger says, ‘Every thinker thinks one only thought.’ (Heidegger, 1968, 51) The thinker’s body of work ‘thinks the thinker’s one only thought.’ (ibid, 51) Heidegger’s one only thought recurrent through his body of work is obvious: ‘What is Being?’ What is less commonly emphasized in Heidegger’s work is his invitation to pursue the unthought: ‘What is unthought in a thinker’s thought is not a lack inherent in his thought. What is un-thought is there in each case only as the un-thought. The more original the thinking, the richer will be what is unthought in it. The unthought is the greatest gift that thinking can bestow. (ibid, 76)

What is unthought in Heidegger’s signed concept Being is the unsigned concept of stillness. Heidegger, borrowing from Taoist thinking, hints at a way to think the unthought in his reformulation of two lines of chapter fifteen of the *Tao Te Ching*: ‘Who can be still and out of the stillness, through it, bring (move) something along the way so that it becomes manifest?’ (Heidegger, 1964, 441) Perhaps it is Heidegger’s way of doing philosophy that more clearly provides insight into stillness as the way in which some thing or thought can show itself or be unconcealed.

**The Way of Doing Stillness**

*(in the Black Forest Mountains and in the Judean Desert Mountains)*

Heidegger’s way of doing philosophy has been disclosed in the recent work *Heidegger’s Hut*. What is particularly relevant for the endeavor of ‘Dynamic Stillness’ is the relation between thought and place, thinking and dwelling, that constitute the physical landscape of Heidegger’s work-world.

Heidegger’s hut remains high in the Black Forest mountains of southern Germany at Todtnauberg. Heidegger spoke of his philosophical work as a manifest part of the mountains. ‘He located himself as a susceptible scribe, suggesting that philosophy suspended the landscape in words through him almost without agency.’ (Sharr, 2006, 2) The philosopher, like the artist, functions as a passageway for thinking and writing. In ‘Why Do I Stay in the Provinces?’ Heidegger explains:

On a steep slope of a wide mountain valley in the southern Black Forrest, at an elevation of 1150 meters, there stands a small ski hut. … This is my work-world, … Strictly speaking I myself never observe the landscape. I experience its hourly changes, day and night, in the great comings and goings of the seasons. The gravity of the mountains and the hardness of their primeval rock, the slow and deliberate growth of the fir trees, the brilliant, simple splendor of the meadows in bloom, the rush of the mountain brook in the long autumn night, the stern
simplicity of the flatlands covered with snow – all moves and flows through and penetrates daily existence up there, and not in the forced moments of “aesthetic” immersion or artificial empathy, but only when one’s existence stands in work. It is the work alone that opens up space for the reality that is these mountains. The course of the work remains embedded in what happens in this region…. Solitude has the peculiar and original power of not isolating us but projecting our whole existence out into the vast nearness of the presence [Wesen] of all things. (Heidegger, 1981, 27-28)

Heidegger considered the philosophy of Todtnauberg to be that of forest, brooks, rocks, mist, meadows, and winds. In addition to writing, part of his daily routine was mountain walking and drawing water from the well. Water was drawn from a spring which flowed from the Danube. Heidegger had a composite six point and five point three dimensional wooden star fitted to the well. The star possibly combines both Judaic and Christian symbolism. Sharr notes: ‘Whether there was any connection intended between the philosopher’s star and the star of David is a contentious point given [Heidegger’s] political history, not least because the star represented victim-hood in postwar Germany.’ (Sharr, 2006, n57, 121) Heidegger claimed that this star stood for the wandering thinker.

I have chosen place similar and very different from Heidegger’s dwelling to engage his unsigned concept of stillness. The dwelling, Metzoke Dragot, is a rustic guest-house high above the Dead Sea in the Judean Mountains of Palestine. Metzoke Dragot is placed on the edge of a cliff facing the coastline of the Dead Sea. Metzoke Dragot is located on the only entrance to the Judean Desert from the Dead Sea area. The Judean Mountains in this area are just above sea level; the Dead Sea is 417 meters below sea level. The location and place were chosen based on the following considerations: mountains, desert rather than forest, still dead water rather than running spring water; a resting ‘sea of salt’ with significant healing qualities. The physical elements penetrating thought are desert, sand rock, caves, air, high oxygen content, sun, lowness, and salt water. The Dead has ancient geological history being part of the Great Rift Valley formed some three million years ago in Miocene time, and ancient human history that traces back to the destruction of the cities of Sodom and Gomorra in the time of Abraham. Mount Sodom sits on the southeast shore of the Dead Sea. Similar and very different to the five/six point star Heidegger had fitted to the well, I have a large yellow star of David tattooed to my the left chest above the heart; this also is the mark of a wandering thinker.

Heidegger encountered the presencing of Being through the stillness of a philosophy of the mountains; ‘Dynamic Stillness’ encounters the presencing of Being through digital philosophy of the desert and of water. The daily video recordings are complimented with the practice of walking in the desert, half day and full day treks in the desert, an overnight desert trek and walking on water in water.

Walking on Water in Water
The aquabatic work of Sarah Jane Pell in which she thinks, writes and performs a new aqueous philosophy brings forth insights into stillness in Being. Aquabatics translates as ‘walking with water.’ Aquabatics, is proposed by Pell, ‘as a noun and a verb,’ a theoretical concept and praxis; the aquabatic body is a oneness of the human body and a body of water. In a sense, the aquabatic body exists as a being-in-Being and Being-in-being. (Pell, 2005, 168) Pell grounds her performances in the process of becoming aquabatic: a oneness of the surrender and concentration of the human biological body of water as water towards the body of water as water; or simply water as water. (ibid, 83) Heidegger cautions: ‘What is strange in the thinking of Being is its simplicity.’ (Heidegger, 1964, 263) Pell proposes Being Aquabatic in which the aquatic self relinquishes that which drives western philosophy: the desire to know coupled with the impulse to ask, to question, and instead exists ‘like water in water.’ Pell presents an aquatic animality informed and
conditioned by diving techne as the performative state of being for an artist aquanaut. She terms this state of being ‘walking with water.’

In a number of performance pieces Pell has done variations of walking-with-water. ‘Trans>Port’ (2004) involved total body submersion in a 12m x 2m x 1 Aqua Super tank filled with 17,000lts of seawater. Pell performed ‘Trans>Port over three movements in one evening; 20:00, 15:00 and 25:00 minutes in duration. The first movement was viewed live with live sound broadcast. The second and third movements were performed live in silence with the sound and vision capture broadcast via live video feed to an internal screen system and projected externally. Pell performed five John Cage performance instructions that included ‘Water Walk’ and ‘Water Music.’ (Pell, 2005, 103-113) In ‘Hydrophilia’ (2004) Pell submerged her head in a custom-fitted oyster diving helmet. The helmet was sealed water tight at the neck and filled with 30lts of saline. Pells eyes were uncovered and her nose unpegged. Air was drawn through the mouth from the surface via a small umbilical. Her breathing was amplified and filled the artspace. Due to the weight of the oyster helmet, suspended on a wire rope, Pell remained relatively stationary at a perch support. In the second staging of ‘Hydrophilia,’ which I witnessed, Pell performed ‘Hydrophilia’ for 111 minutes. (ibid, 114-122)

Pell brings forth the dynamic of stillness in her work, stillness through motion and stillness through breath. Following Pell’s way of being as water with water, I daily entered the Dead Sea merging as an active intra-haptic buoyant system. For forty minutes submerged to my neck and suspended in liquid space, held by the buoyancy of the water, I Walked on Water In Water 417 meters below sea level.

**Time Presenting Stillness**

Time: ‘It which gives Being, which determines Being as presencing and allowing-to-presence[.]’ (Heidegger, 2002a, 10) Time, the unity of past, present and future, is (re)presented in terms of the now. The now of the daily event of sunrise and sunset allows-to-presence ‘the no-longer-now’ of past sunrises and sunsets and ‘the not-yet-now’ of future sunrises and sunsets. (ibid, 11)

Taking and relocating Heidegger’s claim ‘that philosophy suspended the landscape in words through him almost without agency’ from the forest to the desert; replacing ‘words’ with sounds, images, and colors; the imaging of sunrise, sunset and restless sea water brings forth singularity within repetition of color, sound and image. Taking Heidegger’s observation that it is ‘the place of stillness which gathers in itself what grants unconcealment to begin with’ (Heidegger, 2002, 68) and pursuing this through Deleuze’s technique of the crystal image, the direct image of time, captured again and again over a duration of forty, simply allows stillness to unconceal and presence itself. Similarly, Deleuze’s techniques of the affection image and the perception image put to work in the water of the Dead Sea over a duration of forty 90 second shots, presented as a succession of restless images, sounds and colors, allows to presence a no-longer-now of past stilling of stillness and a not-yet-now of future stilling of stillness, letting appear the in-motion and restlessly active dynamic of stilling.

**Presenting Dynamic Stillness**

Forty singular 2:40-3:10 minute images, sounds and colors of sunrise are presented in one continuously looping film sequence; forty singular 2:40-3:10 minute sunsets are presented in a second continuously looping film sequence; and forty 90 second images, sounds and colors of the water of the Dead Sea are presented in a continuously looping film sequence. The three sequences are shown simultaneously. The solicited affect is simultaneous stillness and agitated restlessness. For the CADE presentation, the three film sequences are presented at five times the speed of the real time in which they were shot; this will add to agitated restlessness performing a stilling of stillness and presencing a place of stillness in live time and in ‘the office of the image,’ (Bergson, 1988, 20) or body of the viewers. This performative occurrence is premised on Henri Bergson’s understanding of the relationship between the human body which ‘acts likes other images’ in the material world. (ibid, 19) For Bergson the body as image and external images operate as a
movement feedback loop: external images transmit movement to ‘the image I call my body’; this body gives back movement to external images. (ibid. 19)

A real time sample of Sunset June 9-22 can be downloaded from http://rapidshare.com/files/41917449/Sunset_June_9-22.mov. It can also be viewed on http://blip.tv/file/301597 and it is viewable @ http://fastbodies.livejournal.com/

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Biographical Notes

Shannon Bell is a performance philosopher who lives and writes philosophy-in-action.

Her five books include Reading, Writing and Rewriting the Prostitute Body (Indiana University Press 1994, Japanese trans.2000), Whore Carnival (Semiotext 1995), Bad Attitude/s on Trial, co-author (University of Toronto Press, 1997), New Socialisms co-editor (New York: Routledge 2004), and Fast Feminism (forthcoming).

Bell is currently researching ‘extreme’ science and art for a book Fast Bodies; this research is funded by Canada’s Social Sciences and Humanities Research Council (SSHRC).

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STILLNESS AS AUTONOMY*

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Abstract
Stillness needn't mean stasis. But it could mean homeostasis (i.e. constancy in the face of environmental changes) – which is an example of autonomy. This is a key notion in certain forms of computer art. However, there are two very different forms of autonomy: physical and mental/intentional. Artists strongly influenced by A-Life pay more attention to the first. Some interactive artists prioritise the second. Evolutionary artworks have a greater degree of autonomy than other computer artworks. But the autonomy (freedom) of the artist is still key.

Keywords
Autonomy, computer art, interactive art, evolutionary art, artificial life

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I: Stillness, Stasis, and Homeostasis
Stillness can mean stasis. But it doesn't have to. It could, for instance, mean homeostasis. This is an example of autonomy – which, in turn, is a key notion in certain forms of computer art. Considered as autonomy, then, stillness is at the core of these artworks.

However, we'll see that there are two very different types of autonomy: one physical, and one mental. Artists strongly influenced by A-Life pay more attention to the first. Some interactive artists prioritize the second. The kind of aesthetic "stillness" that's achieved differs accordingly.

Homeostasis is the ability of living organisms to keep certain aspects of their physical state constant, irrespective (up to a point) of what's going on in the environment. One familiar example is the maintenance of blood-temperature in birds and mammals. It's not that the temperature of the blood never changes: it does. But incipient changes are soon compensated by other bodily changes (the diameter of blood vessels, secretions from the pituitary gland, etc.).

The end-result is the maintenance – the 'stillness' – of the blood-temperature. Homeostasis is a form of autonomy: the system does its own thing, achieving constancy despite varying environmental factors. The organism itself controls the various bodily perturbations that occur, directing them towards the final state which it wanted all along – 98.4°F Fahrenheit, perhaps.

Birds and non-human mammals, of course, don't actually want a normal blood-temperature. Even human beings very rarely want that. Occasionally, however, they do – and then they take active, deliberate, steps to achieve it. As we'll see, this reiterates the point remarked above, namely that there are two very different kinds of autonomy.

II: Two Kinds of Autonomy
Autonomy is a complicated concept (Boden 1996). For there are three aspects of an organism's – or, more generally, a system's – behavioural control which are crucial to its independence. Moreover, these don't necessarily run alongside each other, nor keep pace even when they do.
The first is the extent to which response to the environment is direct (determined only by the present state of the external world) or indirect (mediated by inner mechanisms that depend on the system's previous history). The second is the extent to which the controlling mechanisms were self-generated rather than externally imposed. And the third is the extent to which any inner directing mechanisms can be reflected upon, and/or selectively modified in light of general interests and/or the current problem and context.

Clearly, then, autonomy isn't an all-or-nothing property. An individual's autonomy is the greater, the more its behaviour is directed by self-generated (and idiosyncratic) inner mechanisms, nicely responsive to the specific problem-situation yet reflexively modifiable by wider concerns.

Even within A-Life, there are various types, and varying degrees, of autonomy. For example, the senses in which autopoietic systems or self-organizing networks are autonomous differ from each other, and from the sense in which situated robots are autonomous. (See Zeleny 1977, Linsker 1988, and Brooks 1991, respectively.)

For our purposes, however, the most important difference is that between autonomy as ascribed to non-human systems and autonomy as ascribed to adult human beings (though not to babies or infants). The latter has a name of its own: freedom.

Human freedom is commonly regarded as the epitome of autonomy. A-Lifers, who concern themselves with organisms well below Homo sapiens in the phylogenetic scale, rarely mention it. Occasionally, they admit that their work doesn't cover it (e.g. Bird et al. forthcoming: 2.1). But sometimes, their words imply that they confuse it with autonomy as such. That's a mistake. A-Life's examples of autonomy show varying degrees of independence from outside control. But none has the cognitive/motivational complexity required for freedom (remember the third aspect of autonomy listed above).

Traditional, or "top-down", methods of artificial intelligence – which are often disparagingly referred to as GOFAI: "Good Old-Fashioned AI" – have got closer to an understanding of freedom than A-Life has done. Freedom is best understood in terms of a particular form of complex computational architecture (Dennett 1984; Boden 2006: 7.i.g-i, 12.ix.b). It requires a range of psychological resources, which combine to generate decisions/actions selected from a rich space of possibilities. These resources include reasoning, means-end planning, motivation, various sorts of prioritising (including individual preferences and moral principles), analogy-recognition, the anticipation of unwanted side-effects, and deliberate self-monitoring. (It's because these capacities aren't yet developed in infants that they aren't truly free.)

In the paradigm case, the choice is largely conscious. But an action may be termed "free" because, given the computational resources possessed by the person in question, it could have been consciously considered by them, and the decision could have differed accordingly. (This usage is sometimes relevant for understanding 'autonomous' computer art, too.)

Freedom can be compromised by everyday threats and bribery, or – more deeply – by relatively exotic circumstances. Under hypnosis, for instance; or when someone obeys hallucinated instructions; or when brain-damage undermines action, so that the person repeatedly forgets what goal/sub-goal they were following, or performs plan-steps in the wrong order (e.g. licking the letter instead of the stamp). Those "exotic" phenomena have been theorized and/or modelled in partly GOFAI terms (Boden 2006: 7.i.h-i; 12.ix.b). In short, the third aspect of behavioural control isn't modelled in A-Life but does feature in (some) GOFAI.
Another way of putting all this is to say that the autonomy of non-human organisms is purely physical, whereas the autonomy of adult human beings is both physical (blood-temperature, again) and mental (or, philosophers would say, intentional). Physical stillness, and mental stillness – where, in each case, the "stillness" isn't stasis but involves continual effort and change. (The goal-forgetting example is an especially clear case of the lack of constancy, or stillness, in the afflicted person's behaviour and thinking.)

In the context of computer art, this analysis raises the question of which type/types of autonomy are being attempted (or perhaps even achieved?) by the artists in question.

III: Autonomy and Computer Art

It follows from the discussion above that the "autonomy" one can ascribe to the computer artist and to the computer artwork are fundamentally different. Both involve various types of independence, and both can result in some form of stillness, or constancy. But there are important distinctions to be drawn.

Consider interactive art, for instance. In general, the computer systems involved here are reactive, or responsive. They do what they do, and change from moment to moment, as a result of environmental input. They are thus "autonomous" in the same sense that A-Life's situated robots are autonomous.

In practice, what happens is a function – usually, a direct function – of the viewer's behaviour. (The term "viewer", here, is a shorthand: it could also be a listener, or a viewer-and-listener, or even a sniffer or a feeler...). The relevant input may be the movements of the viewer's body, even including the movements of the eyes, or perhaps the sounds emitted/cause by the viewer. Or it may be something more abstract, such as the density of viewers located in a particular area of the gallery floor, or the rise in temperature due to the accumulation of body-heat in the room. It may even depend to some degree on past events: if the artwork has a memory of past interactions, the cue-response rules may vary accordingly.

In principle, non-human input could be relevant too: the temperature outside the room, or shadows in the sunshine, or the density of autumn leaves falling in the wind. Indeed, some artists have produced video-installations that are partly driven by impersonal changes such as these, as well as by the actions of the viewer. However, this approach lessens the viewer's sense of engagement with the artwork concerned. And that sense of engagement is crucial to truly interactive art. The characteristic feature of interactive art – as opposed to traditional paintings or sculptures – is that the viewer doesn't merely engage with it intellectually, or even emotionally: they change it, too.

(That's true also of traditional music or drama, if we consider only the audience – although there's a form of audience-interactivity in John Cage's pregnant 'silences', where individual listeners interpret/fill the silence in their own way. In these genres of art, however, performers/interpreters are involved too. 'One and the same' concerto or sonata may sound very different if played by different musicians, and/or under different conductors. Indeed, Baroque composers typically omitted the decorations, leaving those to be freely decided/played by the performer. And, notoriously, different directors/actors draw very different things out of Hamlet. So a 'static' work by a 'dictatorial' artist, if music or drama is in question, enables 'artwork-altering' interactions on the performer's part, if not on that of the audience.)

Whether the viewers of interactive art can decide how the work will change is another matter. If the viewer is able to follow an agenda, producing a desired end-result in the artwork in question, their sense of engagement (control) will be much greater than if they can cause only unpredictable,
apparently random, changes in the piece. Some people, however, may prefer to luxuriate in the experience of caused-but-uncontrolled unpredictability.

It is the computer artist who freely (sic) decides just how unpredictable the artwork's responses will be. They also decide just what the environmental cue/cues will be, and just how the system will respond. Whether the viewer is able, with experience, to discover what the particular artwork's cue-response rules are depends on whether the computer artist wanted that to be so. One can give an aesthetic rationale for wanting viewers to have this capacity, which could give them some voluntary control over what happens to the artwork; and one can equally justify not doing this, so that the changing artwork remains unpredictable (Boden in press). In the first case, the autonomy (independence) of the artwork is lessened, and the autonomy (freedom) of the viewer is increased.

What about the autonomy of the computer artist? They exercise their freedom in deciding what sort of artwork to produce, and why. Even a relatively 'formless', or unpredictable, artwork is a result of the artist's free choice – which isn't to say that they will have foreseen all that the artwork will do. But they may want to engender certain fairly specific types of experience in the viewer. In other words, the artist may be aiming for a particular aesthetic effect to arise constantly (sic) as a result of the interaction. Since the viewer's behaviour too is autonomous (in the strong sense), that constancy can't be guaranteed – unless the system is very highly constrained, not to say boring. But, with skill and understanding (of the human audience as well as of the computer artwork itself) on the artist's part, it can be approximated. In such cases, the artist's autonomy is over-riding the autonomy both of the artwork and of the viewer.

An increasingly popular genre is evolutionary art, inspired by A-Life and the self-organizing powers of biological evolution (Whitelaw 2004). This employs genetic algorithms (GAs) to make random alterations in the images/sounds produced and (often) to select the 'best' at each generation, as in natural selection in biology. Evolutionary artworks have a stronger claim to autonomy than the more traditional computer artworks do, because the system's detailed performance (arising from its evolutionary history) is less dependent on human choice.

There are different kinds of evolutionary art, however, wherein the influence of the viewer varies. As a result, the degree of autonomy that can be ascribed to the artwork, and/or the program, varies too.

On the one hand, an evolutionary artwork may run in complete independence of the viewer. In such cases, both the nature of the images/sounds produced and the selection at each generation are wholly automatic. As in the non-evolutionary cases, the autonomy of the human programmer is crucial – even though the results are less predictable (because random mutations are involved). But the autonomy of the viewer is irrelevant, since it can't affect what the program does.

On the other hand, the evolutionary artwork may be interactive – in one or both of two senses. First, in a work of art (e.g. a video-installation) that responds to the movements of the viewer, the cue-response rules themselves may evolve as the engagement proceeds. So one and the same movement has different effects in different generations. Second, the selection of images/sounds at each generation may be done by the viewer. This gives the viewer a better chance of (freely) moulding the artwork to his/her own preferences.

In principle, there could also be a third type of interaction, wherein the viewer can choose the type/s of mutation to be used. For instance, suppose that the artwork allows not only for superficial parameter changes (such as altering numerals in an image-generating procedure), but also for the hierarchical nesting of an entire image-generating procedure into another and/or for the
concatenation of such procedures (cf. Sims 1991). The viewer might be able to 'switch off' the nesting and/or the concatenation at will (sic) – in which case, the newly-evolved images will be much less varied, much less surprising. The viewer's reason for limiting the degrees of freedom possessed by the artwork in this way might be that they find the images of generation \( x \) aesthetically interesting, and want the program to explore only images of that general type rather than jumping into a very different (e.g. hierarchically more complex) space of possibilities. (That choice was made by the sculptor William Latham, to produce otherwise-unimaginable images within a clearly recognizable aesthetic style: Todd and Latham 1992.)

Even if the selection at each generation is done automatically (not interactively), the artist's freedom constrains the autonomy of the evolutionary artwork itself. For it is the artist who chooses the fitness function, or functions. These are the ways in which the evolutionary program measures the success of the phenotype in the Darwinian sense. (This choice is usually made 'once and for all', but it could vary during the development of the program.)

Indeed, many people see this point as crucial. Any GA-system's performance, they say, is implicit in (wholly determined by) its fitness functions and mutation rules. Ultimately, then, it's the human who is the creative force. Human autonomy (on this view) trumps computer autonomy, every time.

**IV: Robot Artists?**

This tension – between the autonomous variation of the system and the artist's free choice of fitness functions – is being explored in a project on creativity and evolutionary robotics at the University of Sussex (Bird et al. forthcoming). The robots in question have a retractable pen, with which they can make line-drawings as they move. These aren't representational drawings (of houses, or men ...), but merely abstract marks – which sometimes have aesthetic value.

Two key questions for the project are: (1) whether the robots can evolve to draw aesthetically acceptable lines that do not reflect the personal signature of the computer artist involved (Paul Brown), and (2) whether the relevant fitness functions can specify only very basic properties of the lines, such as (for instance) whether an existing line is or is not about to be crossed. If so, then some degree of creativity would seem to be attributable to the autonomous robots themselves. By contrast, if the fitness functions have to include relatively 'weighty' feature-specifications, then not only will the drawings display Brown's signature, but his creativity (and that of his roboticist colleagues) will be entirely responsible for them.

Suppose that the answer to (1) turns out to be Yes. In that case, the artist's autonomy will be largely hidden. An artist's signature is a form of constancy, or stillness, in their oeuvre. If it doesn't appear in the drawings done by an evolved robot, then the autonomy (weak sense) of the robot will – to that extent – have avoided, or even overcome, the autonomy (strong sense) of the human being. Indeed, the reason for using actual robots rather than artificially 'clean' simulations is that unpredictable noise in the real world – such as friction on the wheels, or obstacles on the floor – may affect the drawings that are done.

Of course, human autonomy is still crucial. After all, it was Brown himself who decided that the project should aim at losing his signature. Moreover, humans designed the robots in the first place. And, not least, it was they who evaluated the acceptability of the drawings at each 'generation' (more accurately: at the end of each experimental batch of 600 uninterrupted generations) and – if necessary – adjusted the nature of the fitness functions accordingly.

For example, an early fitness function produced robots that made marks within a very small region and then moved back and forwards over them repeatedly. To prevent this, the team added a
component to the fitness function that rewarded the robots for making marks spread across the whole arena – which resulted in robots which, in effect, did wall-following. As the next step, a further component was added which rewarded marks spread over a large proportion of the arena. The overall result was that the robots would turn away from walls at an angle, and mark the centre of the arena as well as its edges.

Another key question is (3) whether unpredictable input from the external world (e.g. friction on the wheels, or encounters with obstacles on the ground) will engender line-drawings of a kind not expected by Brown, and not wholly implicit in the mutation rules and fitness functions. Other work by a team-member has shown that radically unpredictable results, such as the formation of novel types of sensor, sometimes occur due to fortuitous interactions with seemingly irrelevant aspects of the physical environment (Bird and Layzell 2002). Some philosophers have argued that this is the only way in which fundamental novelties, as opposed to gradual improvements, could have developed in biological evolution – and that purely programmed A-Life is limited accordingly (Cariani 1992). That's why the Sussex team chose to evolve line-drawing robots, rather than programmed agents displaying on a computer screen.

Suppose, for argument's sake, that aesthetically acceptable line-drawings do evolve thanks to such physical interactions. In that case, the creative responsibility of the human artist will be somewhat less, and that of the robots (better: of the robots-plus-environment) will be increased. To be sure, we're still speaking of strong-sense versus weak-sense autonomy. These robots aren't evolving decision-processes comparable to those underlying human freedom. But the human being's creativity, considered as the origin of certain specific aspects of the final-generation drawings, is highly indirect, if not irrelevant.

In short, to regard human artists as the undisputed creators of all evolutionary art may be to speak too soon.

Credits
Helpful comments were provided by Jon Bird and Paul Brown.

References


**Biographical Notes**
Margaret A. Boden is Research Professor of Cognitive Science at the University of Sussex. She is a member of the Academia Europaea, and a Fellow of the British Academy and of the American Association for Artificial Intelligence. In 2002 she was awarded an OBE "for services to cognitive science." Her writing has been translated into 20 foreign languages. Her latest books are THE CREATIVE MIND: MYTHS AND MECHANISMS (2nd edn. 2004) and MIND AS MACHINE: AHISTORY OF COGNITIVE SCIENCE, 2 vols. (2006).
Video painting: A hybrid between the still and moving image

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Abstract

The use of new technologies has almost inevitably led to the blurring of established definitions, roles, and taxonomies of visual art. The ‘video painting’ is a new form of contemporary video expression based around the latest developments in High Definition Video and flatscreen displays providing a high-quality platform for the presentation of the moving image. It is a hybrid concept between the still and the moving image using traditional patterns of film narration and painting practice, quoting different genres such as the still life, landscape, portrait or the abstract painting. As Jim Bizzocchi of Simon Fraser University in Canada suggests, ‘It is a smooth temporal flow, always changing, but never too quickly. The piece is an exploration of concepts of ambience, time and the liminality of image and of narrative’. Importantly, one of the most interesting questions it poses is with regard to how time is performed in these video paintings.

As an example, I present my project ‘Still life in motion’, which I created in 2005 as a German media artist in cooperation with SONY Germany as part of the SONY BRAVIAmotionart project. The canvas is replaced by a large high-resolution flatscreen expanded by perspectives of time and space, simultaneously reconstructing and deconstructing the issues of the still life genre. Other examples will discuss video works by artists such as Bill Viola, Robert Wilson, Sam Taylor Wood, etc., who have downplayed the temporal nature of their images so much, that they often become nearly static in their effect.

Keywords

Video Art, Remediation, HDTV Technology, Visual Arts, Time-based Media

New video technologies constantly change the aesthetic capabilities of the moving image, and the latest developments in High Definition Video and flatscreen displays provide a high quality platform for the presentation of the moving image. Only within the last few years, new affordable technology has been developed to deliver High Definition Video as a new standard for commercial and artistic moving image expression. Flatscreen technologies such as plasma and LCD displays are being steadily introduced to our domestic and creative cultural spheres and will be part of our everyday lives in the near future. Bill Buxton, University of Toronto, principal researcher at Microsoft, maintains that gel, thin film, and painted surface video technologies are the inevitable next step in this development, and that massively large scale moving images, beyond anything we have experienced, will be part of our everyday lives. As a result our domestic and public visual spaces will be profoundly transformed, representing a great challenge for future visual and time-based art and design practice.

As part of this development the technological setting of flatscreen and HD video has already created the new ambient video genre of the ‘video painting’ in fine art practice. It is a hybrid concept between the still and moving image using traditional patterns of film narration and painting practice, quoting different genre such as still life, landscape, portrait or the abstract painting. Topics and concepts come both from the areas of film and painting practice, and one of the most interesting questions it poses is with regard to how time and narration are performed in these video paintings. As Jim Bizzocchi at Simon Fraser University in Canada suggests, ‘video paintings are video works, which are presented on LCD panels. They are wall-mounted in the same manner as traditional paintings. Content in this emergent form is designed to work at all times as either a highly aware foreground experience or as passive background. Therefore a video painting emerges as a supremely pictorial form. It creates a visual aesthetic, which relies on high visual impact, the subtle
manipulation of image, multiple layers, and the play of gradual, complex transitions. It is a smooth temporal flow, always changing, but never too quickly. The piece is an exploration of concepts of ambience, time, and the liminality of image and of narrative.’ (Bizzocchi 2005)

Video paintings have been increasingly accepted as a viable and progressive artistic practice and have started to be exhibited in museums and galleries within the last view years. A lot more ambient video paintings are exhibited in international digital media art festivals and exhibitions, which represent cutting edge artistic work on the crossroads of sound, image, media, design, cinema and performance art. The genre has been much better explored in the US and in Canada, simply because HD video technology is available and more commonly used there. Jim Bizzocchi and other artists working in the area of the video painting, who are addressing this clearly within their work, come mostly from the US and Canada. Visual artist Jeffers Egan, for example, has been working with the video painting medium for some time, producing works described as references to Mark Rothko and Jackson Pollock. One of the early participants in the growing ambient video genre, DetourDVD have been designing ambient video since 2003 and sell their work commercially via their website. Their main focus is to explore the ambient character of video paintings in reference to the tradition of abstract painting practice to create work with a strong emphasis on the slow near-imperceptible evolution of abstract video content, and to explore the development of software specialized for the production of slow morphing animation.

From 2000, the American Bill Viola, being one of the most influential video artists, began using plasma and LCD screens in ‘The Passions’ series that feature silent, slowed down, moving pictures exploring the human emotions, a theme that Viola has continued to develop. The composition and sensibility of these works were influenced by well-known paintings in the western medieval and renaissance traditions. He chose, for example, Hieronymus Bosch’s ‘Christ Mocked’, using it as a departure point for something quite different: ‘The Quintet of the Astonished’ is the first work of ‘The Passions’ series. By making use of slow motion and mechanically repeated ‘loops’ Viola deliberately downplays the temporal nature of his images so much so that they often become nearly static in their effect. Patient watching reveals subtle shifts and ambiguities of emotion. The formats of the original artworks range from laptop-sized screens to wall-sized projections. Another example is ‘The locked Garden’, a color video diptych in two free standing hinged LDC flat panels, representing a video version of the hinged portrait on the mantel piece in every American home.

Robert Wilson, one of this era’s most important figures in theater, opera and art, has created a series of video portraits of celebrities, ordinary people and animals called ‘VOOM Portraits’. The recent developments in HD technology have allowed Wilson to create something like a precise hybrid of still photography and motion pictures playing with the notion of a documentary video portrait – a conceptual idea, which has been explored in the traditional video format and in reference to the medium of photography by the British artist Gillian Wearing in her work ‘Sixty minute Silence’ in 1996. One other important example of a European artist still using the traditional video format is the work ‘Still Life’ by the British artist Sam Taylor-Wood. Created in 2001, it reworks the still life in a moving picture. This work is not created within the framework of making a contribution to the new genre of the video painting, but it is referring to the same idea: It is a DVD-projected film set in a traditional wooden frame as though it were, in fact, a painting. The work explores the irritation that occurs between a still image and a slow changing moving image of a bowl of fruit, which decays at an accelerated pace. Over almost four minutes the time-lapse film continually observes the fruit slump and rot until everything ultimately collapses.

How can the fascination for the paradox of stillness in moving image practice that these artists share be explained? The strong affection between the still and the moving image has been addressed in other art works prior to the technological setting of the video painting, but with it’s wall-mounted
high quality presentation of the moving image it seems to have created a very strong analogy to the representation of a painting. ‘Kindergarten Antonio Sant’Elia 1932’, created in 1998 by the Belgian video artist David Clearbout, is a good example: it refers to and expands upon Clearbouts interest in filmic and photographic picture strategies to create works that experiment with notions of temporality. The piece is made from an archival photograph and shows a group of children at play during their day at kindergarten. In accordance with the characteristic of the medium photography, the living situation appears to be frozen. It stands for a past reality emphasized by the year stated as being 1932 in the title. Yet closer examination reveals gentle movements in the large projected 60 min video installation. Whilst the figures remain static the foliage of the trees moves softly in the wind. With this minimal intervention the artist brings together film and photography in interesting and thought-provoking ways, and the absence and presence of time emerges as the main theme of the work.

In the pivotal book ‘Remediation - Understanding New Media’ published in 2000, the new-media specialists Jay David Bolter and Richard Grusin coined the word ‘remediation’ to refer to the ways in which any new medium is always both a refashioning of an earlier medium and a novelty understood through previous media. They note that earlier media have also refashioned one another: ‘photography remediated painting, film remediated stage production and photography, and television remediated film, vaudeville, and radio.’ They come to the conclusion that ‘for our culture, mediation without remediation seems to be impossible’. (Bolter and Grusin 2000, 271) Any new medium develops step by step from the emergence of a novel technology and through the articulation of a specific media language and semiotic system by reworking, remodelling and sampling various elements of differing other media into newly converged forms to successfully establish its own aesthetic vocabulary. Once such a media-specific set of means of expression is established, it becomes a medium that can be distinguished from other, already existing media, presenting itself as an improved version of other media.

One of the most interesting questions in relation to the video painting is, if the technological setting of flatscreen and HD video is capable of creating something new, which is so different from other existing media that it is not only a new moving image aesthetic but creates a new medium in itself according to the theory of ‘remediation’, then the question for the future will be whether or not there is a development from technology to medium taking place? Therefore the aim of my research project is to explore the basic characteristics of the video painting, how it reworks traditional themes, not only from painting but also from film practice, and if there is the potential for it to develop into a new medium. In 2005, I created my first video painting ‘Still life in motion’ as a German media artist in cooperation with SONY Germany as part of the ‘SONY BRAVIAmotionart’ project. SONY in Germany has a long tradition in supporting video artists to promote the innovative potential of their newest technologies. ‘Still life in motion’ connects the tradition of still life painting with the moving image. The canvas is replaced by a large flatscreen expanded by perspective of time and space, reconstructing and deconstructing the issues of the still life genre at the same time. I chose the subject of still life, because the absence of the dimension of time seems to be particularly evident in an arrangement of still objects. Often the presence of the absence of time is the subliminal dominant subject of still life! Often there is a slice of lemon nearly falling out of the frame, and there is a fly in the centre of the painting waiting to be discovered. It irritates the perception of the viewer, because he cannot decide for a moment, whether it is part of the picture or sits on the linen about to fly away within the next second or two. The work seems to be similar to the ‘Still life’ of Sam Taylor Wood, but there are major differences: To create an analogy to cubistic painting practice and to deliver different perspectives and viewpoints simultaneously within one image, digital techniques of collage, split-screen, and video layering are applied. The motif of the still life gets fragmented through a collage of established traditional film codes and shot sizes. Time is heavily manipulated in this process and emerges as the main element
of the work. First the slow decay of a still life is filmed over a period of several weeks from different shot sizes and perspectives. Then the real-time video and sound footage is manipulated through fast motion effects so as to speed up the rotting process to a visible level. During the editing process several stages of the rotting process get arranged in a narration determined by the movement within the image and the accompanying sound patterns and rhythms. Different parts of the image are arranged running simultaneously forward and backward, in fast motion, at different speed, or being looped – and the still life starts to ‘breathe’. Growth gets confronted with destruction, aesthetic beauty with rotten ugliness.

Figure 1: Still life in motion 2005. Copyright: the author.

Although the work seems to focus on reworking a traditional theme from painting practice, it is equally interested in exploring how specific visual codes of film and video practice are remediated in video paintings. How are traditional and contemporary patterns of narration and montage transformed by using a collage of multilayered video streams within one frame? Time is treated and performed very differently from current moving image practice. Instead of presenting different shot sizes and perspectives in the linear fashion common in temporal television montage, the concept of spatial montage is used. This is common practice in traditional cinematic montage, because the larger and richer screen of cinema prefers the carefully composed and detailed image to deliver an experience where the viewer can explore the image by himself, and his eyes can wander around and pick up whatever he wants. The increased picture size and quality of the video painting supports this pictorial cinema in the same way, and subtle details can be observed much better. More time is needed to explore these rich images, and editing pace needs to slow down. This is in opposition to the temporal acceleration in contemporary video narration and brings more ‘stillness’ into its aesthetic. Television screens are small and deliver a low quality image. ‘Therefore story tends to be presented and staged through sequencing of tighter images rather than through the visual dynamics of a single rich image - temporal montage displaces spatial expressivity. The standard viewer is accustomed to the fast speed of television narratives, and his ability to take in visual information has increased enormously with the fast editing norm.’ (Bizzocchi 2005) This has been now for more than 20 years the dominant characteristic of moving image practice starting with the development of music television and the short clip format, which has been commonly titled as ‘clip aesthetic’. The ambient video painting seems to be a return from this long tidal wave of fast moving, low quality
images and ‘rediscovers the use of the cinematic composition-in-depth, and a slow editing pace using more layered transition instead of the hard and fast video cut.’ (Bizzocchi 2005) This means, that the dimension of time in video narration, which has been divided up and sequenced in small units of fast moving and continuously changing key visuals, can now return to a slow flow of evolutionary nature. HD video is privileged to perform real-time events due to its high-resolution quality and realistic impact. In ‘Remediation’, Bolter and Grusin discuss the phenomenon of ‘transparent immediacy’, which is defined as a ‘style of visual representation whose goal is to make the viewer forget the presence of the medium (canvas, photographic film, cinema, and so on) and believe that he is in the presence of the objects of representation.’ (Bolter and Grusin 2000, 272-73) According to Grusin and Bolter all media seek immediacy and a perfection of technology, which will make the medium invisible. ‘Transparent digital applications seek to get to the real by bravely denying the fact of mediation; digital hypermedia seek the real by multiplying mediation so as to create a feeling of fullness, a satiety of experience, which can be taken as reality.’ (Bolter and Grusin 2000, 53) HD video satisfies the desire for immediacy much better than traditional video formats, and nature sequences and the play of landscape in real-time are very suitable topics. The viewer seems to enjoy the irritation of the imitation of a real experience in a very slow time flow, probably as a welcome experience in contrast to the omnipresent fast flow of the current moving image dogma.

‘Still life in motion’ does not perform in real-time, but like most video paintings, it has a slow flow of manipulated time, which provokes irritation in the viewer’s perception, whether s/he sees a real, still, or moving image. Like the still life painting, it can confuse the viewer. Will the fly move or not – in reality or on the screen? The perception of the viewer is a very important aspect in explaining the sensation of the meditative character of the video painting. The ideal viewing situation is one where the viewer can sit on a bench or a couch to contemplate the video painting. A meditative ambient atmosphere must be provided to seduce the viewer into a longer and closer examination, and then the viewer is able to experience his own individual time flow. The video painting invites the viewer to increase his or her own visual sensibility. Being in an irritated state between observing a still or moving image emphasizes the time flow even more and delivers an experience which seems to be not only relaxing but actively proffers relief amidst the fast pace of contemporary society.

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Biographical Notes
Christin Bolewski is a media artist and filmmaker from Germany. She studied at the Academy of Media Arts Cologne, Germany. She exhibits regularly and has taught in Universities in Europe and America. Currently she is a Lecturer and Researcher at Loughborough School of Art and Design
UK. The application of new media technologies to art and design practice is an ongoing aspect of her research and teaching activities.
Stillness design attributes in non-formal rehabilitation

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Abstract
Non-invasive sensor technology is used as an interface to a computer system to collect physical movement data that controls elements of a virtual environment. The environment is used for rehabilitation training i.e. physiological learning, for people with profound disabilities, and often no verbal competence. Movement of the human body is sourced as feed-forward kinetic data and empowered to control multimedia feedback content, e.g. audio, visual, or robotic feedback. It is delivered to be as a direct and immediate feedback so as to optimise user-awareness and association. The feedback is selectable as either figurative or abstract in form and can be art or game based. Inherent to the programming design of the data collection is the creation of stillness zones which generate null data. The stillness zones have been found significant for participant augmented communication. The uses of these stillness zones for this targeted community have been subject to limited exposure. This paper describes how these zones are used in rehabilitation training. Findings are presented from the established SoundScapes body of research that has existed for two decades.

Keywords
Stillness zones; Non-formal Rehabilitation training; Creative Expression; Performance Art; Digital Games

Introduction
Throughout the last decade of the 20th Century a body of research titled SoundScapes evolved so as to offer people with disability new opportunities for creative and joyful expression through movement. Originating in 1987 the research was established as a result of experiences gained from living with a relative having profound disability that were synthesised to experiences gained in working with creative expression through the arts in a professional capacity. The concept is based upon creating a supplementary entity for therapists working within the field of physiological rehabilitation training. Motivated engagement in sessions is achieved through fun experiences targeted through the control of interactive personalised multimedia content. In a programme of training the design of the interactive environment is such that behind the user perceived level of fun through the empowered control the same kinetic data that is empowering is simultaneously monitored and archived for session-to-session analysis of the intervention. In this way participant progression/regression as well as facilitator intervention decisions are reflected upon for system and intervention strategy refinements for following sessions and programs. Evaluation is through qualitative methodology where we systematically analyse via a synthesised model combining action research with hermeneutic recursive reflection. Triangulation techniques are used including video recordings, interviews, and case study strategies correlated to a quantifying of the kinetic data generated from the participant’s movement.

This paper presents not just one specific case study but rather it compounds the two decades of research in reflective focus upon the stillness attribute in design of the interactive non-formalised rehabilitation and learning inherent to the SoundScapes environment. Following a presentation of the concept and the human-centred technological issues an overview of the pros and cons of non-intrusive interface technologies and the paradigms of application are outlined. These highlight the significance of facilitator knowledge, understanding and awareness of use of the stillness zones for the intervention sessions. The paper illustrates how art, design and education are involved in the non-formal rehabilitation concept and practise, and how computer use is enabling a new generation of therapists to achieve accessibility to related digital tools. Through this access certain traditional
aesthetic values are questioned. Conclusions attest to the use of stillness zones as communication mediators in interactive virtual environments and their potential in rehabilitation for non-formal training. The paper is presented with a view to inspire a next generation of digital artists toward exploration of the SoundScapes concept as well as to further disseminate to the rehabilitation community.

**Technology and technique**

Non-intrusive digital interface technologies that do not require any worn devices on the body to source movement information are central to the SoundScapes concept. These devices are selected from a 'library' of input interfaces based upon various sensor technologies that operate beyond human visible range. Such 'invisible interfaces' have been found optimal to promote uninhabited and intuitive natural kinetic expression from activity zones that were coined as Virtual Interactive Space (VIS) (Brooks, 1999). The sourced *feedforward* kinetic data is mapped to a computer workstation. The digital signal protocol is MIDI (Musical Instrument Digital Interface), which is a standard open protocol designed for communication between musical devices. In SoundScapes the digital signal is mapped to control various multimedia content *feedback* that make up the personalised interactive environment. The environment is a room sized space. The personalisation of the feedback content is designed according to an individual profile that originated from knowledge of the individual and evolves throughout a programme of monitored training. A computer database tracks progression of the participant using the profile as a baseline. Feedback content can be music making, digital painting or game playing, all responding to the same kinetic information.

The technique of utilising stillness zones is exemplified in figures 1 and 2. Figure 1 illustrates a single participant head and upper torso with two 3D sensor activity zones set up either side of the head.

The participant in the intervention training becomes aware of the proprioception connected to activating the feedback content, e.g. sounds. The stillness zone is the area between the sensors which is usually established in the neutral position, in other words, the position where the head comes to rest when the participant is in neutral posture and not involved in ‘doing’ anything. The intent in use of the active zones combined with the stillness zones by people with profound disability augments participant communication with facilitator. Apart from this set up there is the opportunity for programming the stillness zone inside of the active zone so that activity transmits a ‘null’ signal.

![Figure 1. Participant with two active zones either side of the head. The stillness zone is established at the normal rest position.](image-url)
Figure 2(a) and (b) illustrates two scenarios for an extended 3D infrared sensor system. On the left, in Figure 2(a), 7 sensors are set up to surround the body with active zones. The stillness zone is predetermined as a central neutral position from where selected activity, e.g. hand, arm, hip or foot movement will result in triggering (or manipulation) of the selected feedback content. Figure 2(b) illustrates a single sensor that is used in the extended setup (>1 meter <14 meters) but the body size is positioned to block the infrared light. In this second scenario the stillness zone is where the body is situated to block the infrared light beam, and as the beam is invisible this can only be determined by a sonic or visual feedback. To activate the mapped media, e.g. sound, in the second scenario the participant moves laterally so as to permit the infrared light to pass the body and in this way the participant can listen to his or her body movement in space as a result of the generated kinetic data being sensed.

Figure 2: (a – left image) active sensor zones can be positioned around the body with the stillness zone being in the neutral position and kinetic data generation is from entry into active zones, as opposed to (b – right image) where a single sensor is blocked by the body so as to establish a stillness zone and where kinetic data generation is from movement away from the active sensor zone.

In comparison to state of the art figure 2 (a) looks similar to common computer vision techniques in camera based interaction where active matrix zones, blob tracking, or pixel differentiation scenarios are established that generate data according to inhabitation of zones, recognition of an object, or change of pixel colour. The use of an infrared sensor instead of a standard camera means that it can operate in complete darkness and that the sensor used is able to collect 3D data from close proximity. Figure 2 (b) illustrates the scenario set up where transfer from stillness to active generation of kinetic data can be as a ‘felt’ dynamic interaction through body change of position that is intuitive and suitable for rehabilitation training. In rehabilitation training with acquired brain injured patients exercises were conducted where the patient closed their eyes when in the neutral still position. Notably, closing of the eyes while standing was a traumatic experience for this group as fear of falling was evident. Body movement trained was initially along an approximately perpendicular plane (to sensor/body alignment) away from this still position and back again. As they moved they were able to ‘listen’ to their body motion in space (the mapped sonic feedback) as a linear sonic scale so as to train direct proprioception association and body dynamic awareness. In other words from no sound (the stillness zone) then rising linear scale tones depending on...
movement away from the stillness zone, and then falling linear scale tones as the body was returned
to start position in the stillness zone. Individual limb movement gave similar training opportunities
(also in non-perpendicular motion exercises) and the basic technique of moving to permit the
passing of infrared light from emitter to reflector to receiver was easily learnt and intuitively
associated and understood. Positive response from participants supported observations of a self-
motivated pushing of limitations as confidence grew so that each increment of sonic scalar feedback
was an indicated matched achievement of quantified progress in their movement training. The
flexibility of the system to be able to change sound patches (also parameters such as octave,
resolution, trigger/control etc.) also gave opportunities for change (alleviating boredom/repetition)
and development of system-mediated social-cultural interaction between the facilitator and
participant.

Aesthetic Resonance – Where the expression is the art and the art is the expression.

In SoundScapes the ‘art’ aspect of the work is often misconceived as the interactive content
feedback created from participant movement; however, this is incorrect as the true art lies in the
perceived effect on the participant, thus the therapeutic aspects attributed to the system. This
experienced phenomenon is optimised through the tailoring of the design of the environment and
the interaction to it so as to be immersive and engaging such that a state of flow and related
autotelic experience (Csikszentmihalyi, 1991) is achieved. This has been termed as Aesthetic
Resonance and has multiple interpretations, for example, Swingler (1998a, np) quotes Ellis’ (1996,
1997) original coining of the term as referring to “special moments experienced by individuals
described as having profound and multiple learning difficulties, in which they achieve total control
and expression in sound after a period of intense exploration, discovery and creation.” Whereas
Camurri et al. (2003) states that it is defined as giving “patients a visual and acoustic feedback
depending on a qualitative analysis of their (full-body) movement, in order to evoke ludic aspects
(and consequently introduce emotional-motivational elements) . . .” (p. 269). Ellis further refers to
how it is the facial expressions of children with a disability that are indicators of aesthetic resonance
(Ellis, 1996, 1997, 2004; Ellis and Van Leeuwen, 2000; Swingler, 1998a, 1998b). In our earlier
work we have augmented Ellis’ definition by suggesting it refers to “a situation when the response
to intent is so immediate and aesthetically pleasing as to make one forget the physical movement
(and often effort) involved in the conveying of the intention” (Brooks et al., 2002; Brooks &
Hasselblad, 2004). With this document we redefine the meaning as special moments that are
experienced as control with intent within a responsive environment where a direct association
between body movement and audiovisual feedback content (including games) acts as a stimulus that
evokes joyful discovery, intense exploration, and expressive creativity that results in, and from,
optimized and motivated ludic engagement. This phenomenon is such that the response to the intent
is so immediate and aesthetically pleasing as to make one forget the physical movement (and often
effort) involved in the conveying of the intention. The approach is such that it encourages the
participant to disassociate toward incremental higher engagement and the inherent motivation of the
play. This disassociation could for example be from pain that may otherwise be present as a result
of the physical movement involved in the conveying of intention in interacting with the system. The
aesthetic resonance paradigm can offer a potential in training where physical functionality
limitations may be exceeded through motivated play.
The state of Aesthetic Resonance happens when there is a balance between a person’s skills and the
challenge at hand. This can be compared to the state of flow (Csikszentmihalyi, 1991) which
associates to autotelic activity (Csikszentmihalyi, 1991). Play is similar to the autotelic experience
as it is characterised as being carried out for its own sake by inner goals generating the state of flow
(Pettersson, 2006). This is similar to the way the ‘doings’ or actions function as prerequisites to
playful engagement and how the technical system intends to awake and develop enjoyment and
curiosity among the participants resulting in an optimised motivation to train, play and learn. Being
engaged is in this case closely related to “having fun” (Göncü, 1999; Rogoff, 2001). We build upon

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this view by referring to Gadamer (1997) where we agree to his statement on the transformational power of real aesthetic experience. However, we decline from expounding further, as, whilst in agreement with the above suggested inferences, we believe that once an experience phenomenon such as aesthetic resonance, or the performing of an art, is attempted to be described in detail it immediately becomes something else, and thus we refer back to the acquaintance principle that states the need for that being referenced to be experienced so as to be evaluated (Budd, 2003).

**Designing for kinetic data mapping**

SoundScapes is not therapy and we are not therapists. The research has evolved to be a vehicle for multi, interdisciplinary exploration. A concept, apparatus and method has evolved from the work that substantiates non-formal rehabilitation as an intervention towards improved opportunities in quality of life for certain people. The designers and creators of these works are artists. Processing decisions in respect of the kinetic data mapping, both pre/post sessions (designer assigned – therapist advised) as well as in session (facilitator intervention), has continued to be via a computer graphical programming language called Max produced by Cycling74. This has been extended over recent years via improved software. Feedforward data is now more efficiently mapped to an array of multimedia feedback so as to enable the facilitator to address participant preferences and profile. The 3D infrared sensor device and Soundbeam\(^1\) ultrasonic sensor that were used mostly in SoundScapes sessions in the 1990s were easily programmable/changeable, either directly at the sensor head when in intense one-to-one sessions, or in the computer software. In this way the functional ability of the participant, for example sensitivity, range or resolution of the active source zone according to dexterity or other physiological dynamic targeted by the therapist was addressed.

Whilst this paper presents the delimited case it is opportune to state that the SoundScapes concept is applicable beyond solely rehabilitation for persons with disability and can address all ages, and abilities. Recent additions to the libraries of sensors are also expanding with various new prototypes alongside commercially available devices such as the ‘flexible’ Nintendo Wii remote which we predict offers many future opportunities in the field.

VIS has been referred to as an inhabited information space (Brooks, 2004) and it is through active use, (and non-use) of this dynamic volumetric data space that a level of non-verbal communication between a person with profound and multiple disability and a SoundScapes facilitator is achieved so as to arrive at a non-linguistic meaning from the intended action by the participant with disability. The interpretation meaning is achieved through the intention of a participant in use of these stillness zones during facilitator intervention in a rehabilitation session. Examples are given that highlight where this symbolic gesture has been as an indication of user-selected cessation or choice change. It is thus important to incorporate stillness zones into the design of interactive spaces when used in rehabilitation as this community are often lacking in opportunities for artistic or playful expression through being limited by their dysfunction, thus they are restricted from full exploring and experiencing to their fullest potentials. Creatively applied technology can augment such limitations.

**Non-formal rehabilitation and the facilitator role**

Controlled operation of the system and dynamic use of the stillness zones, which are spaces that do not generate data from inhabitation, indicate user progression in sessions. However, of great importance to a successful non-formal rehabilitation session is the facilitator intervention. This intervention is successful when interpreted meaning from the intent of the participant is achieved. Central to gaining the interpreted meaning is an intimate knowledge of the participant such that space is given for non-linguistic communication. Exemplifying this form of communication is the interaction between the parties through the stillness zones acting as a mediation of intent. It is often in this phase of intervention that misunderstandings are realised through facilitator 'need or desire'

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\(^1\) http://www.soundbeam.co.uk
to reach a goal. In other words, time needs to be given where the facilitator steps back and permits the participant a breathing space in the session interaction so as to indicate through the mediating stillness zone his or her desire. This could be an indicated preference for the next phase, for example if bored with a choice of content to move forward to another; it could be a defined pause to reflect upon what had been happening; or it could be an indication of exhaustion and a desire to stop the session. Often these moments can be wrongly interpreted by the facilitator and in most cases the participant would enforce their desire through response to the experienced facilitator verbal questioning so as to reach agreement and mutual understanding. However, the stillness zone offers an increased independence for the participant in that they can indicate choice rather than have a secondary role and thereby contribute to a fun and playful experience.

**Pros and Cons of a non-invasive invisible interface**

Each sensor interface from the SoundScapes input device library has pros and cons that have to be evaluated so as to make a conscious choice based to optimise for the participant and the therapist goals. This choice is based upon knowledge of the available device (i.e. hardware), the opportunities available via computer software, and the participant (i.e. a personal profile developed with those closest to him or her and including the therapist). In SoundScapes three forms of invisible sensor technology are used where the data retrieval is achieved from, linear, planar or volumetric space. Each sensor can be applied in multiples and the technologies are mixable without any undesirable system cross-talk artefacts. However, the planar sensors require a minimal lumen level of light (not necessarily visible light, e.g. infra red) and when working with image feedback content it can have a tendency to pixel corruption and subsequently miss-triggering. Although improvements have been evident in the field of linear sensors they are still often overly-sensitive to hard surfaces (resulting in false signalling) and operate with an annoying perceivable audible click that represents each cycle of the ‘send-receive’ frequency of the sensor head. A negative attribute of the infrared volumetric sensor is that it has a limited data retrieval hierarchy which is either incremental from ‘skin to core’ or from ‘core-to-skin’ (the invisible volumetric space can be imagined as a virtual onion skin where each layer is a level of data) however, this can be programmed otherwise and saved as user presets in the software so that each participant has specific patches to work with. This latter sensor is the one commonly used more so than the others in SoundScapes as it can source data from natural three dimensional gestures and is operational from close range (figure 1) or up to around 14 meters as illustrated in figure 2. Being invisible there is limited reference for guided operation thus the interactive space becomes ‘tangible’ through the mapping of the data to selected content, i.e. the feedback stimuli. In this way the an autonomous intuitive link between user and system is such that a direct and immediate feedback, e.g. auditory or visual, is achieved and recognized which gives the interface its ‘tangible’ attributes for the user.

**Conclusions**

Digital advances that are used to create environments that evoke proactive experiences are empowering a question of traditional understanding of aesthetic values. SoundScapes is a vehicle for questioning related aesthetic resonance that is embodied in the experienced content as a between-ness that provokes imagination beyond solely what is witnessed. This is in line with McCloud’s (1994) statement of how certain new media, as invisible art, evolves special moments that are connected through a mental construct – a “continuous, unified reality” (p. 67).

The potentials in augmenting opportunities for the community of people with disabilities by implementing SoundScapes non-intrusive sensor technologies, digital video games and creative expression through music making and painting via whole body, head or limb movement has been shown as evident through application in field studies. Method of delivery has been observed as optimal when a mirroring strategy is evident, i.e. rather than a small desktop monitor to view a

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visual stimuli created and controlled through the body, the participant is positioned in front of a one-to-one scale back projected screen. In this way the strategy of intervention used in physiotherapy for proprioception training, i.e. a body size silver mirror, is replicated for participant association. The referred to ‘stillness zones’ are also learnt through such mirrored strategies.

Care-givers were initially reluctant to credit the gain for their charge through the concept of non-formalised rehabilitation, possibly believing their services under threat from a digital agent or just thinking SoundScapes a latest novelty or fad. The witnessed evidence of engaged participation and a desire to express and play, often with gestures beyond what was usually perceived however was irrefutable. Aesthetic Resonance has been found to be a phenomenon that requires first-hand experience according to the acquaintance principle (Budd, 2003).

The multidisciplinary and interdisciplinary responses to SoundScapes have been positive. The afforded opportunities in rehabilitation have been stated by the community. SoundScapes has evolved into a consultation entity that advises institutes and families on intervention strategies and products. Supplementing the dissemination of SoundScapes is the realisation of an international conference titled ArtAbilitation, and further, a workshop under the same name of ArtAbilitation travels under commission to various corners of the world to work with local artists, students, and other interested parties, where targeted is knowledge exchange towards expanding the established network of globally situated user groups. However, the authors recognise that they are just ‘scratching the surface’ of a larger body of research which has inherent questions such as the use by institute staff that are mostly untrained in any IT related activities, or indeed by the end user who can train at home. With the next generations of end users being incrementally at ease with technology we can safely forecast significant changes both in institutional strategies as well as self-health care from home. Conscious of these future directions SoundScapes has evolved into a platform for knowledge exchange, product research and development, and international networking. Currently funding and international collaborations are being proposed and we are open for interested parties to contact us.

SoundScapes is considered in line with McCloud’s (2000) views on the evolving ‘conceptual distinctions’ of digital media and how:

> The resultant *media landscape* will be populated with *art forms* not rooted in a particular *machine, venue, or physical substance*, but in the implementation of their respective *ideas*. Each one, a simple irreducible concept - - one that *distinguishes* it from all others. (p. 205).

SoundScapes is posited as such an art form.

References


**Biographical Notes**

Associate Professor Tony Brooks has a background in performance art, and was born into a family with disability. He has advocated the use of digital technologies in intervention for people with a disability and founded Handi-MIDI in 1987 which later became SoundScapes non profit organisation. He is on the management team of the Medialogy education ([http://www.medialogy.eu](http://www.medialogy.eu)) and is director of the SensoramaLab at Aalborg University ([http://sensoramalab.aau.dk](http://sensoramalab.aau.dk)) where he leads a team of post-doc assistant professors. He was awarded the European Eureka prize for SoundScapes in 1999 and the Danish research prize in his field 2006. There are approximately 50 publications associated to the concept including achieved international degrees citing the work where readers who wish for examples of the research can explore. As founder of SoundScapes he has realised the annual ArtAbilitation international conference and undertakes international workshops where he is invited to work with local artists and research students. SoundScapes has been featured at major international events, for example, the cultural Olympic/Paralympic events 1996 and 2000; the European Culture Capital of Europe 1996 and 2000; the Danish NeWave, New York 1999; the UNI/NGO World Summit 1995; and has been a featured exhibitor at leading Museums for Modern Art. His PhD is based upon SoundScapes
and is under the Arts, Design and Media at the University of Sunderland in England. SoundScapes has been responsible for numerous published patents and national and international research funding. His main sponsors are IBM, Martin, and Lego.

Dr. Eva Petersson is an assistant professor; coordinating/managing the Medialogy Bachelor and Master Education Program (see http://www.aau.dk/medialogy/uk/index.php); and vice chancellor at Aalborg University Esbjerg in Denmark. She is member of the research group SensoramaLab (see http://sensoramalab.aau.dk). She has a background in Education Science and her PhD is focused on ludic engagement (playfulness as a foundation for engagement) within virtual environments and the potentials in associated non-formal learning (see http://dspace.mah.se:8080/dspace/handle/2043/2963). Petersson has been coordinating research projects in inclusive and participatory design, storytelling, and creativity and learning processes through the use of new technology in education and rehabilitation contexts. She has been leading projects on physical and virtual toys, the design of toys for children with disabilities, and the use of computer games (interactive environments) in educational and rehabilitation contexts involving flexible methods of delivery for local, national and international users. Petersson is member of the International Toy Research Association (ITRA) and the Toys for Tomorrow Forum. Furthermore, she is a board member of the Pan-European Game Information (PEGI) and expert member of the Interactive Software Federation of Europe (ISFE). She was one of the founders of International Toy Research Conference recently organised by the International Toy Research Association (ITRA).
The Body Keeps the Score

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Abstract

American animator Robert Breer has been credited in introducing the first visual bomb to cinema in his loop film Image by Images I (1954), Two abstract animated films by Robert Breer are examined: 69 (1968 5 minutes) and Fuji (1974 10 minutes). Using Merleau-Ponty’s phenomenological perspective, though these films are not representational or photographic in the traditional sense it is argued that they are still able to talk to us about real experiences because ‘the lived perspective, that which we actually perceive, is not a geometric or photographic one.’ (Merleau-Ponty, 1964b: 14) 69 provides a metaphor for a system that collapses and Fuji as an articulation of that embodied seeing required for train travel. It is argued that Breer’s work in its explorations of style ahead of content is research into an act of viewing that offers a contemporary simulation of the impact of a traumatic experience on the body. Just as one cannot grab each object in the landscape at the speed of train travel nor can one grab or understand each frame that is presented to the retina of a Robert Breer film. What is required to attain “stillness” is a more dissociated way of looking that allows the images to wash over you. Such a “stillness” may be more about suppression than contemplation and could involve a process of metamorphosis.

Keywords
phenomenology, metamorphosis, speed, perception, rewindability

In film a lot of things have been repressed for so long that they’re fresh. I explore the medium for that kind of thing. There is an awful lot of conformism.

Robert Breer in (MacDonald, 1992: 42)

Robert Breer’s playful short quickly moving animations ‘research’(MacDonald, 1992: 17) the perceptual experiences of cinematic reception that are generally ignored and buried by the industrial model of film production. They are rich in technical innovation and resist the narrative expectations of an audience weaned on entertainment films. As ‘a movie is not a thought; It is perceived’ (Merleau-Ponty, 1964b) these films are read here as about ‘making sense’.

Breer has been making short animated films since 1952. In his continuous loop film Image by Images I (1954), which Christian Lebrat (1999:74) describes as the ‘first visual bomb in cinema’, Breer first introduces the technique of a different image for every frame and so a different image every 1/24th of a second. His highly compacted graphic animations are considered key films of what Sitney has coined a ‘Graphic Cinema’(Sitney, 1979:175-304) and are included as foundation works in Anthology Film Archive’s ‘Essential Cinema’(Sitney, 1975: xiv). In their single frame or multiple frame bursts and clusters, they contain a mixture of abstract and concrete images that explore the illusion of motion through a reconstituted collage of fragments, sudden appearances and subliminal effects.

69 and Fuji

It can be argued that a new technology’s impact on the body has to be negotiated to avoid scarring the senses. Historical situations where the body has been impacted by a ‘new’ technology include fair ground joy rides, air and railway travel. Sometimes a technology’s traumatic impact cannot be avoided, as in the machinery of war. It can lead to a list of traumatic symptoms often diagnosed as, in the case of war, shell shock and Post Traumatic Stress Disorder (PTSD). It is in the ‘crash’ or breakdown of the technology that we can discern extreme cases of perceptual collapse of those body senses associated or interfaced with that technology.
Two films of Breer’s 69 and Fuji are particularly useful in examining this notion of a bodily or sensual collapse precipitated by technology.

Breer says that: 69 undoes itself. It starts out like a system, then the system breaks down and goes to hell. During the editing I came up with the idea that it should break down, so I shuffled the cards. (MacDonald, 1992: 43)

In the system that 69 performs shapes go through repeating arcs of movement. There is the precision of architectural drawing to the imagery in the early stages of the film and the motion effect is like the movements of the rods on a locomotive wheel from early cinema, yet highly stylised and abstracted. Clusters of images are repeated throughout the film in various permutations. Now and then there are bursts of single frame abstractions flickering and flashing. With each new application of technique to the originating material each cycle or repetition of a sequence leads to a greater abstraction of gesture and movement. Any semblance of story is dissolved in the perceptual performance of the film.

This experience can be interpreted as working at that threshold between making or not making sense. One can ask if there a traumatising of the image happening in these erasures upon erasures, this moving away from source through a relentless application of technique?

Fuji, the other film to be discussed, is constructed from more recognisable imagery:

I had a neat little fifty-dollar super-8 Kodak camera, which I still use. The handle folds up, and you can slip it in your pocket. A no-focus idiot camera. I shot the footage out the window of the Tokaido Express, a 135-mile-an-hour train… …The film plays with deep space and the flat picture of the screen. (MacDonald, 1992: 45)

There are a number of wide-angle shots, a panorama of the Japanese countryside being moved through by the train window, with a special contemplative emphasis, through rotoscoping, on Mt. Fuji. These sections focusing on Mt Fuji are broken up, paused, by moments of black that could simulate the going through a tunnel in a train. After such pauses we receive another animated sequence out of the train window, often re-using frames from previous sequences at different speeds.

I found the most interesting sections involve graphic shapes over rotoscoped shots looking out the train window where the posts and shrubs that flash past close to the window offer a connection to the aforementioned graphic shapes, in both shape and abruptness of appearance and disappearance. There is a play here in tensions between depth imagery and the screen surface that re-enacts the perceptual processes of train travel. The technology of speed impacts on what and how we see, Breer seems to imply.

**The Railway Journey**

We must go back to the working actual body- not the body as a chunk of space or a bundle of functions but that body which is an intertwining of vision and movement.

Merleau-Ponty (1964a: 162)

I used to take lessons in a biplane and do stunts and things.

Robert Breer in (Griffiths, 1985)
Let is examine further in respect to train travel and the train accident this notion of perceptual collapse that technology can bring about. What is the impact on the senses? How can 69 and Fuji, as examples of experimental film, comment on these encounters with technology, and provide insights into the perceptual shift these technologies may impose?

The aeroplane appears in sound and image in many of Breer’s films as well as images of birds and flight. As a perceptual event flying stunts can be considered as the ultimate of joyrides and it is ‘real’. It involves the disorienting push and pull on the body, the images moving past at changing angles and the depth perception involved at locating yourself to the ground and horizon. Flying stunts provides a classic un-simulated embodied pre-reflective encounter with technology and suggests a trace in Breer’s work of what Gunning has named a ‘Cinema of Attractions’. One that, in Breer’s case has distilled its movement and unhinged itself from re-presentational context in similar way to thatarticulated in Marinetti’s Futurist Manifestoes. ‘Attraction’ is Eisenstein’s term taken from the fairground. ‘An attraction aggressively subjected the spectator to ‘sensual or psychological impact’’ (Gunning, 1990 :59).

Such exhibitionist and often joy-ride films from early cinema were about showing and enacting ‘direct stimulation’ rather than telling or recounting a narrative. They were usually constructed serially and generally utilised trick effects and held a position in public space akin to the pre-cinema toys’ status in the home.

Dadaist shock tactics have also been compared by Benjamin (1976: 238) to the visceral impact of film. For Gunning contemporary effects in their strategic placement within narrative film are ‘tamed attractions’. For Kirby such effects can still act with the ‘force of trauma’. She identifies a male specific hysteria within such early cinema forms and identifies how shock has not only been co-opted by the avant-garde but resides within film more generally:

If shock was by this time a programmed unit of mass consumption, and a principle of modern perception, it could clearly turn back in on itself and frighten- or thrill- with the force of trauma, (The flicker film is a perennial tribute to this power.) (Kirby, 1988: 121)

In its essential re-enactment of perception itself Breer’s work connects back to this early cinema tradition. Such films challenge the conventions of narrative cinema and play with the cinematic apparatus. For Breer going around in circles, doing his loops is not about getting lost, though this may well be the impact on the viewer.

The regular ‘political’ line coming from experimental filmmakers has been that such experimental films have to be watched in a different way. You have to be willing to put in the effort. Carels made this point recently in his discussion of Dutch Experimental Film:

Viewing experimental films is always a bit like experimenting with yourself, being confronted with your own expectations, attention span and viewing habits. We try and watch without inhibitions but rarely succeed. (Abrahams, 2004 :14)

Audiences weaned on entertainment are often resistant to their insights and inherent critical position and find such films dull, boring and unreadable, and often too stressful to watch. Lebrat has made this point about Breer’s films:

The frustration imposed by the film’s short running time, and its denied communication which ensues, upsets people’s habits and demands a new kind of spectator. (Burford, 1999: 75)
It is of some interest here that the argument around the reception of experimental film re-plays the debate around the advent of railroad travel. In discussing this period Schivelbusch notes that:

Dullness and boredom resulted from attempts to carry the perceptual apparatus of traditional travel, with its intense appreciation of landscape, over to the railway. The inability to acquire a mode of perception adequate to technological travel crossed all political, ideological and aesthetic lines. (Schivelbusch, 1986: 58)

In a phenomenological reading, in both cases the issue of resistance and disorientation lies at the pre-reflective stage of perception. The products of reflective thinking are irrelevant to our disorienting experiences, which are manifest physically on our body. Political, ideological and aesthetic positions are the product of intellectual discourse and cognitive decision-making and values subscribed to reflect the result of such thinking and are articulated reflectively.

Schivelbusch identified three perceptual adaptations, or organising principles that train travel delivered (1986: 160): Panoramic vision, the compartmentalisation of time and space and a shift to a more sampled reading strategy while travelling. These shifts made the old way of seeing seem alien. This dispersal of attention, de-centredness can also prove useful in negotiating Breer’s rapid-fire films whose images disappear as soon as they are presented. Visually capturing each fragment and fracture generates too much visual fatigue. Letting them wash over you avoids its stress.

Schivelbusch also talks of the abruptness of motion of train travel as delivering a sense of stress and bodily fatigue through a ‘series of small and rapid concussions’ (1986: 117) to the body. This is what could be said Breer delivers to the eye: a series of small and rapid concussions. If such cumulative stresses of travel can lead to metal fatigue, what effect may it have on the body?

Can railway shock be seen as the extreme case of the more general impact of train travel? Is it all a question of degree? Kirby in her exploration of Male Hysteria and Early Cinema (1988) conceptualises this relationship in terms of ‘real and anticipated’ shock and lays out the argument

That the railroad accident victim becomes in relation to early train films, and early cinema more generally, the film accident victim- a traumatised, and, in one sense, hysterical spectator. (Kirby, 1988: 116)

Each dose, the accident and ‘mere’ travel, impacts on the body and senses as lived experience in the world. Travel itself can be read as an accident’s anticipatory prelude.

In Fuji Breer’s rotoscoped view out the train window into the moving landscape has been described as layered with intermittent abstracted shapes. Detail has been lost in both the depth and surface of these moving images. This can be read as faithfully articulating the blurred view out of a moving train window as related in Victor Hugo’s account of train travel from the turn of the 19th century:

The flowers by the side of the road are no longer flowers but flecks, or rather streaks, of red and white: there are no longer any points, everything becomes a streak. (Schivelbusch, 1986:55)

In Breer’s rotoscoped traces in Fuji it is also evident; though reduced we still know it is a flower, a field, a telegraph pole, a mountain.
Within the moving railway carriage the eye at times focuses on the surface of the window and its flecks of dirt and inconsistencies, at times it can quickly sample into the distant slower moving, yet less detailed horizon line or then one is staring out of focus at those shadows and blurs that flash past in an instant. Sampling in and out of these layers of movement harnesses different visual skills that need to be practiced and learnt for the cinematic experience of a Breer film as they were for train travel. To change the way we see this world requires a whole re-alignment of the senses. What is critical here is that perception is:

Not a sum of visual, tactile and audible givens: I perceive in a total way with my whole being; I grasp a unique structure of the thing, a unique way of being, which speaks to all my senses at once. (Merleau-Ponty, 1964b: 50)

In adjusting to new technology the sensory cluster can undergo what could be described as a metamorphosis. As with train travel the act of viewing can at times be a simulation of dissociative state and failure to go along with can be even more stressful and disorienting.

**Rewind**

We have described and reflected upon *Fuji* and *69* and Robert Breer’s filmmaking practice in relation to early and pre-cinema and the perceptual qualities of train travel. It has become apparent in watching *69* and *Fuji* that we are uncannily confronted by what Merleau-Ponty calls the ‘real’.

The real is a closely woven fabric. It does not await our judgement before incorporating the most surprising phenomena, or before rejecting the most plausible figments of our imagination. (Merleau-Ponty, 1962: x)

This is not always an encounter we do willingly or with pleasure. We may look away or shut ourselves down and go perceptually and reflectively elsewhere. We may even move our bodies out of the room. But even here Breer has us, incorporates this into his retinal performances. Like with trauma, there is no escape. Into this we are captured. What awaits the viewer of a Breer film is an encounter with one’s own perception and a sublime suggestion on how it needs to function and not function in a technologised being-in-the-world.

The perceptual shift or re-alignment of the cluster or gestalt of the senses required to confront radical experiences can be overwhelming. It can be experienced traumatically. It can shut the body down. In talking about ‘the film we need’ specifically in relation to the holocaust, Baer sees in such a dilemma as is presented to the viewer of a Breer film a potential for film to uncover trauma:

Film may uncover traumatic memory because it does not necessarily imply a cumulative effect or logic, or a unified point of view. This ability to register an event’s lack of coherence is singularly programmed into the technology, whereas it is unavailable to human consciousness. Memory cannot replay an incoherent scene in order to examine it more closely as incoherent; it either surrenders to the craving for meaning or shatters under the impact of trauma. (Baer, 2002: 171)

After an extended analysis of the photograph as an instant of traumatic effect, Baer goes on to argue for a re-animation of photographic traces of the holocaust as a way of shaking loose something of the energy of lost aura of these captured holocaust images of the Lodz ghetto. This summons for ‘the film we need’ seems to have commonalities with Breer’s practice and experimental film more generally.
As Baer has pointed out the subjective experience a film gives can always be re-analysed by rewinding the film. It is the inherent nature of film that makes it open examining how trauma works.

Because film presents images not as a succession of still photographs but as indistinguishable from movement, it can continually restage this “disintegrating unity” without either instituting coherence or succumbing to total fragmentation. (Baer, 2002: 170)

Breer acts out such a ‘disintegrating unity’ in his shuffling of the cards in 69. He works with the nature of film and ‘lays bare the device’ (Shklovsky, 1969) of its perceptual trickery:

It has to do with revealing the artifice rather than concealing them. The fact of that rabbit sitting inside the magician’s hat is the real mystery not how it is dissimulated. The hat should be transparent and show the rabbit. (Breer, 1973: 70)

It is, as Baer (2002: 170-1) suggests, in its rewind-ability that 69 and Fuji present a historically specific traumatic structure that remains open for inspection. Rewind-ability acts here as a request to inspect history and is enabled because film continues to exist in its originating form after each performance. This availability can present us with a methodology of re-presenting (continually and upon request) the unknowable of trauma.

As at the advent of photography at the beginning of industrialisation, the photograph was seen as offering a superior form of memory in its ability to record the most intimate of details that the naked eye missed, so too I offer up Breer’s moving image for this new digital post-industrial period as a prosthetic memory. This is an aspect of moving images that has been incorporated into some installation art. It is offered up with an artistic methodology illuminated by phenomenological reflection, to trace the most invisible of missed relationships and to record the unspeakable and transgressive interconnectedness between and across bodies and objects.

I submit that it is within the traumatic perceptual collapse of an ‘old way’ of seeing that the senses can metamorphose (morph) into such a ‘new’ whole, one that can deliver a new balance of the senses, a new kind of stillness to negotiate a the new technologically ‘real’. It is a stillness that has been mapped and presented before. It can be traced through Robert Breer’s films. As a retrograde gesture I offer up a photograph of the film Fuji in its can, in its insidious stillness as a trace of such a prosthetic memory for a contemplative moment at the end of this paper. Let this image predict and signify every database on every computer containing moving image art.

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California Press, Berkeley.

**Biographical Notes**
Dirk de Bruyn has made numerous experimental, documentary and animation works over the last 35 years. He was a founding member and past president of MIMA (Experimenta) and curated various programs of film and video art internationally and written extensively about this area of arts practice. A retrospective of his own work was shown at the Deutsches Filmmuseum, Frankfurt in 2004. He is currently teaching Animation and Digital Culture at Deakin University in Melbourne, Victoria. (Burwood Campus).
Posturbanism and Paradise: Real gardens, vicarious landscapes or virtual arenas for stillness and spectacle

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Abstract
This paper investigates the paradox of stillness within posturban space, and in particular the garden. Posturbanism is identified as a synthesis of two principle ideas: the city as an analogue of the mind, and for virtual urban space to satisfy immaterial human needs. The contention is that for urban theory to be useful and satisfying it must direct the integration and extension of the real into the virtual. The human need for spectacle is described in an historical context.

Only one element of urban landscape is explored here - the garden. More specifically, the Eastern/Persian paradise garden is juxtaposed to the Western modernist city and park, drawing on (visual) commentary derived from film, virtual gaming arenas, and thirdspace hybrid landscapes. The paradox of stillness within the real and digital landscapes is critiqued. It is concluded that a rehabilitated posturban landscape is required if stillness is to be revealed and embraced.

Keywords
Garden, landscape, posturbanism, spectacle, vicarious

Introduction
This paper investigates the paradox of stillness within posturban space, and in particular the garden. At least two distinct trains of thought are evident. The first of these focuses on the potential for recently emergent posturban space to satisfy human needs. This is discussed within an historical perspective detailing the shift from reality towards virtuality as a primary means of satisfying the desire for spectacle.

The second train of thought (which cannot be fully detailed here) relates to the design and interpretation of garden-space as a metaphor for stillness. Trinh Minh-ha defines the paradox of stillness as “sound or silence, movement or stillness, not opposed to one another” (Minh-ha, 2005). In terms of the garden, we interpret stillness as ‘duration’. Stillness as duration abounds in Eastern gardens. Accepting the quantum view of decoherence, there is a flow of information about an object (for example, a garden) into its surroundings, and since information can be neither created nor destroyed, the duration of this flow is as timeless as the centuries between the construction of Eastern gardens and the present and future.

The East’s social paradigm, which is underpinned by near totalitarian capitalism with its singularity of idea/information, provides a semblance of homogeneity, and thus immutability and durability, at least to the outside observer. In contrast to this homogeneity that remains relatively undisturbed, the West enjoys the riches of disaffected/economic immigration, accentuating the paradigm shift towards diversity and postmodernism.

Many Western gardens do not contain information that is homogeneous enough to be retained through time. Heterogeniety does not seem to lend itself to duration. Cosgrove notes the ephemeral nature of postmodern landscape space (Cosgrove, 1997):
The concept of carnival is frequently employed in discussions of representation and promotion in postmodern space. In the renaissance city one can observe a parallel significance of carnival as a significant element in both civic and social life… the Piazza San Marco… Often described as a stage set, this celebrated apotheosis of urban landscape design is, in fact, an eclectic assemblage of architectural styles… It would not be inaccurate to describe this space in terms now regularly employed for postmodern landscapes: ‘an architecture of spectacle, with its sense of surface glitter and transitory pleasure, of display and ephemerality, or jouissance’ …

In contrast to the postmodern Western landscape, on a semiotic level the Zen garden is empty; movement is implied, yet stillness is the reality. Saito outlines ideas behind the placement of “principle and “subordinater”, “pursuer” and “pursued” stones in the Japanese Garden (Saito, 1970). The Persian garden embodies stillness as duration with its reflection pools of infinite stillness, in counterpoint to the constancy of noise generated by fountain jets. In the Alhambra, movement from cloister and pavilion, to loggia/veranda, and walled courtyard, varies from containment to strongly axial: movement through creates spectacle, Grand Tour being the goal. (These metaphorical/interpretive design ideas are described in the visual presentation).

Posturbanism, human-needs and spectacle
Posturbanism is “identified as a synthesis of two principle ideas: the city as an analogue of the mind, and for virtual urban space to satisfy immaterial human needs. The contention is that for urban theory to be useful and satisfying, it must direct the integration and extension of the real into the virtual” (Hotten and Diprose, 2003). This paper focuses on one aspect of posturbanism, namely that well-designed real/virtual spaces should satisfy immaterial human needs through their provision of settings and situations.

The range of needs per se may be few and unchanging, but the ways in which these needs can be satisfied may vary markedly over time, or from place to place, and culture to culture. The human requirement for affection, understanding, participation, leisure, creation, identity, and freedom can all be satisfied to some degree by virtual cultural environments. However, some satisfiers are less satisfactory than they appear at first glance, and may in fact have the potential to undermine the genuine fulfilment of needs (Max Neef, 1992). For example, internet relationships/sex may seemingly satisfy the need for affection in the short-term, yet prove merely an addiction (Carnes, 2001). An evergreen satisfier of understanding, leisure, identity, and freedom is that of the ‘spectacle’. Whether a genuine satisfier, or not, the human desire for spectacle is well documented (Cosgrove, D. 1997, Hotten & Diprose 2000).

From panoramic view, to cinematic view, to virtual view
More than one hundred years ago the urge for (exotic) spectacle was satisfied by the 360-degree panorama. Comment states the panorama was one of the most popular phenomena of the nineteenth century. “A motley crowd in search of wanton, enigmatic and rarely denied pleasure would rush to see these spectacular paintings” (Comment, 1999).

In general, the panoramic photograph or painting technique records and simulates comprehensive views of a portion of the earth’s surface, landscape, or built environment (Oettermann, 1997). Between 1787 and 1900, panorama painting was a medium through which ordinary people could access and experience the other. Namely, for those living in the large established European cities, this ‘other’ was life beyond typical mundane existence, a reality experienced by others elsewhere at some other time. Through the panorama, newly discovered exotic colonial landscapes and architecture were ‘captured’ by teams of painters for homeland audiences. An example is “Panorama of the Congo” by Alfred Bastien and Paul Mathieu. The viewer of this period was also
able to gaze upon the totality of significant events in time and space through a single work. An example of this is “Panorama for the struggle for Tyrolean independence in 1809”, by Michel Zeno Diemer. This was the nineteenth century equivalent of “Saving Private Ryan”, with the viewer being transported to a hazardous time and location to experience a situation of spectacular interest in relative safety and comfort.

At the beginning of the twentieth century the still panorama was quickly displaced by film as the means of vicarious experience. With the introduction of television, and more particularly the proliferation of personal computers over the last decade, screen-based media, which satisfy the (instant) human desire for vicarious experience, have become pervasive (Hotten and Diprose, 2000).

**Garden spectacle and movement**

The garden can also be located within an historical framework of spectacle. However, the popularity of the exotic garden has not wavered…until now. With the vicarious representation of garden in cinematic form together with the potential offered by virtuality to provide (instant) gratification of landscape spectacle, the future of the real ‘garden’ is now less certain. We suggest that the garden within human imagination is likely to become the major focus in the future, a state that Riley predicted ten years ago (Riley, 1997):

... vicarious... landscape experience... fantasy landscape or internal landscape narrative...

Landscape scholars have paid almost no attention to this vicarious, internally structured landscape - despite our fascination with deconstructionism, with its tenets of the indeterminacy of the text and the open-endedness of interpretation and its common sense - confirmed contention that such landscape readings will exist and will vary. These internal landscapes might well be central landscape experiences in a person’s life.

Our consciousness as observers may be vastly more powerful in our construction of visual texts than ever imagined. Robert Lanza outlines this dualist dilemma (Lanza, 2007):

...a reversal, of the central mystery of knowledge: that the laws of the world were somehow created to produce the observer. And more important than this, that the observer in a significant sense creates reality and not the other way around... We are living through a profound shift in worldview, from the belief that time and space are entities in the universe to one in which time and space belong to the living. Think of all the recent book titles - The End of Science, The End of History, The End of Eternity, The End of Certainty, The End of Nature, and The End of Time. Only for a moment, while we sort out the reality that time and space do not exist, will it feel like madness.

From this view are we to expect ‘The End of the Garden’?

With the above ideas in mind we have created the following historical list of garden representation for spectacle and stillness. Actual movement to satisfy need for spectacle is noted as well as the (metaphorical) concept of stillness as duration.

Real Gardens and Landscape:
1. Native landscape / authentic landscape / reality (Historical Eastern and Persian garden); Stillness and duration; BC to present
2. Exotic landscape / stolen landscapes / altered realities; Extreme movement; 1850s to present

Artistic and Photographic Representations of Gardens and Landscape:
3. Dreamscapes / artistic landscape / panoramic landscapes in 2D and 3D (for example, sci-fi drawings); Some movement; Panoramas 1800 to 1900

Cinematic Representations of Gardens and Landscape:

4. Classic vicarious landscape / TV and epic cinematic landscape (for example, The Constant Gardener); Limited movement and stillness as duration landscape imagery; 1920s -1950s to present
5. Hybrid vicarious landscapes / blue screen digital landscapes for cinema (for example, House of Flying Daggers / Matrix / Sin City); 1990s to present
6. Screen-based, virtual arena landscapes ‘A’, cinematic-themed gaming arenas that are spin-offs from film (for example, Star Wars); Stillness and instantaneous gratification; 1990s to present
7. Screen based, virtual arena landscapes ‘B’, standard gaming arenas which may have movie spin offs (for example Final Fantasy / Spirits Within); Stillness and instantaneous gratification; 1990s to present

‘The end of the Garden’ – the Posturban future

8. 3D fully immersive arenas / simulated 3D / 360 degree stereoscopic environments; Stillness and instantaneous gratification; Late 1990s to present
9. Immersive virtual "parallel" realities and communities (for example, the Second Life ‘game’ and addictive dreamlands; Stillness and instantaneous gratification; 2000s to present

Towards posturbanism

The posturban garden is more an illusion, as are film or digital gaming arenas or thirdspace hybrid landscapes, than a real artefact. One of the strengths of posturban landscape is that it provides neutral ground: a territory for fusion of peoples (for example, within online communities) beyond the contested, sometimes over-regulated and typically inequitable landscape reality. We contend that posturban virtuality can, in part, satisfy an individual’s need for spectacle. That is, understanding, leisure, identity, and freedom, embodied in examples such as the individual realising/morphing themselves into a virtual person in Second Life (Sobchack, 2000); or as character/player within an alternative internet gaming universe (Irvine, 2007); or as the location for an immigrant to rise above alienation within (an)other place, enabling reconnection to authentic/native communities.

Physical distance to exotic spectacle has been overcome, and reconnection to distant community is now instantaneous. Stillness is the result. So what of the garden? Should real landscapes be reinterpreted with this in mind, seeking out timeless, authentic, and still places of sanctuary? Should real space be informed by new environments derived from film, virtual gaming arenas, and thirdspace hybrid landscapes? In schools of architecture this has been happening for many years as a regular aspect of the pedagogical instruction, directing students away from naïve reproduction of standard/functional types and towards creative processes informed by the realm of vicarious landscape and idea (Diprose and Hotten, 1999).

At one end of the spectrum the result may be (real) recreations of authentic still and timeless gardens reminiscent of the Generalife garden. This approach can be identified in the rustico-modernist gardens of Fernando Caruncho. Caruncho notes that “in order to travel into the future, it is necessary to walk towards the pure clarity of the past” (Cooper and Taylor, 2000). This authentic/recreation garden type may be considered as a site of contemplation and of stillness, in which the mind is free to travel. In contraposition to this, our ‘death of the garden’ proposition suggests the rise of a posturban thirdspace - a place of dazzling speed and diverse garden spectacle. This posturban landscape may include globalised gardens of varied phosphoric movement
embracing the viewer - electric displays of instantaneous gratification resembling Eros (Piccadilly Circus). While the need for spectacle may be satisfied in this realm, the garden is recreated as a restless and uneasy site, inevitably overwhelming the mind. The desires of the designer and the gardener respectively are likely to be expressed and fulfilled within and between these spatially schizophrenic realms. “In today’s electronic space of computerized realities, the sage’s words would fare quite well, for one can hear in them all at once: the practical voice of ancient wisdom, the dissenting voice of postcoloniality, and the visionary voice of technology.” (Minh-ha, 2005). Posturban space is likely to be a world colonised by architects and all those that seek designs and dreamscapes for stillness and spectacle. If that’s the case, we will see you there.

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Biographical Notes
Robert D. HOTTEN was most recently a guest "Professeur Associe" in Paris, and formerly a Teaching Fellow at the University of Auckland. With a Joint Program in Urban Design Masters from the University of California, Berkeley, he has practiced and taught architecture, landscape,
urban design, film, and CAD/CAE/CAM/GIS as a Registered Architect. He presented a paper "From Dreamtime to Quicktime: Panoramas" at the ACADIA conference in Washington, October 2000. Recent work included papers at the SFIA Eco-Wave Conferences, 2001 - 2005, Berkeley, California. He continues to develop sustainable alternatives at his eco living community project in Hawaii and has a highly rated web site in "sustainable architecture", www.aloha.net/~laumana. His personal interests include toying with a "virtual professor" status.

Between 1990 and 2002 Peter balanced his time between architectural practice in Whitford and teaching/research. Over those years he taught architectural design at the University of Auckland and landscape design at Unitec. His theoretical interests include: Design for sustainability; the zone of mediation between interior and exterior, veranda and outdoor room architecture; computer visualisation and landscape including panoramic representation and virtuality and film art and animated imagery.

Peter is past chairperson of the New Zealand Institute of Architects Environment Task Group and was involved in writing and reviewing the NZIA Environmental Policy.

More recently Peter has devoted his energy and enthusiasm to architectural practice and specifically to the integrated and sympathetic design of landscapes and architecture.

Kelly O'MEARA joined the practice as a Landscape Architect / Architectural Assistant, after graduating from Unitec in 2003. His strong design ability and software skills - including the use of ArchiCAD, Artlantis and Photoshop - add yet another facet to the office's presentation abilities.

Kelly's Whitford background gives him an intimate understanding local rural development, heritage and planting. His knowledge of soft landscaping is as extensive as his plant obsession.

Illustrations

Figs. 1 & 2. Reflection Pools, Alhambra and Generalife Garden, Granada, Spain, P. Diprose, 2005
Fig. 3. Jets and Pool, Alhambra, P. Diprose 1995.

Fig. 4. Rock garden, Kyoto, K. O’Meara 2006

Figs. 5 & 6. Zen Garden - Ryoanji, Kyoto, K. O’Meara 2006

Figs. 7 & 8. Contrasting landscapes from “The Constant Gardener”, UK Film Council, 2005

Fig. 9. Panorama of the Irwin Garden at the Getty Center Los Angeles, Robert Hotten, 1999

Figure 10. Rosales Garden, Madrid 1988, F. Caruncho

Figure 11. Caruncho Garden, Madrid 1989
Figure 12. Caruncho Garden, Madrid 1989, F. Caruncho

Fig. 13. Eros, Piccadilly Circus, London

Fig. 14. ‘Holodeck’, CAVE Fakespace Systems 2007
Stillness and Presence in the Performance and Sound Design of 
BioHome: The Chromosome Knitting Project

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Abstract
BioHome: The Chromosome Knitting Project is a hybrid performance/installation incorporating live ‘wet biology’ 
practices in a contemporary biotech display home. It was first presented in August 2006 at the FCA Gallery, University of Wollongong. Procedures such as extraction of plant DNA, culturing of live insect cells and knitting of salmon DNA fibres are used to explore reproductive futures and biotechnologies.

This paper seeks to explore the concepts of ‘presence’ and ‘stillness’ in the performance and sound design of BioHome. Theories of ‘presence’ in performance are examined alongside a discussion of the compositional process involved in this collaborative project between the two authors.

Keywords
Collaboration, installation, performance, sound, wet biology

Introduction
BioHome: The Chromosome Knitting Project is a hybrid performance/installation incorporating live ‘wet biology’ practices in a contemporary biotech display home. The installation features video, interactive sound, live performance and text. Wet biology procedures such as plant DNA extraction and live insect cell culturing are used to explore reproductive futures and biotechnologies. In the context of this performance, ‘wet biology’ is the term used for working with live plant or animal material in the life science (biology) field, including genetic modification of organisms and the creation of bio-products such as DNA fibres and live cell cultures.

Visitors are welcomed to the BioHome installation by a plasma screen video introduction at the entrance (Fig. 1). When the audience enters the installation space they hear a recorded voice outlining laboratory safety instructions over ambient but unsettling music. This music sets the tone for the performance and creates a sense of an insulated environment, a world that might exist just beyond our current reality, in which home and laboratory intersect. Upon entering the gallery the audience sees several domestic spaces: a kitchen tabletop, a bassinette, a chair with knitting and a bed with a screen. It is only when they inspect more closely that this domesticity is disrupted by the intriguing and uncomfortable presence of biotech products, including live caterpillar cell cultures, salmon DNA fibres, pea seedling DNA and IVF hormone products.
The blurring of lines between laboratory and domestic procedures aims to heighten the awareness and discomfort the audience may feel about incorporation of biotech products in our daily lives. They are encouraged to investigate and interrogate these technologies and their impact on human, social and environmental futures and contemporary kinship systems.

The performance includes a number of ‘personas’: a naïve and eccentric ‘housewife’ persona who invites newcomers into the biotech display home, exploring objects and products with a domestic simplicity and innocence; a ‘scientist’ persona who demonstrates laboratory procedures for extracting DNA from snow pea seedlings, and shows how to knit with a sticky white fibre extracted from salmon DNA (Fig. 2); as well as a ‘storyteller’ persona who recounts a fable about The Woman Who Knitted Herself A Child. This paper seeks to explore the concepts of ‘stillness’ and ‘presence’ within the BioHome installation, and how the accompanying sound contributes to these notions.
Stillness and Presence in Performance
The notions of presence and stillness have been an important aspect of both sound art and performance art since the 1960s. Performance theorist Peggy Phelan documents performance/body artist Marina Abramovic’s work *The House with The Ocean View* in the article “On Seeing the Invisible” and describes her work in relation to the intensity and stillness she creates, allowing the audience to create meaning from their interactions with her. Phelan locates Abramovic’s work in the tradition of body art. She notes that the origin of body art involved:

A combination of courage and recklessness – performance artists of the 1970s focused particularly on what happens to the body and mind when thinking is a secondary, if not an impossible, response to the enacted event. Much of this work explored acute physical pain and touched on the elusive horizon separating life from death (Phelan 2004, 17).

According to Phelan, an issue for body artists of the 1970s was an investigation of the body as a medium for art and for life: how can the relationship between the artist and her own body serve as a mirror for the broader drama of the relationship between the individual and the social body?

*BioHome* presents the first author, Catherine Fargher’s responses to the invasive reproductive technologies she encountered in her research, as well as her conscious and unconscious responses to the ethics of reproductive technologies. This was the corporeal material from which the work arose and the issues which it ‘mirrored’. The body-based theatre exercises of Margaret Cameron and Nikki Heywood, discussed later in this paper, allowed the performer to channel this corporeal knowledge and create a work which could then be shared intimately with the audience, so that the body could, in Phelan’s words “serve as a mirror for the broader drama of the relationship between the individual
and the social body” (Phelan 2004, 17). It is this intimate sharing of corporeal presence and stillness, performed behind the persona or mask of performed science (discussed later in the paper), alongside the repetitive and hypnotic soundscape by the second author, Terumi Narushima, which create a place for audience immersion and contemplation of the subject matter.

An extract from Fargher’s research journal reflects this:

During the storytelling in *BioHome*, there is a moment when I feel all faces are not only watching me and hearing the story, but engaged in a shared intimacy. This is an altered intimacy though – it is not one-to-one intimacy – I create a space that is large enough for my audience to share with me. I become a body that can be read, a site of emotions that can be shared. I give this emotion freely, that which Lacan says of love: ‘giving something which you do not have’. I prepare for this intimacy through body rituals in a theatrical tradition: breathing and bodywork, imagery and exercises. That moment of sharing, of contact is a pure space. A huge space. When I am in it, it feels enormous; *it feels still, almost like a meditative space*. It has the certainty of a spiritual space: it is infinite, it is timeless and it is ethereal. In that space I hold the audience. There is a certainty in that moment, which does not exist off stage. This space is heightened at the time of performance, exists only in performance.

To prepare for this performance, Fargher worked with director/dramaturg Nikki Heywood who has a background in movement-based theatre, extensive vocal training and devised performance. The subjectivities of both scientist and housewife, as well as the internal imagery of cellular space were explored during rehearsals using ‘body weather'/butoh techniques.

Another major influence for this project was developed through participation in a masterclass with performance artist and writer Margaret Cameron. This workshop included an exploration of ‘making theatrical meaning’ and the creation of an intimate space between performer and audience. Cameron suggests that putting out a range of images and presenting them with absolute attention to physical presence, and the creation of an intimate space between performer and audience, allows the audience to create their own meaning. Her work with influential American performance theorist and practitioner Deborah Hay, who is influenced strongly by Buddhist traditions of living in the present, has sought to find that ‘present moment’ in the performers’ interaction with their audience.

These methodologies are discussed in the *Meanjin* article, “Ready, Fire, Aim”. Performance exercises that Cameron employs include ‘Yes Let’s’, and Deborah Hay’s ‘One hundred million atoms’ or ‘Ready, Fire, Aim’. These exercises aim to immerse the performer in the moment and create a sense of ‘firing’ in the present through self-awareness in connection to the performance material. For instance Cameron discusses the game ‘Yes Let’s’ with performer/writers Cynthia Troup and David Young, who state:

The Yes Let’s game is fast and furious. Something will happen, a collision of things, a glance, a suggestion, ‘let’s’ which would yield an electrical charge: ‘nzzzt’. We were following these electrical charges almost like checking for life. We got meaning. We didn’t know what meaning. With this kind of work the brief occupies an unconscious level of some kind. The game of Yes Let’s draws on intuitions. It requires a communicative facility that’s unconfined to spoken language (Cameron 2005, 303).

This describes as succinctly as possible, that moment which defies description, the notion of finding the present moment within the work. In the development of *BioHome*, Fargher worked with a number of Cameron’s and Heywood’s exercises to explore her unconscious connection to both her written and conceptual material, as well as a range of objects with which she was working, such as
ChromoKnit dolls, wool, needles and sheeting. Thus the work developed a notion of ‘presence’ and almost meditative stillness within the performance, with which the audience could interface or interpret the work. The action of knitting and the repetitive biological procedures which were also used in performance and on the live video feed created a meditative, repetitive, and grounded act in performance. It accompanied the live sounds that also played with repetitive motifs (to be discussed in the following section).

Most importantly, the project has derived from or been gestated in Fargher’s body in response to her own ‘instincts and anxieties’. Through improvisation techniques developed with Heywood and Cameron, this corporeal gestation shaped the subjectivities and dramaturgical form of BioHome. Finally, in relation to stillness in the corporeal performance of the work, theorist and writer Alison Lyssa alludes to the ‘mask’ of stillness that accompanies the performance in her appraisal of BioHome:

Imbricated in the inspiration, research and development of BioHome is Fargher’s active interrogation of and engagement with both the science of bio-technology and a wide range of contemporary art practices that offer critiques of a science-mediated body / life / future.

Fargher invites the audience to enter the work through multiple channels as if we are at once: (not an exhaustive list) a bonded tour group enjoying our inspection of a radiant, science-solved present / future; … physical bodies wincing as if we are the knitted doll being subjected to clinical invasion; and, participants in an unsettling, even disturbing, trespass into a ‘set’ that is concomitantly domestic space… and a laboratory / surgery, whose alchemical transformations lure us into a black hole where the displaced pain of domestic inadequacy is absorbed and intensified as a medically sanctioned procedure that will solve everything.

Catherine Fargher performs science as a trespass that appropriates the human face. In adopting what the script calls the Scientist Persona, Fargher represents, in performance, the scientist as a persona whose mask is the human face itself. The Scientist Persona becomes an arbiter of human destiny … by remaking the face itself as sophisticated achievement of science and its marriage with public relations. Fargher makes visible, and risible, the self-cloaked face of authority with its patina of certainty and security. At the same time Fargher’s tour-de-force is to make visible through the sheen, the ought-to-be concealed emotions that authority represses, such as doubt, cruelty and fear. It is a well-observed, compelling performance. The precision, coldness and vocabulary of the science of bio-technology collide with the softness, confusion and terror of the ‘natural’ world.

This sense of collision between the scientific procedures and the corporeal or emotional response to those experiences reflects on theorist Michel Foucault’s notions of state control created around bio-political regulation, and the many social and human implications of these controls. Bio-politics was discussed in his lectures to the College de France, Society Must Be Defended, and concerned the biological control of whole populations through regulation of, for example, births, deaths or health. Feminist theorist Elizabeth Grosz also asserts in her recent work In the Nick of Time: Politics, Evolution and the Untimely, that “we need to understand, perhaps with more urgency than in the past, the ways our biologies work with cultural variation that concern politics and political struggle” (Grosz 2005, 2).

The sense of stillness and presence created within the performance is a result of this corporeal response and it is further enhanced by the sound design which is discussed in the following section. It is arguable that the sound content, which is characterised by persistent and hypnotic repetition, creates an ambient environment that heightens the receptive capacity of the audience to become both
still within themselves, and present to the work and the more complex meanings contained within it.

**Music and Sound**

The challenge in designing the sound for *BioHome* was to devise a way to relate DNA sequences with knitting through the medium of music. The sound requirements of the project were twofold: 1. to provide an interactive interface for visitors to manipulate the soundscape of the installation, and 2. to provide a live musical accompaniment to the theatre performance which is presented within the installation space. Knitting is a central metaphor in the performance, highlighting similarities between the use of patterns and stitches in knitting to the basic techniques of biotechnology or genetic engineering, i.e. working with DNA as the ‘building blocks of life’. It is also a metaphor for human reproduction. Much work has been done by musicians collaborating with scientists in the sonification of DNA sequences (Clark); in contrast a less scientific, more homespun approach was taken for the *BioHome* installation.

There is a technique used by molecular biologists to analyse strands of DNA called gel electrophoresis. This process results in a visual representation in which fragments of DNA are separated into bands. To create a unique musical timbre for *BioHome*, these DNA band patterns were ‘reinterpreted’ as overtones of an inharmonic sound spectrum and a metallic, gong-like sound was synthesised using Pure Data (Pd) music software. This timbre was then used to play melodic sequences based on various knitting patterns.

A large number of standard pattern stitches used in knitting have names that refer to nature, such as ‘moss’, ‘herringbone’ and ‘honeycomb’ stitches. The idea was to represent these knitting patterns as patterns in sound. The most obvious approach was to assign random values to the different knitting stitches (e.g. 1 for knit, 2 for purl, etc.) to create simple melodic sequences. The limited number of stitch types, however, resulted in little variation in the patterns so further modifications were made by changing rhythm and tempo, detuning pitches and applying various filters to alter the original gong-like sounds beyond recognition. The results were recorded as short audio samples which then became the musical source material for the installation as well as the live sound mix for the performance.

Through constant repetition, knitting can be a soothing, meditative activity which often becomes a background to some other action that requires more immediate attention in the foreground. As a parallel, the sound design for *BioHome* consists of continuously repeated sound patterns that form an audio backdrop for the installation. A patch created in Pd (Fig. 3) allows visitors to select a number of sound samples to be looped and played back at varying speeds. These sounds vary in length from half a second to 19 seconds and include several samples of the gong-like timbre described earlier (labelled A-F in the Pd patch), as well as sounds recorded in a laboratory (autoclave, biohazard bag, centrifuge, etc.). The speed at which these looped sounds are played is determined by sequences of values derived from three knitting patterns (labelled ‘moss’, ‘herringbone’ and ‘honey’): higher values increase the speed of playback, while lower values decrease the speed; negative values reverse the play back of sounds. It is also possible to control the sounds using the two vertical sliders labelled ‘Modify’ and ‘Volume’ in the Pd patch. The looped playback of different audio samples eventually results in a pervasive, womb-like ambience in which a sense of stillness is achieved through persistent and hypnotic repetition.
Figure 3: Pd patch for BioHome: The Chromosome Knitting Project installation 2006. Terumi Narushima.

During performance, a more elaborate Pd patch than the one shown in Fig. 3 is used to select and manipulate various sound loops live. The music is ‘knitted’ together from multiple strands or layers of sound to create varying textures. Although the music is computer-generated, the sounds have an organic quality that bubbles, splutters and burps. Sometimes it is tongue-in-cheek to complement the humour of the performer’s narration; at other times it hints at a darker undertow of unspoken tensions and emotions that are hidden beneath the actor’s mask as she switches between different scenes and personas. It is during these transitions that the music is used to innervate the drama and suggest the presence of an inner emotional life, as ambient sounds suddenly jolt into the foreground of the character’s consciousness.

**Conclusion**

The synthesis of performance and sound design in *BioHome* and the meanings created through collaboration are a result of research and development experienced through the affective channel of the body. This ‘knowledge’ gained through the body and sensitivity to natural biological patterns has allowed theory and practice to be combined in a manner consistent with other feminist artworks. As Elizabeth Grosz asserts, biology has become an important site for feminist investigation, stating “The exploration of life, traditionally the purview of the biological sciences, is a fundamental feminist, political concern” (Grosz 2005, 2).

According to Grosz, feminist artists cannot afford to defend definitions of nature or the female body that fail to embrace the abundance and variation which biology allows and now entails, especially as our bodies are inherently transformational. The notions of ‘presence’ and ‘stillness’ discussed in the paper are the result of a variety of creative processes based on biological patterns and forms. It is hoped that the collaborative presentation of *BioHome* invites internal reveries and meditations for audience members, thus allowing a multiplicity of meanings to arise.

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Biographical notes
Catherine Fargher has been active as a performer and writer since 1985. She has had eighteen scripts produced for radio, contemporary performance, new media, television and theatre. Catherine has performed widely in cabaret and contemporary performance in Australia. In 1998 she toured with other Australian, UK and New York artists for ‘It’s Queer up North’ in Manchester, Glasgow, Warwick and London as well as WOW Café New York. In 2002 she was funded by the Australia Council New Media Fund for the *Motherload* project, exploring genetic science and human reproductive futures. She has recently submitted a Doctorate of Creative Arts at Wollongong University, developing performance texts from bioethical fables. Her fable *Dr Egg and The Man with No Ear* has been commissioned by The Sydney Opera House Trust for a new media/puppetry production in July 2007. Her collaborative work *BioHome: The Chromosome Knitting Project* will be performed at the Experimental Art Foundation Art and Biotechnology Event in October 2007.
http://www.biohomeproject.net

Terumi Narushima is a Sydney-based composer who writes instrumental as well as electronic music. She completed her undergraduate degree at the University of Sydney and obtained a Master of Music (Composition) from Sydney Conservatorium in 2003. Her compositions have been performed in concerts broadcast on Australian radio and she has also worked as a sound designer/composer for experimental short films which have been screened at festivals in Australia and overseas. Her main musical interests include exploring alternative tuning systems and her sound installation, *Tritriadic Chimes: bells in just intonation*, has been presented at festivals including Carnivale Multicultural Arts Festival at the Sydney Opera House (Australia 2001), MicroFest (USA 2001) and Florida Electroacoustic Music Festival (USA 2007). She is currently doing a PhD in Music at the University of Wollongong with Greg Schiemer as her supervisor.
http://www.biohomeproject.net
The Edge of Stillness

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Abstract
In this paper, I consider what happens when the digital allows us to so slow down motion that we create an ambiguity in which we cannot tell if what we see/hear is still, or very slow, through three cybernetic ideas: control; deciding the undecidable; and the involvement of the observer. It is argued that the distinction that we use in deciding the undecidable, the edge of stillness, is crucial as a pointer to the observer’s involvement, an interaction. This edge is the liminal. The experience is a sort of edgy trance.

Keywords
control; distinction; (edgy) edge; involved observer; liminal; slow/still; trance; undecidable

Starting
In recent years, I have explored an area of experience that I have come to specially love. Although in some respects it has long been available (e.g. in trance and hypnosis), it has become available in new ways through digital technology. In particular, I refer to our ability to slow down “sources” of our experience (particularly sound) and thus to explore their detail. We can hear (and see) an extraordinary wealth of detail and change in sounds (and images that seemed unchanging until we slowed them down. At the same time, the act of slowing creates experiences in which trancelike states become hard to avoid. There is an interesting and powerful, liminal ambiguity between these: the fascination in revealed detail contrasted to the tranciness of the still (the liminal). The liminal is the edge where we distinguish between the almost imperceptible (the sub-liminal) and the perceptible.

Through this paper I wish to understand something of this strange experience by exploring the liminal edge, using three concepts that have been developed in (second order) cybernetics: control; the drawing of distinctions/deciding the undecidable; and the involvement of the observer.

The liminal edge, and playing in this world of cybernetic ideas, is where I like to be.

Introduction
This paper is a personal reflection on an interest and practice based in the ambiguity of the very slow that I believe evokes the liminal. Its source is constructing a certain type of experience, embodied in an art that exists at the edge between the very slow and the still, which has become possible through the control offered by developments in digital technologies.

It is a personal meditation, explored through three intertwined strands.

The first strand is reflection (in Schön’s 1987 (also Glanville and Schaik’s 2003) sense). It is a meditation on these possibilities and experiences, coming from my experience making, and the consequent opportunities I believe they offer audiences.

The second touches on the work of others, in conventional descriptions of the world we inhabit. It introduces developments in digital technology important to this approach, and discusses the constructive source of ambiguity (particularly undecidability) and understanding.

These are illuminated through a third strand, (second order) cybernetics. The power of second order cybernetics is that it recognises boundaries (for example) that are drawn by observers and are
therefore constructed. An examination of the making of boundaries leads to one of the seminal works from which second order cybernetics arose: Spencer Brown’s *Laws of Form* (1968). Drawing a distinction to act as a boundary is also the way an observer constructs and understands. Such boundaries can be considered places in themselves (Glanville 1990), as in my notion of (architectural) zero space and the “thick” wall (Glanville 1988).

Other approaches are possible, leading to different frames and sets of references. I chose cybernetics because I find it informative (helping me understand), and beautiful in itself. Although the concept of the liminal is crucial, this paper is not an academic exploration of the liminal (or the liminoid): rather it is an exploration of experiences and explanations that can be clustered with this concept.

It may help the reader to keep these threads in mind as they weave their own way through this text.

**The Liminal**

At the edge of the imperceptible, there is an area that can be called the liminal. In the liminal, we live in ambiguity, the betwixt and between (see Turner 1986, also Glanville 1988, 1990). We resolve (if only for a moment) ambiguity and its uncertainty by deciding on a threshold. Our decision is personal and made for the moment of its making. It determines where, for instance, the slow becomes the still. The liminal describes the edge we make, and our relation to it: a relation that may be decidedly edgy.

My interest is not in what the artist wants to say, but in post-Cagean work that explicitly welcomes the audience (observer) as the creator of his/her own understanding. Therefore, I welcome ambiguity, and its personal resolution in the liminal.

**Technology**

Many have argued that developments in technology are major forces forming how, at any time, we understand the world (e.g. Gregory 1984).

We recognise that technological developments allow us to investigate and reveal new substance where we had thought there was nothing. Instruments, such as the telescope and microscope, opened up notions that there is vast detail in the emptiness of space, the pinpoints of stars; and apparently uniform, solid surfaces we learn are lumpy, bumpy and mainly void.

So we expect the extra-ordinary technology of the digital to afford us new ways of understanding.

I believe the biggest development deriving from the digital is increased control: we can now copy, exactly, any image within the “grain” of the digital unit, with a vast range of possible modifications—which was previously impossible. The analogue world (pre-digital) allows, in principle, infinite variety. Whereas we cannot duplicate the (infinitely) fine precision of the analogue, the digital gives us (discrete) precision we can copy precisely, at will. We can summarise the difference thus: we trade the infinite variety of the analogue for the precise control of the digital. Digital precision (the grain) can be scaled so the variety is very large: but it is never infinite because its formation is discrete rather than continuous. The effect of the increase in control can be seen most expressively in the drawable-and-hence-buildable forms of some contemporary architecture, previously limited by the difficulty of both duplicating and scaling lines defining forms that were non-Euclidean.

One aspect of increased control is our ability to separate previously linked elements. The analogue link between sound frequency and duration can be broken. In the digital realm, we can alter tempo and pitch independently of each other (e.g. Roni Music’s “Amazing Slow Downer”). We can, in real time, adjust the pitch of singers who do not hit desired pitches (e.g. reputedly, The Spice Girls),
and, in the extreme, recast all aspects of individual sounds (e.g. Celemony’s “Melodyne”), without the result sounding artificial. We can achieve similar results visually by interpolating/extrapolating frames. The digital, here, might be considered the temporal, ephemeral equivalent of a microscope or telescope.

**Slow**

We use technology to extend extremes. Slowing sound lets us reveal minute detail and tiny changes previously inaudible, under the liminal threshold. In terms of such detail the slowed sound may seem full of events, as, when we look into a drop of still water under a microscope, we find it busy with movement and life. We may hear and see detail previously “missed”. This detail may be so unfamiliar we are lost when facing it. Pauline Oliveros (in her deep listening programme, Oliveros (2005)) teaches us to listen attentively without imposing a predetermined pattern on the sounds we hear, to find such detail without digital sensory prostheses (arguably impossible, but we can try).

More interesting to me than unveiling detail through slowing down is the effect of the very slow, which becomes available to us through the digital. Slowing down removes the progression of change from realms we can grasp, allowing us to concentrate on the experience of (and at) the moment. I have noticed long-lasting events become isolated: we lose our sense of pattern, even our ability to perceive change at all. Seeking pattern becomes more urgent and harder at this pace, where we are essentially alien. What does it mean to lose our sense of pattern because change occurs too slowly for us to sense? This is one way to think of stillness.

And so we search to distinguish the slow from the still. We never previously had access to the really slow as an artistic means. The really slow brings us to trance: not the trance associated with insistent rhythm, heartbeat and brain waves, but the trance of slowing down, leaving us uncertain—where we step outside the conventions of our own perception and, hence, of ourselves.

Slowness is not only interesting in sound. Visually, we gain control in our ability to cross-fade and otherwise blend two images, or over time-spans inconceivable before the digital. The mechanics of moving analogue faders makes long, smooth fades humanly unachievable. Now we can take as long as we want. Resulting cross-fades move beyond the perceptible: they enter the sub-liminal, bringing us to trance. The image changes, imperceptibly, and we are left uncertain, outside our realm of competence, trying to distinguish the slow from the still.

Thus we shift to stillness, and the realm of perception. When does the very slow become the still? At what point does slow movement become no movement? The question is technically “undecidable” (see next section, below). Not being able to decide whether sound is slow or still presents an ambiguity. In the end we make a choice of one of the two possibilities (we decide). There is a fine line. Second order cybernetics talks of the act by which we make observations: see George Spencer Brown (1968) and his opening command: “Draw a Distinction”! This distinction, this line, is not a line that can be drawn by agreed mechanism: each of us draws our own line, individually—distinguishes as we distinguish. This distinction is not just where one stops and another begins, but exists in its own right and its drawing is hence recursive (Glanville 1979). To quote Heinz von Foerster: “Only we can decide the undecidable” (Foerster 1991, 2004).

**Deciding**

Von Foerster’s aphorism tells us that when there are equally acceptable answers to some question, and no overriding logical or evidential procedure promoting the acceptance of one rather than the other, only we can make the choice—and make it freely. Where the slow ends and the still starts is such a question. Making one choice does not oblige us to make the same choice again: there is no “natural” requirement for consistency. We chose where to draw the distinction between the slow and the still—there is no “natural” point where we can insist we cross from one to the other.
We may even sense change in the supposedly completely unchanging. La Monte Young and Marian Zazeela’s (1993) installation “Dream House” essentially consists of a Manhattan apartment with a complex, unfamiliar sound generated by a computer programme, playing continuously and unchanged for over 14 years. Yet, when I (and other visitors I have spoken with) listen in it, freezing all the acoustic factors that can affect sound, the sound changes. Is this unchanging sound still, or moving slowly? Does knowing that the sound is generated by a fixed computer program pumping out a stack of Fourrier sine waves really tell us the outcome is fixed, unchanging?12

In my piece “Still” (to be shown at the conference) I have produced cross-fades between abstract, non-representational images so slow they are scarcely, or perhaps un-observable. At no moment can we see change. Yet we become aware change has occurred. After some (how much?) time we are convinced the image is different, but we did not notice it change. As with the movement of the stars, what we see now no longer appears the same as what we saw some time ago.

Even if we try to talk as scientific “observers”, we find we are anyhow involved in acts of distinguishing and observing. This is particularly clear where the slow may be still, and v.v. What is crucial to my concerns is that WE decide. The advantage is explicit recognition of the centrality of experience and the role of the observer; understood to be through what is, conventionally, described as individual interpretation (individual difference). The involvement of the observer is a central theme in second order cybernetics (Glanville 2002).

**Interaction**

In second order cybernetics terms, the decision each of us makes at any moment in the face of an undecidable question is our response to an experience. We have learnt (following Piaget 1955) to behave as though experience is caused by objects in a real world. In this view, experience exists between us and whatever object we take to be its cause—although we construct objects from our experience.13 The distinction we draw derives from the experience we take as lying between us and what we think of as its source object (the betwixt and between of Turner’s liminal (Trubshaw 1995)). Following Piaget, the (undecidable) decision we make is not of the experience (by definition personal) but of where we locate that experience, reflecting the contribution of both myself-as-observer and the (constructed) source objects we have come to believe generate this experience. The decision is thus shared, exists between and is not predictable. In this sense, it is interactive.

Interaction reflects the involvement of the observer, making sure (s)he is always in the position to choose and re-choose. The uncertainty that is part and parcel of the ambiguity demands the involvement of the observer to decide between options (or maintain ambiguity), and to make whatever meaning (s)he will as a result of his/her decision. This view (developed by Gordon Pask in his earliest cybernetic machines in the early 1950s (reported in Pask 1970, 1982),14 and the norm in second order cybernetics (Foerster (1975), Glanville (2002)) contrasts to that proposed by, for instance, semiotic interpretations—where meaning is assumed to be in objects rather than in our understandings (of them).15

This is how I understand my experience in “Still”, where the experience I have is ambiguous; of the still, yet moving slowly. Is it slow? Is it still? And of the detail I find in this slowness that sits edgily in contrast to the trance I can also enter into. I jump between the two, resolving the ambiguity one way and then the other, or I concentrate on the edge, the extraordinary phenomenon of the edge which allows me to choose and re-choose: the choice at the edge of stillness, where I distinguish the slow from the still; the distinguishing (and even disintegration) of trance through listening and watching acutely for detail. I am caught in anxiety and in calm, maintaining further ambiguity in my response. I am betwixt and between. I live in contradiction. I am lost.
The Liminal

Above, I argued it is we who decide whether an ambiguous experience is of (e.g.) the still, or the very slow (which the digital makes possible): the decision is not made for us. I used the cybernetic concepts of control, distinction drawing, and deciding undecidable questions to illuminate this experience. I wrote of the “edge” this freedom to decide brings to our experience—a liminal edge, where we are never sure which side of the distinction to be on.

In this understanding, we (each, individually) draw our own distinctions, wherein personal meaning lies. Making the edge embodies distinction drawing, undecidability and personal choice. It’s where we bring into being,16 moving from the potential to the actual: from the sub-liminal to the super-liminal, via the liminal. It’s the liminal, the edge-threshold we straddle, that does it!

This is the intellectual reason I am interested in exploring and explaining experiences that explicitly require active and continuing participation of the observer. But it is enjoyment of the experience, which in the case of the slow/still is edgy and trancy, that drives this reasoning, as it drives my involvement in the making of the edge in the edgy uncertainty.

The term “liminal” for this sort of edgy edge is a particularly appealing term because it carries with it the notion of the sub-liminal, which can encompass such ideas as that there may be movement yet to be found in the still; that new technology may offer us (as it has in the past) the opportunity to reconsider what still is, as it allows us to individually determine where still begins and slow ends. We may even come to consider that stillness, like silence, as unattainable in the traditional sense, and that we need to re-interpret it—just as John Cage re-interpreted silence (Cage 1966).

For me, this is the value of the edge of stillness. It is the value that allows us to find, within the stillness of the very slow, unimaginable detail—detail without form but with presence. It is the value that allows stillness to enter the transcendental, transcending the stillness of non-motion and the very slow to take us towards that whatever-we-may-call-it where we are, ourselves, no longer distinct. It is the edge that allows either, but also allows both.17 It is the liminal, where consciousness begins.

Acknowledgement

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Endnotes

1 The Oxford Dictionary of the American Language (Apple Computer OS X) defines liminal as follows: 1 of or relating to a transitional or initial stage of a process; 2 occupying a position at, or on both sides of, a boundary or threshold.

2 I am using variety in the technical, cybernetic sense developed by Ashby (1956).

3 This distinction is based on mathematical curves typically used in analogue descriptions, which have infinitely many points on them, and the stepped lines of digital representation. I have been arguing this distinction, and the consequence in controllability, for the last 20 years.

4 There are many examples in the architecture of leading contemporary stars. The best general introduction was the exhibition of Non-Standard Architecture at the Centre Georges Pompidou. See Migayrou, F and Menen, Z (2003).

5 The familiar effect of speeding up and slowing down sound in “novelty records” (e.g. the
Chipmunks) demonstrates the unbroken link between frequency and duration.

6 The appreciation of slowness in this paper should be seen against what Carl Honoré (2004) has written about as the Slow Movement.

7 Oliveros has a special room for deep listening. She runs courses on this, helping us to hear a richness in sound that we had not previously noticed.

8 Perhaps the most influential recent thinker about trance and hypnosis is Milton Erickson. See, for instance, Erickson, M and Rossi, EL (1981). Graham Barnes has written extensively about hypnosis and cybernetics (e.g. Barnes 1994, 2002).

9 There are so many definitions of “still” in the dictionary. Still as quiet, calm; still as without movement; still as frozen sampled from the continuous (still frame); still as in yet; still as up to now; still as continuing; still as un-bubbly; still as the device used in distilling. Here I use still as in the first two definitions.

10 Perhaps the most basic undecidable question is whether there is, or is not, a reality independent of a mind recognising it: how can we know, if no mind recognises it exists? Note that this difficulty does not mean there is no such reality, merely that we cannot know it. Acceptance of this undecidability is the basis from which Ernst von Glasersfeld develops his Radical Constructivism (Glasersfeld 1995).

11 There are also those who build and maintain the undecidable questions. My aim in much of what I do is to create that which explicitly and articulately asks the listener/viewer to decide, to add their meaning rather than to hope for meaning in the work.

12 We can ask how we know it is unchanging, etc. Those are questions for another paper.

13 Thus, in the case of the “Dream House” sound, for instance, we say the experience was of a sound generated by a computer broadcast through loudspeakers.

14 At the very moment of completing this paper I was fortunate to visit the “Maverick Machines” Exhibition in Edinburgh, which features some of Pask’s work in this area, and work of others inspired by Pask. See http://www.maverickmachines.com/ which discusses and shows this work.

15 A consequence of my interpretation is that the art which lasts is that which is (in and of itself) understood as the most meaningless, requiring observers to make all meanings. Otherwise, it is hard to explain how we continue to value some artworks through changes of culture and era.

16 In cybernetic and systems thinking, the system boundary is so central that it is taken to define the system. This assumption is built into Spencer Brown (1968), already discussed.

17 The distinction between a logic of either/or, and one of both/and was explored by Bateson (1987), who argued that we live in a time when our understanding is changing from either/or to both/and thinking. I have developed an example of this in an examination of a five day workshop at Fuschl, Austria, in Glanville (2006).

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Biographical Notes
Ranulph Glanville studied architecture (spending most of the time working in experimental electronic and electro-acoustic music/performance), followed by cybernetics and then human learning. He has published extensively in all three fields. He has taught in Universities around the world. He currently holds a post as Professor of Architecture and Cybernetics at University College, London, and is an Adjunct Professor and Senior Visiting Research Fellow at the Royal Melbourne Institute of Technology University. He is visiting professor at several Australian and other universities. He was recently awarded a DSc for his seminal work in Cybernetics and Design. He has a small, wide ranging art practice founded in musical composition. His hobby is whichever of his interests he is not currently involved in. He is married to the Dutch physiotherapist Aartje Hulstein: they live on the south coast of England. His son, Severi, works in digital post production.
A practice-based research project on Science, Technology, Art and Design [SILENT WHITE AS HELL: INTUITIVE AND EMOTIVE TOOLS with SILENT EMPATHIC FEEDBACK].

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Abstract
This paper elaborates on the theoretical, conceptual, ethical and methodological stakes that are developed by the design of COASTOMIZE!. This design project is a clear-cut example of practice-based research, showing the design of an artefact as well as the design of concepts.

It triggers questions/answers to themes as co-creativity, collective intelligence, mixed reality,… and how science, technology and design can get us involved in this.

The artefact is conceived as a [Silent White] that uses stillness as a [INTUITIVE AND EMOTIVE TOOL (IET)] with a capacity of [SILENT EMPATHIC FEEDBACK (SEF)] - two concepts formulated by its designers to describe the quintessential user-friendly link between such in and outputs as [Sound], [Bio], [Data], [Duration] etcetera. It mirrors Man’s current relationships with science, technology and design. This artificial ambient is essentially [Blanco]. A [Blank]. A non-verbal object and environment, an intrepid [Flash White Thing], a [Silent] as hell.

Practice (design of the artefact) and theory (ongoing reflection) were developed in parallel to tackle the question: ‘how can an artefact explore and express collective intelligence, collective behaviour, collective space?’.

The [Silent White] literally embodies knowledge (from users’ knowledge to professional knowledge) and generates knowledge (through implicit and explicit interactivity and co-creativity). It is simultaneously research input and output, showing the ongoing process of design generating concepts, concepts generating design.

The artefact developed during this practice-based research is a [Blank Chock-a-Full Data Movement], a vehicle to explore landscapes of layers and layers of knowledge.

Keywords
Silent White / Collective Intelligence / Co-Creativity / Practice-Based Research / World Water
The project we discuss in this paper is called COASTOMIZE!. COASTOMIZE! is the collaboration between the free associating designers FLCextended (FLC), the Flemish Architecture Institute (VAi) and the Hogeschool voor Wetenschap & Kunst, School of Architecture [Sint-Lucas] Brussels.

Literally the coast made to measure and to meet your customers needs, COASTOMIZE! is an interactive and ambient set up that will open up to a larger public, notions and dynamics of individual and collective space, individual and collective behaviour, precariousness and the perennial. COASTOMIZE! shows how interactivity, chain reactions and the unpredictable shape shared territories, here spaces of limits (as for example the Belgian coast) in particular and our every daily space in general. COASTOMIZE! questions the roles of design and planning in co-creative processes and illustrates how daily life, science, technology and design can get us involved.

This project builds on FLC’s previous reflective design experiments on how the intentional ruptures of the coastal membrane could stimulate urbanized coasts to pick up energy and to reset when congestion reaches red alert.

FLC’s 2005 project called M.U.D\(^1\) for example displays an interactive coast with its inner loops, catastrophes and singularities. The coastal membrane is intentionally ruptured in the light of the eventuality of flood, of capsularity and hyper-economy\(^2\) and so a new Age is induced: M.U.D, standing combined for [MUD], for [Multi User Domain] and for [Multi User Dimension].

M.U.D dissolves the coastal urban network into a state of positive emergency: changes surrounding the nodal points in the dynamics of current flows and future conflicts, vast flows of undifferentiated data, patterns of information. M.U.D is entirely process; infinitely more than the combined sum of its various selves.

Consequently COASTOMIZE! displays other angles of this interactive coast. COASTOMIZE! is a M.U.D and like M.U.D it is entirely process, and the realm of ongoing serial creation its only reality.

COASTOMIZE! elaborates further on the M.U.D concepts of [MUD]: a hybrid, de- and re-composed state between land, water and air; of [Multi User Domain]: a collection of desiring machines, aggregates of subjective desire, architectures of articulated longing and of [Multi User Dimension]: the ability to respond to simultaneous and even controversy needs, there are no laws, only agreements: a test bed for futurity.
Initiated as a science information project and growing out of concepts like M.U.D, COASTOMIZE! is a practice-based research project that reflects on how science, technology and design can open up other (spatial) realities. It triggers different kinds of knowledge production by mirroring the users’ collective intelligence and co-creativity in (re)shaping shared territories.

[SILENT WHITE AS HELL: INTUITIVE AND EMOTIVE TOOLS with SILENT EMPATHIC FEEDBACK] --- the design of concepts/the design of an artefact.

In the close interaction between the design of the artefact and the ongoing reflection on the core issues at stake in COASTOMIZE!, a central concept emerged, encompassing the ideas of [MUD], [Multi User Domain] and [Multi User Dimension]: the [Silent White], presenting itself as another (mixed) reality continuum. It was in first instance the coming together of the collective intelligence, experience and creativity of the designers that generated this and other concepts. And although each concept that got formulated through design and reflection offers starting points for further elaboration, more extensively grounding in and development of theory is not the first concern here. Generated by the design, the COASTOMIZE! concepts are in first instance further developed, clearly formulated and put in evidence by the design itself (and vice versa). In this paper we want to keep the focus on this practice-based character. This is reflected in the composition of the text below. Different text blocks, explain the key ideas, concepts and features of the project and display the different kinds of writing used during the design process. Basically two stories are told. One is a rather explanatory text on the different concepts. The other is a more explorative text, evoking the lines of thought that resulted in the design of the [Silent White]. As is typical for practice-based research, different narratives, notations, text fragments and images are used to support and enhance the design of the artefact and of the concepts.

[Space of Limits]

The spatial setting of the COASTOMIZE! project is inspired by the Belgian coast. Looked upon from a spatial perspective we define this coastal environment as a [Space of Limits], the ultimate meeting of land, water and air. At the coastline one stands on the edge of the since centuries cultivated (European) land, staring at what’s left of the natural, wild world: the sea.
From the user's perspective, a coastal setting is also a [Space of Limits]. Here one is confronted with how the cumulating of individual and collective behaviour shape shared territories. The desire of every tourist to have his own private ‘sea-view’ results in very particular urban settlements, like the so-called ‘Atlantic Wall’ at the Belgian coast, Monaco towering on its bay, Coney Island in New York... At such limit-positions it suddenly becomes obvious that extreme amounts of hyper-individual behaviour driven by “what I like” and ”what I don’t like” define the use of the space and shape the shared territory.

Many coastal environments are an exploded field of experiences, impressions, stories, references, etc... where the chock-a-full beaches make extremely tangible the limit of this hyper-individual consumer behaviour.

The coast is a clear-cut example of limits: it is as far as you can walk but it is also the border of society, it marks the line between chock-a-full and empty.

This limit-position turns a particular perspective on consumer behaviour: collective behaviour and hyper-individual experiences, triggered by an offer of apparently unique experiences, are confronted with climate worries (rising sea

promenades and populate terrace decks

each arrival shockwaves overcrowded beaches

and unripples to a hovering sun baked nearly

lie still

where to hide a ubiquitous computer better than on the beach mixed with the sand?

COASTOMIZE! is a projection of:

land on land

air on air

water on water

light on light

sight on sight

sun on sun

sea on sea

sand on sand

view on view

people on people

coastline on coastline

This artificial ambient is essentially a [Blanco]. A [Blank]. A non-verbal object and environment, an intrepid [Flash White Thing], a [Silent] as hell.

Its [White on White] noise to signal only revealed [like Malevich’s White Square on White Surface teaches us] by the slight distortions coming into / slipping out of existence between projection and projection merging real and virtual - and not by contrast.
levels), tourist decadences and careless consumption of space.

The coastal environment and all the experiences it embodies is in fact a critical space where, in this case, a large collective meets the limits induced by the meeting of land, water and air. COASTOMIZE! evokes this [Space of Limits], examines how the coastal experience can be made accessible and adjustable for every individual and triggers awareness of the impact of all these simultaneous claims. COASTOMIZE! simulates and stages this coast as a [Space of Limits] from a multi user perspective.

But how can that be?
How can we make the coastal experience accessible and adjustable for and by
1. 1
10
100
1.000
10.000
100.000
1.000.000
10.000.000
100.000.000
1.000.000.000 people?

Each individual approach, communication and exchange defines layers upon layers of knowledge, establishing a vast space of collective intelligence and behaviour punctuated by TYPICAL MOMENTS IN TIME, creating an open sourced game like environment [collective of collectives] with its unique form of RESETS: ‘WHAT I LIKE’ and ‘WHAT I DON’T LIKE’ popping up like pink twin rabbits, coaching our new pattern of [SILENT MAN / HOMO SAX-40 or something equivalent to the SAX-40 silent airplane] wandering, hunting, grazing and gathering identities and experiences out of the shared sea of data, no longer being a human only among other human beings and above all the rest, but from now on, also being animal among all other animals, plant among plants, idea among ideas, object between objects, avatar between avatars, organism between organisms, physiology between physiologies, chemistry between chemicals, etc, etc, the big scale being an enormity of little things. Cool!
How can that be done spatially?
How to trigger collective intelligence by interactivity?
How to evoke and intensify the sense of co-creativity?

[Silent White]

The only way to solve this problem and create a Multi User Domain for collectiveness is to step into a mixed reality continuum. Places of critical limit can be shared territory for large collectives, at the same time as being subject for individual excess, in the merging of the real and the virtual. This mixed reality continuum finds its expression in the [Silent White]. In this [Silent White] everything is translated, converted to data; an endless amount of interchangeable, trans-actable data, creating a white noise. The [Silent White] essentially is a M.U.D environment: a MUD that can dissolve in its different levels of aggregation and re-assemble itself in different combinations; a Multi User Domain as a shared territory that can be used by many at the same time and in different forms; an environment with a Multi User Dimension, having the capacity to be different things at the same time.
Stepping into the [Silent White] of COASTOMIZE! one encounters the highly user-oriented !MY COAST.

!MY COAST in first instance is an environment, a podium-like, a carrier of multiple limit behaviour in a collective [space of limits] and in that sense also ‘model of’ (mould) and ‘model for’ (open) a form of collectiveness. It is based on multidimensional interactivity, fuelled by user generated content.

This [Silent White] shows how science, technology, design and daily life can get us involved in this co-creative world. Here designers, scientists, technologists, users and consumers meet and switch roles.

But how can one enter this [Silent White]?
How can one move in this mixed reality continuum?
How can one see and materialize things in this endless projection of data on data?
How can one create a signal, a pattern in the white noise?
What can be the tools to do this?

Figure 6: FLC2007 IDEAL VIEW/SUPERPIXEL INTERFACE. Copyright FLCextended

TYPICAL MOMENT IN TIME [a white noise turns into your favourite sound] INDIVIDUAL LOG IN / CONTACT [hello, we already met, happy to see you / hello, we haven’t met before, happy to see you / welcome to this interactive coast / feel free to make your personal settings] TELL US WHAT YOU LIKE/DON’T LIKE

TYPICAL MOMENT IN TIME [your favourite sound splits in to samples and samples of surf] MAKE UP YOUR OWN FAVORITE VIEW OF SUN, SEA and SAND [an elementary coast / a combination of land, water and air with only advantages and no discomfort] YOUR OWN IDEAL PIXEL OF COAST [and follow it through what you like / don’t like] SNAPSHOT

TYPICAL MOMENT IN TIME [scenic offer and demand for scene] COASTAL SUPERPIXEL CYCLES [seasonal - tidal - journal - ritual - … versus a large amount of] INDIVIDUAL PIXEL BEHAVIOUR [individual preferential (sub) routines and unpredictable behaviour and] PIXEL RESIDU [flocking, clustering,…]
INTUITIVE EMOTIVE TOOLS (IET) with SILENT EMPATHIC FEEDBACK (SEF)

What is Man’s current attitude towards science, technology and design?

Science and technology nowadays experience difficulties to express their own specific, authentic image. A fissure between science and its image has occurred. Science and technology have become extremely complex fields, evolving through far-reaching specialisation. After the era of the mechanics that one could analyse and comprehend visually, there now is a fundamental [image-fissure], between science and the image of science, between technology and the image of technology. For instance when we look at the desktop clock of our computer, we don’t really want to know how this works. The reference image to a clock with a dial, or to the seventies calendar clock does not at all correspond with the functioning of the computers’ bits and the bytes, searching for the nearest atom clock. Things like the nostalgic wooden inserts in dashboards of high-tech super-performing cars, show us that we
hardly can cope with pure technology, pure science, and pure design.

Our daily relationship with science and technology is one of consumer and consumption. We expect from science and technology user-friendliness. We want user-friendly ‘tools’ that we can understand in an ‘intuitive’ and ‘emotive’ way. We expect the tools themselves to scan us and ‘understand us, to know what we like and what we dislike.

The new understanding of the relationship between science, technology and Man therefore can be characterised by the desire for what we call [INTUITIVE EMOTIVE TOOLS (IET) with SILENT EMPATHIC FEEDBACK (SEF)].

A combined projection of oceans and seas, straights and narrows, riverbeds and lakes is projected like a new MEDI TERRA at your feet.

A WORLD SEA washing and retrieving with every move you make while CAMERAS representing COASTOMIZE!MY COAST connected populations of One up to Millions of Individual People imbedded with basic beach behaviour roar over this distorting WORLD WATER, orbiting a Sun or either its Negative, pursued by the terminator and holding on fanaticlly to their respective ideal views that pilot their personalised SUPERPIXEL of combined SEA-SUN-SAND [only advantages no discomfort] outdistancing as far as possible neighbouring, shadow projecting and view blocking cameras, avoiding taik of stray light and intrusive lines of sight, flocking around the scenes giving weight to the more popular ones, modelling and remodelling thus the total amount of worlds surface water and its currents and undertows of migrating data, shaping and reshaping further and further its overall WORLD COASTAL LINE in time and space: a collective tunnel vision of an interactive coast with its inner loops, singularities and catastrophes versus extreme amounts of individual subjective, a [White as Hell].

Figure 8: FLC2007 MY COAST!WORLDSWATER WITH TROLLEYS. Copyright FLCextended
Hand moved trolleys (one with helicopter view / another a fish eye / a satellite scan / or sonar sub or periscope) hover above this [interactive White] commuting [White Noise] into signal and back into [White Noise], each coastal view into its spatial equivalent and site or network related data: competing views in equivalent seas of stillness, ruptures of the coastal membranes into their sounds of surf, sunsets into shores.

[Silent White] --- conceptual and methodological stakes expressed.

The above discussed practice-based research project elaborates on how interactivity, the (un)predictable chain-reacting of more or less complex individual actions, shape shared territories. It confronts the public with notions of individual and collective space, intelligence and behaviour. It questions the roles of design and planning in such processes and illustrates how daily life, science, technology and design can get us involved on a co-creative basis.

The project’s first role is clearly that of a critical design: triggering people’s awareness about co-creativity by mirroring collective intelligent bodies of environment as extreme amounts of hyper-individual behaviour driven by “what I like” and “what I don’t like”.

Secondly, it questions Man’s current attitudes towards science, technology and design and introduces a new understanding of

Figure 10: FLC2007 COASTAL VIEWS / SPATIAL EQUIVALENTS / MIXED REALITY. Copyright FLCextended

Figure 9: FLC2007 COASTAL VIEWS/SPATIAL EQUIVALENTS. Copyright FLCextended
these relationships: the desire for [INTUITIVE EMOTIVE TOOLS (IET) with SILENT EMPATHIC FEEDBACK (SEF)]. As users we want these tools to show us empathy in the most split second pro-active and discrete as possible feedback way as they silently, joyfully scan our every wish, enjoyment and dislikes.

Finally, it expresses IT and the like embedding awareness into matter: awareness objects, memory materials, reacting/anticipating on their environment. What Buddhism and animism taught us we discovered anew: things have a life, a drive, a soul.

Methodologically it shows how practice (design of the artefact) and theory (ongoing reflection) develop in parallel and how, by designing, concepts are generated that surpass the singular, concrete design project. These concepts act on a more general level and can trigger new design projects (as is shown in M.U.D – COASTOMIZE!).

The [Silent White] artefact literally embodies knowledge (from users’ knowledge to professional knowledge) and generates knowledge (through implicit and explicit interactivity). It is simultaneously research input and output. It is a [Blank Chock-a-Full Data Movement], a vehicle to explore landscapes of layers and layers of knowledge. It throws light on the paradox of Stillness: a [Silent White] as the embodiment of a vast collective of intelligence, behaviour and space. Stillness as the Art of Noise.

1 See also www.flcextended.be and “FLC, Future Conflicts” Young Architects in Flanders 02 (Brunetta, Patteeuw, 2003). FLC [FUCKLECORBUSIER] is an ongoing sequel of designers in free association and has everything to do with the clashes between individuals, the clashing of individual aims, experiences, desires and intuitions into something more interesting than the unique expression of a unique identity and into something more flexible, workable and exciting: a collectivity, not a compromise.

Cases FLC developed: The coming together of designers with their individual backgrounds, motivations and practices naturally made FLC projects evolve around crucial points where everything meets: shared territories no matter size or medium.

What FLC started to do is emphasize in each job, commission or project, possibilities to turn conflicts into positive energy, introducing the imagination of future conflicts over which space can be negotiated, mirrors for collective intelligence.

Future conflict orientated design: FLC is part of this flip-mode society where networking outsmarts bipolar routines, where reality and fiction merge, where references go tactile or extra-sensory but stop being simply visual.

And in this flip-mode era of reorientation in daily life, planning and politics, some very big problems and contradictions emerge. That is why there is a need for more imaginative design.

‘Flood’, ‘Capsularity’ and ‘Hyper-economy’ are three social trends that were picked up by the design team as usable ingredients for the M.U.D project. They provide three original angles to look forward from the existing reality to a possible reality. The ‘Flood’ phenomenon does not revolve solely around the danger of flooding, but round the interaction between water and land and the effect it has on the border area between the two. Capsules are the nodes of a network society. A capsule is an artificial, strictly organised and controlled sphere. In a world where non-places take the upper hand, capsules are an attempt to provide real places. They do this by simulating a parallel reality in which everything is focused on individual experience. In the West the accent is shifting from an oversupply of standardized products to a less material level: that of the idea, the design and the experience. The term ‘hyper-economy’ refers to this vaporization of the economy (Goossens 2007, 37-51).

2 WI/2005/040 COASTOMIZE! is a science information project and interactive event supported inside the Action plan on Science Information and Innovation, a Flemish Government Initiative.

Members of the team are: Carl Bourgeois, Roeland Dudaal, Marc Gods, Michiel Helbig, Arnaud Hendrickx, Pieter Heremans, Nel Janssens, Bram Labarque, Johannes Taelman, Wim Van der Vurst, Kristof Vermeir.

An example of how creative writing processes support and enhance the design of the artefact and the design of concepts can be found in Gods, Marc. “TRANSCRIPT of a reflective design meeting and its process of reasoning” Reflections+3 (Godts 2006, 70-89)

Reference List

Biographical Notes


Carl Bourgeois: Born 1969, Belgium. Masters Degree in Architecture at the Hogeschool voor Wetenschap en Kunst, Department of Architecture, Sint-Lucas Brussels, Belgium, 1993. He worked for several architects but developed a particularly narrow link with Wim Cuyvers and his vision on architecture. Since 2000 he became part of the free association of designers FuckLeCorbusier and since 2002 he has been teaching Mixed Media at the Hogeschool voor Wetenschap en Kunst, Department of Architecture, Sint-Lucas Ghent. Parallel to this theoretical/academic course he set up the design office BARAK (dutch for shed) with engineer-architect Tijl Vanmeirhaeghe. BARAK tries to search a robust, built form which easily resists contaminations and disturbance and at the same time gathers its strength from it. BARAK shows work in de Singel in Antwerp between the 8th of November and the 16th of December 2007.
-Out of GAMUT

Sue Gollifer; University of Brighton

Abstract
Since 1995 I have been significantly involved in curating digital art exhibitions. These include ArCade 1st-5th, 1995 – 2007 the UK’s Open International Biennale Exhibition of Fine Art Electronic Prints, and GAMUT I1997 & GAMUT II 2007. All these exhibitions were linked to the (CADE) conferences. A major retrospective of ArCade was held in the State Museum in Novosibirsk, Siberia in April 2005. All the exhibitions have toured extensively in the UK Europe and Russia. The exhibitions have included work by over two hundred and fifty digital artists from around the globe.

In August 2004, as Art Gallery Chair’04 I curated the SIGGRAPH Art Gallery Show Synaesthesia, in Los Angeles, USA. Over a thousand digital artists submitted work for the show. The final exhibition included one hundred and twenty digital art pieces ranging from 2D, 3D, interactive, installations, multimedia, telecommunications, screen-based, and computer animation.

The aim of this paper will be to reflect and analyse what I have achieved over these twelve years of curating digital art shows. What lessons can be drawn/learnt from any of these exhibitions, particularly ArCade; did I achieve any of my original intentions and objectives? What has been my main function as a curator? Creating these exhibitions through (CADE), has certainly been an interesting experience and I hope in a small way I can be seen an early pioneer and champion of what can be achieved by the use of computers in art and design education.

Keywords
Curating, digital printmaking, authenticity, ownership

Introduction
Personal gesture and ‘feel’ for materials continues to represent significant factors to those who see Fine Art/ Printmaking in the creative arena of fine art, with a combination of technique and concept whatever the medium. This continues to be true even in the advent of the digital age.

The use of digital imaging makes this an exciting, challenging and innovative time to be an artist/printmaker. Digital art practice often suggests an over emphasis upon applications rather than objects, reproduction over authenticity. The cultural shift this represents may blur, remove, or even reinforce boundaries commonly associated with the activity of fine art/printmaking.

Background
The alliance between art and industry associated with the fine art print continues to be close even in an ever increasing virtual world: for several decades a growing number of artists have been involved with computer technology to generate and manipulate images. In 1968 Jasia Reichardt curated an important show which was held at the Institute of Contemporary Arts in London (I.C.A.) Cybernetic Serendipity explored and developed the relationship between technology and creativity. This proved to be a very significant and pioneering exhibition, enabling artists to see the potential that computers had for producing and generating images, and forecasting the prospect of outputting prints from a computer.

Quote from Jasia Reichardt, (1971) The Computer in Art
The Computer is only a tool, which, at the moment, still seems far removed from those polemic preoccupations which concern art. However, even now seen with all the prejudices of tradition and time, one cannot deny that the computer demonstrates a radical extension in art media and techniques. The possibilities inherent in the computer as a creative tool will do little to change those idioms of art, which rely primarily on the dialogue between the artist, his ideas and the canvas. They will, however, increase the scope of art and contribute to its diversity.

Some of the artists in the I.C.A. exhibition demonstrated, for the first time, algorithmic computer-generated art works. Their still images, produced on a computer, were rarely intended to be viewed on a computer. It is only in recent years, with the advent of high-resolution monitors, plasma screens and the distribution of images ‘virtually’ by the Internet, and more specifically using the World Wide Web, that output from a computer has not been an enormous hurdle. Obtaining adequate printed output has been a problem for which solutions have been developed over a considerable time. Initially, they could be made with a computer-driven graphic plotter, a pen moving along a horizontal rod, drawing onto the paper, which was rolled on a vertically moving drum. Each line was composed of very small steps: each step corresponded to a specific instruction conveyed to the plotter from the magnetic tape. Next, there were many types of printers, which could produce patterns composed of letters and other type symbols. Briefly, artists used a cathode ray tube display or television screen on which to draw with fleeting patterns of light, which could be preserved photographically. Later developments in dot-matrix inkjet, thermal wax transfer, electrostatic pigment transfer, dye sublimation and laser-printed photography followed. These devices emerged in parallel with the development of bit-mapped graphics, for which the pixel is the basic component. Few artists in the Sixties had access to such computer or output equipment, or were trained in the specialised programming needed at the time to gain control over the machine.

It was only in the 1980s, with the introduction of the personal computer and interactive graphics - paint/draw applications - that artist-printmakers were able to see the full potential use of the computer as a creative tool. It was clear that new technology would play a significant role in the process of printmaking. It has taken a little while computing to achieve this, in the early 1990’s there was little evidence in the form of shows or articles for students or academics to refer to. When I curated ArCade I, the first International Exhibition of Electronic Fine Art Prints and subsequently ArCade’s and GAMUT it was to address some of these issues.

Although the common platform was and still is Apple Macs the important works of refining and developing the output of computers were just beginning. In the early pioneering days, the technology of output from a computer was a serious problem. Converting the image on the computer screen into a tangible object, retaining or enhancing its richness of colour, detail and texture and status as a physical image. The wonderful image on the monitor bore very little resemblance to the final outputted A4 none archival print. Now at last we have cheap affordable print technology available

The exhibitions were also part of my on going research as to how using new technology could be used in fine art practices to create, on the one hand, a new media and on the other a hybrid link between both old and new technology, creating a convergence of ideas, disciplines and practices. In the late 1980’s, I anticipated that new technology would play a significant role in the process of printmaking and developed and gradually implemented C&IT into the main curriculum on the BA Hons Fine Art/Printmaking course in the School of Fine Art, at the University of Brighton. Computer generated imagery has now developed into printmaking medium in its own right. It is also used in other hybrid forms, to create links with more traditional print processes, such as screen-
printing, where it is used either to generate ideas or to produce laser prints for photographic stencils. Thus allowing a bridge to develop between old and new technology. Now all Printmaking/Fine Art students at the University use the computer in some way for their final degree show exhibition. This may be in the form of text documents, to support their more traditional prints, but now a significant numbers of their shows are dedicated totally to computer-generated prints and often with an accompanying www site.

This was my original mission statement for ArCade I (1995)

An exhibition of original, limited-edition, artists’ prints, which at some stage in their production involved the use of computers to generate and manipulate the imagery. The ArCade exhibition will demonstrate the range of printing techniques now available, both traditional and state-of-the-art. To include a spectrum of styles and images – figurative, abstract, fractal, feminist, apocalyptic, etc. – to reflect the eclectic vitality of the art which has been engendered by digital technology.

Quote from Sue Gollifer ArCade I (1995)

‘This is a particularly appropriate time for such an exhibition: while artists who wanted to work with computers once had to approach large research or commercial organisations for access to hardware, the explosion of desktop colour computers and relevant approachable software has put a dazzling set of visual tools at the service of individual fine artists.

The most recent advances have been in the technology of output: converting the on-screen image to a physical form while retaining its richness of colour, detail and texture. The ArCade exhibition will demonstrate the range of printing techniques now available, both traditional and state-of-the-art.

Quote from Sue Gollifer ArCade III (2001)

‘Although the most prominent platform was – and still is – the Apple Macintosh, the important work of refining and developing the output of computers is just beginning. In the early days, the quality of the printed output from a computer was haphazard. To transform the image on the computer screen into a tangible object, retaining or enhancing its richness of colour, detail and texture as a physical image has been extremely difficult. The lustrous light-formed image on the monitor has often borne little resemblance to the final A4 non-archival print output. At last, we have affordable print technology available, which has helped to develop the digital process into a printmaking medium in its own right. . It is also used in other hybrid forms, to create links with more traditional print processes, such as Screenprinting, Lithography and Etching, where it is used either to generate ideas or to produce laser prints for photographic stencils. New colour-print technology also enables the artist-printmakers to make crucial decisions about scale and underlying surface for their images.
I hope that ArCade III demonstrates the shift from a celebration of the digital process, and an introductory survey of the available spectrum of styles – represented in the first ArCade – to concentrate on technical and aesthetic progress within a discipline continuous with the traditions of printmaking. To draw a distinction between computer graphics, an area of work which by its nature is readily reproducible and highly visible to the public, and the less frequently seen digitally-generated fine art print, which has presence, texture and status as a physical image’.

Quote from Sue Gollifer ArCade IV (2003)

‘Since I have been curating the ArCade exhibitions, questions such as the of longevity and the light-fast properties of the inks have now broadly been resolved, and digital prints are now entering museum collections. In addition, the cost of high-resolution printers has been dramatically reduced, making this form of printing available to students and artists alike. Furthermore, the new generation of printers allow for a wide range of substrates to be used, from hand made paper through to plastics’.

New colour print technology now enables artists to make crucial decision about scale and underlying surface for their images. Just as the choice of tools affects the art that is produced, so does the surface on which it rests. The digital artist can now choose to print on archival watercolour or etching papers; or to produce the image as a large canvas or as plastic poster or billboard, enabling creative development with an emphasis on physicality.”
Current issues within contemporary art practice and the growth of works of art readily available on the World Wide Web, blur the distinction between 'original' and 'reproduction' and often suggests a growth of work rather than objects, reproduction over authenticity.

Quote from Margot Lovejoy from her book *Art & Artist in the Age of Electronic Media*

‘Photomechanical reproduction raised questions about the ‘uniqueness’ of copies as art, thus undermining the existing function of art not only because it could provide visual reportage, but because it threatened the aura of the handmade object which relied on the specialised skills of the artists.’

This also raises one of the crucial issues in the field of computer-generated art: the intangibility of the artwork. The work is essentially a freely available signal, rather than a visual artefact, which can be packaged, marketed and sold. Another issue is that of authenticity: who 'owns' it- does it even exist? Computer-aided art in its purest form is not concerned with artefact but with communication and interaction, thus raising issues concerned with the ontology of the art object and the identity of the artist in relation to the work. Can new media be considered within a fine-art framework, or should it be considered as a separate discipline? What are the specific aesthetic challenges of exhibiting digital media and are the various institutional frameworks addressing these challenges?

The challenge for Printmaking now is to move on from the legacy of traditional print to a broader definition of its possibilities, be they in the field of art in public spaces, other arenas, the traditional gallery or on the web, opening up new areas of freedom and diversity and establishing a unique repertoire of aesthetic tools. But even beyond the appropriate uses of new technology, the challenge to Printmaking as an art form is clear it can remain purely a collector's specialism, a niche taste on the fringe of the art world, well removed from the avant-garde or it can fully engage with the world as it exists.

However, the Fine Print world still remains deeply conservative, at odds with the instant transmissive digital image on the Internet and the endless identical reproduction open to revision,
evolution, collaborative manipulation and cross-disciplinary utilisation via the Internet in a vastly expanded creative domain.

The challenge now is to move on from the legacy of traditional print to a broader definition of its possibilities, be they in the field of art in public, art in the gallery or on the web. Creating a synergy between processes old and new; opening up new areas of freedom and diversity and establishing a unique repertoire of aesthetic tools to do what they have always done....

Quote from Richard Hamilton in his catalogue that accompanied his exhibition held at Alan Cristea Gallery, London 1998.

‘A medium need not sit in isolated purity. It has always been my contention that the first objective is to achieve a compelling image and that aim demands a felicity in its implementation. There is no law that forbids paint and photography from combining on a single surface or that requires that silkscreen can never benefit from a liaison with collotype or offset or even etching.

In accordance with my practice of setting no limits on subject matter, nor stylistic languages of expression, I see no virtue in circumscribing the technical means of realisation. The image will always be more important than the rationale of its execution.  

An example of new opportunities to exhibit and display work was shown in the SIGGRAPH Art Gallery Show Synaesthesia, which I curated in August 2004, as Art Gallery Chair’04.

Quote from Gollifer’04

‘This year’s theme Synaesthesia demonstrates how artists can excite and stimulate the senses using technology to create art that ranges from low-tech digital plotters to high-end computer graphics and animation. It also features work from both well-established and younger contemporary artists’

(Synaesthesia is the phenomenon in which the stimulation of one sense modality gives rise to a sensation in another sense modality. The term “synaesthesia” originates from the Greek syn (together) and aisthesis (perceive). The most prevalent form of synaesthesia is “hearing” music or vowels in colour).

The exhibition showed work by visionary artists in all areas of digital art that stimulated the senses, including 2D, 3D, interactive techniques, installations, multimedia, telecommunications, screen-based work, and computer animation. The viewers to the Art Gallery were encouraged to see, hear, and touch the art, new ways of experiencing art and an opportunity to be engaged with the artwork itself. The work was displayed in various ways including LCD and Plasma screens; denying the physicality of the artwork in favour of light omitted transmissions.
Most recently I have been called upon as a jury member for international digital art shows. Often I view work totally online selected from digital files or websites; where again there is little notion over its means of production, its size, scale or physicality. Is this an appropriate means of validating and selecting work? What if the work is a collaborative venture between the technologist and the artist? Who has ownership over the work; can it be seen as an original? Which raises issues of copyright and digital surrogates. This also raises important business and contractual issues, such as the need for written creative partnership agreements, freelance or employment contracts, including clarification of one's own intellectual property rights in such joint ventures.

Indeed currently the role as a curator doesn’t end with the exhibition of existing work, it can also consist of further work, as in a virtual museum, plus providing opportunities for new activities such as curating digital archives, networks and collaborations. Digital imaging and digital archiving opens up the opportunities for providing wider access to the world's artistic and cultural heritage. Museum images and information in digital form can also be distributed over world-wide or local networks and has the potential to change the nature of teaching and research, offering the potential for developing new audiences and broadening cultural appreciation both for recreation and lifelong learning.

In conclusion
Computer-mediated fine art/printmaking offers the possibility of generating ‘radically new’ physical, aesthetic frameworks. Conceptually print has once more become relevant.

DIGITAL ART MUSEUM (DAM)
http://www.dam.org/gollifer/

ArCade
http://creativity.bgsu.edu/classes/Sp04/ARTC400/arcade/

SIGGRAPH Art Gallery’04
http://www.siggraph.org/artdesign/gallery/S04/
Biographical Notes
Principal Lecturer in Fine Art, the Course Leader for the MA in Digital Media Arts, and MA in Printmaking and Professional Practice.

She has been a professional artist/printmaker for over 30 years, regularly exhibiting worldwide with her work, which is owned by major international public collections. An early pioneer as a computer artist with her primary research into 'the impact of new technology within the practice of Fine Art’

Since 1995 she has played a significant role in the conference CADE and has been the curator at ArCade which accompanies the conference. In 2004 she was appointed the SIGGRAPH Art Gallery Chair in 2004 the first European to hold this significant position.

She serves on a number of National and International Committees including a Directorship of the Design and Artists Copyright Society (DACS), UK, and the College Arts Association (CAA), USA and the Assistant Editor of Digital Creativity.
Evaluating quality practice-led research: still a moving target?

Lelia Green; Professor of Communications, School of Communications and Contemporary Arts
Edith Cowan University

Abstract
This paper compares and contrasts the evaluative regimes of the UK's Research Assessment Exercise (RAE) and Australia's (forthcoming) Research Quality Framework (RQF). It considers their foreseeable futures; and the fact that each framework is scheduling a 2008 data collection and evaluation. Interestingly, the shared commitment to evaluating the quality of research has, in both countries, opened a space for consideration of 'non-traditional research outputs', including those created by practice-led research in the Creative and Performing Arts. In the UK this recognition has led to the inclusion of practice-led research in the RAE since 1996; in Australia such recognition is about to happen for the first time in a sustained and rigorous way.

Paper
This paper ties somewhat loosely into the theme of the BEAP-CADE conferences by arguing that the quality of practice-led research is the still centre of a hotly-contested debate around the recognition of practice-led methods as a way to achieve rigorous research and robust outputs. Whilst people generally agree that practice-led research has quality and produces new knowledge – and this is implicit in the recognition of practice-led research projects as appropriate vehicles for some higher degrees by research – practice-led research has often been dismissed as not generally contributing to research quantum. This paper takes the quality of some practice-led research as the point of stillness in the eye of the storm which is raging about appropriate policies and practices when it comes to evaluating the quality of creative arts research in the UK and Australia.

Both Australia and the UK stand poised at the brink of a major assessment of the quality of research funded in each country by the public purse. In the UK, after 20+ years of qualitative assessment, the Research Assessment Exercise (RAE) is operating for the last time in its current form. It is about to be replaced by ‘lighter touch’ assessment as a way of answering arguments about the cost of the RAE process, assessed as GBP 77M (RQF 2006) and, partly as a result of that cost, the temporal gap between assessments and a perceived lack of responsiveness to changing circumstances. As an indication of this unresponsiveness, the most recent RAE was in 2001, with funding implications flowing from 2002 through to the present day. The world – and research about the world, its arts and its cultures – has changed dramatically in the course of those years yet the funding decisions made on the basis of the 2001 RAE continue to resonate throughout the UK’s higher education system. A more incremental regime which responds appropriately to changes in circumstances has now been promised.

The RAE and the RQF
For the UK, the experience of the RAE was to a large extent one of make-or-break. Members of Panel O, for example, protest strongly that their role was simply to assess quality: they had no say in the funding model that eventually flowed from the deliberations. For institutions in the UK – and in their footsteps, in Australia – this creates huge uncertainty. Is it better to include a larger cohort of staff and outputs for evaluation, or is a smaller, higher-quality submission the way to go? In the UK, the answer turned out to be ‘smaller/higher quality’. No funding was made available to institutions rated at 3 (where 5 and 5* were deemed to be internationally excellent and 4 was deemed to display “national excellence in virtually all activity with some evidence of international
excellence”). As the Vice-Chancellor of Newcastle commented after the outcomes and the subsequent white paper (Edwards, 2004):

> It is quite possible, and indeed there are many examples, of individual departments being rated Grade 4 which actually contain a larger number of staff who are internationally excellent than a small department rated 5. The White Paper is wrong to describe a unit scoring 4 in the 2001 RAE as a “non-research intensive department”.

In the event, 80% of Panel O funding went to the 5 and 5* rated departments with the remaining 20% shared by departments rated 4 (Brown 2007). Overnight, a number of highly productive and well-thought-of UK research departments, judged to be nationally excellent, lost all their government research funding. Five years later it has not returned.

Times in Britain are changing, however. UK Sciences – and this will look familiar to Australian academics – face a funding model post-RAE 2008 based on an annual collection of data, driven primarily on a quantitative and indicative basis using a combination of: bibliometrics; research income; and graduations of higher degree by research students. In fact, the UK is moving quickly towards the research evaluation protocols that Australia seems keen to relinquish. When I discussed this with Paul Hubbard, a policy maker in the Higher Education Funding Council of England (HEFCE), and the manager of RAE1996 (Hubbard 2007), he commented that the mission of the RAE had been achieved: quality was the first and foremost thought when it came to assessing research and this would continue to be the case, even when the funding drivers changed to reflect cruder, quantitative, evaluations. According to Hubbard, the conclusion that had been drawn was that UK research can now capitalise upon success and move towards a less costly, more frequently utilised, evaluation system.

The UK’s Arts and Humanities researchers, however, were less keen to embrace convenience. Instead, they argued successfully that bibliometric data were much less appropriate and reliable for their research outputs than they were for the scientists’. Some UK research areas consequently have until 2013 to come up with a ‘lighter touch’ formula for the measurement of quality which – according to opinion leaders such as Brown – is likely to be a system of “peer review informed by metrics”. Peer review will remain important given that the acid test of quality research is that it achieves one or more of:

- The production of new knowledge;
- The recovery of lost knowledge;
- Testing the limitations of existing knowledge;
- Popularising complex knowledge and
- Building a knowledge infrastructure (Brown 2007).

Metrics may help evaluate quality research, but peer review remains indispensable when it comes to gauging the expanding of knowledge.

The UK RAE and the Australian Research Quality Framework (RQF) systems are both described as being future-driven: not retrospectively valuing past behaviours, but identifying and rewarding the seeds of potential. The University of Newcastle’s response to the UK Government’s White Paper (Edwards 2004) indicates how fraught the judgement calls can be, however. “Many units graded 4 in RAE 2001 may have structured their submission because they consciously flagged the high quality younger researchers being developed as future research leaders. Highlighting this succession planning was particularly encouraged by HEFCE”. The implication is that these institutions might have scored better had they excluded their fledgling leaders and relied instead upon the established
old guard. The politics of the submission are clearly crucial: following guidelines is no guarantee of playing the best possible game, especially when not all the rules and interpretations are publicised at the outset.

There is a significant difference between the RAE and RQF systems in terms of the information available to support this kind of political decision making, however. The “panel criteria and working methods” for Panel O of the RAE (covering sub-panels 63—7: Art and Design; History of Art, Architecture and Design; Drama, Dance and the Performing Arts; Communication, Cultural and Media Studies; and Music [RAE 2006]) run to 90 pages and were released in January 2006, after extensive consultation, for a data collection deadline in 2008. In contrast, the full guidelines for the RQF Panel 13 (Creative Arts, Design and Built Environment including Performing Arts, Visual Arts and Crafts and Cinema, electronic arts and multimedia: RQF Panels 2006) are not expected to be released for consultation until at least July 2007 for a data collection deadline of 30 April 2008 (FAQ 2007).

As can be appreciated, the unknowns facing academics in the UK seem akin to certainties-set-in-concrete in comparison with the fluidity of the situation in Australia. The yet-to-be-determined issues concerning the RQF are legion, and for a number of reasons:

Firstly, the RQF has had two starts to life. Education Minister Brendan Nelson set the ball rolling in May 2004 and recruited the UK’s Sir Gareth Roberts to head up the ‘Expert Advisory Committee’ and develop the detail of the quality framework. Not surprisingly – given that Sir Gareth had led the UK Government’s 2003 review of Research Assessment – the model that evolved was closer in feel to the UK’s RAE than to any alternative model. As it so happened, the RQF Expert Advisory Committee report was handed down at the same time that Minister Nelson moved to Defence; and the Education portfolio was transferred to Julie Bishop. Minister Bishop commissioned an ‘implementation’ phase and the RQF ‘Development Advisory Group’ was formed, chaired by Australia’s Chief Scientist, Dr Jim Peacock. To those affected, this new committee rewrote many matters that had seemed settled, and put the whole structure into contention once more.

Secondly, as well as being contested ground within the ruling Coalition party, the RQF has become a political football between the Coalition and its opposition, the Labor Party. Indeed, the Labor Party has said they will scrap the RQF if they win office. Since there is an election due before the end of the year, and since the opposition has recently been leading in the polls, a change of government is a significant possibility. Even so, the Labor Party has stopped short of supporting a return to the status quo (where university research is funded in proportion to publications, grants, patents and higher degree by research completions). Instead, Labor has indicated that they too wish to assess the quality and impact of publicly-funded research as part of the allocation of future monies: just not through the use of the RQF. Unfortunately, with a January 2008 deadline for an ‘Expression of Intention to Submit’ for each RQF portfolio (and there are nine possible such portfolios in ECU’s Faculty of Education and Arts alone), and with those portfolios due to be lodged for evaluation between March and April 2008, most of the preparatory work will have been completed before the outcome of the election is known, and prior to any possibly-new Education Minister calling the process to a halt.

Thirdly, as previously indicated, the guidelines for the RQF are a work in progress. At the time of writing (May 2007) the RQF Specifications remain “in draft form until the completion of sector consultation, Reference Committee endorsement and Ministerial approval” (FAQ 2007). Government-funded RQF pre-implementation trials are underway, supposedly to test the RQF submission guidelines. The RQF guidelines were to be examined in the context of complex areas,
such as claims for the quality of non-traditional research outputs; and/or cross-institutional research groupings. The trials were due to be completed in early May. As it happens, the trial timelines have been extended: their original timeframe has run through to completion without the draft specifications (which they were designed to test) becoming available. Once the trials are finished and the results known, the RQF specifications will be refined and offered for comment. The process promises to become protracted. (This is one of the few certainties in a morass of unknowns.)

Fourthly, the RAE has – until now – continued unchallenged under both major UK political parties, and there has been a confident expectation of survival or adaptation within accepted (and consultative) frameworks. There was general agreement that the RAE could learn from history and be improved with each iteration. Given that ‘quality research’ has been assessed in the UK for two decades or more, and the higher education sector has engaged in a spirited dialogue with the government and the funding bodies as the assessment exercise evolved, it is hard to find parallels with the current RQF scenario.

Fifthly, the RQF aspires to judge not only quality, but impact (‘a world first’: but why has it not been attempted before?). The system also has an each way bet on quantity as well. The evidence portfolio, as near as can be deduced in the absence of firm guidelines, is ‘cluster specific’. Each cluster tends to be located in one institution – although cross-institutional clusters are one of the areas to be investigated in the pre-implementation trials – and is reported upon in terms of RFCD codes (research fields, courses and disciplines). In this context it is almost irrelevant that these codes are accepted to be entirely out of date (excluding as they do such new areas of scholarship as ‘Creative Writing’) and are currently under review by the Australian Bureau of Statistics with the results of consultations due in 2009 (CHASS 2007). In any case, every research cluster creates an evidence portfolio which includes quantitative data on the number of researchers involved in the group, grants won, research students graduated, dollar value of competitive grant income, etc and a 10-page statement from which the impact of the cluster will be judged. This will largely be done through the details of up to four impact-related case studies. Additional to this context statement, each researcher associated fully with the cluster will list all their research outputs for the data collection period (2001—6) as well as, assuming that the researcher is ‘RQF-returnable’ (definition and implication still not crystal clear), the four best-quality outputs for that individual. In combination with the other quality returnable-outputs, these four pieces of work will be assessed using an accessible digital repository (requiring a whole separate set of ongoing trails and evaluations) to determine the panel’s quality judgement relating to the cluster. There are separate and even more complex rules for researchers who contribute to two clusters (only recently established as the maximum permissible spread).

Given these many issues and concerns about the RQF, it is to be expected that Australian academics are despondent. This might especially be the case with those from the 29 universities that garner approximately one quarter of government research funding (as opposed to the ‘Group of 8’ which receives the lion’s share). There is extensive anecdotal evidence of a flight of research talent from the ‘Group of 29’ to the ‘Group of 8’. The poor effectiveness of anti-poaching regulations that try to prevent richer institutions capturing the productive research staff of less-well-funded universities is only one talking point, however. It seems that many academics are interested in a process that allows potential pockets of research excellence to claim recognition – to some extent, without regard for their location but upon their own merits. Resilience is an unpredictable quality and the interest in the unfolding RQF process is tangible. It is not only that the RQF is proving difficult to treat reverentially (and can thus sometimes be construed as fun): there is something exciting for many of us about discussing the nature of research, and what constitutes quality and impact. Interestingly, and of particular relevance to CADE, the debates are particularly intense around the the methodological framework of practice-led research; the research outputs of Visual, Performing
and Creative Arts and the RQF’s inclusion of Panel 13: Creative Arts, Design and Built Environment.

**Practice-led research in an RQF environment**

Comparatively, Australia lags behind equivalent nations in the acceptance and treatment of practice-led research (Green 2004, 2006). Apart from the evaluation of Creative Doctorates (typically comprising a thesis that takes the form of a creative work plus an exegesis or written exposition), there is no widespread experience within Australia’s academic community of the qualitative assessment of research outputs of practice-led methodologies. In Australia, practice-led research is not constructed as contributing to universities’ research performance. Instead, research performance in the tertiary sector has been overwhelmingly assessed via quantification of publications and research income. The tiny proportion of central funding flowing from the successful completion of higher degrees by research that use practice-led methods has a negligible impact on the sector. The RQF “offers an immense opportunity for those who advocate – and those who use – practice-led research. For the first time in Australian research history, practice-led research has been allocated an arena in which its unique approaches and advantages can be appropriately explored” (Green 2007, p. 5).

Although promising, this situation stands in stark contrast to that in the UK where the RAE has included practice-led research outputs since 1996. UK systems have been evolved to develop and refine the handling of these non-traditional outputs and additional funding has been made available that has effectively hot-housed conceptual work on the methodological rigour of practice-led research (eg PARIP 2006). Further, plans for the treatment of practice-led research in the 2008 data collection (RAE 2006) are well advanced and informed by feedback on the 2001 data (RAE 2001). The take-home message is that the UK has developed robust confidence in practice-led research methods to the extent that 47% of eligible UK Art and Design academics made submissions to the 2001 RAE – more than double the proportion characterising other disciplines (Rust & Mottram 2007). Such inclusivity in research culture encourages the promotion and recognition of diverse research methods, projects and outputs. In turn, practice-led perspectives enhance the strength and vitality of UK research.

At the point that practice-led research outputs were first included, UK higher education institutions already had 10 years’ experience of this kind of qualitative research assessment (the Research Selectivity Exercises in 1986 and 1989 preceded the RAE), so the demands on the sector to develop new ways of validating research were incremental. The submission of practice-led work for assessment in 1996 allowed continuous learning via: exposure to accessible repositories of a range of practice-led research claims; the feedback of panels of expert reviewers; and, the refinement and restructuring of research proposals and practice to address the required indicators. Even so, 5 of the 7 areas identified by HEFCE as areas of research weakness requiring additional resources for development fall within the RQF’s Panel 13 discipline areas of the Creative Arts, Design and Built Environment (Cunningham 2007).

There is an important difference between the work to be done for the RQF Panel 13, and that required for Panels 1-12. Participants in Panels 1-12 already share accepted protocols for the recording and evaluating of research outputs falling within their relevant RFCD codes: the current endeavour for leaders in these research communities is to re-visit assessment practices within the context of the RQF. In contrast, academics in Panel 13 have no shared experience of peer review of their practice-led outputs and need to develop these understandings in tandem with establishing ways in which these protocols can be related to the RQF framework. Consequently, the RQF provides an Australian context in which the issues raised by the evaluation and recognition of practice-led research become pressing and critical.
All Australian academics active in quality research are engaged in learning about, shaping (and second-guessing) the RQF process over the 2008—14 period. (Assuming continuous Coalition government, 2014 is currently gazetted as the second Australian RQF round: Bishop 2006.) Academics involved in practice-led research will also be carrying out a parallel engagement with issues relating to the validity, rigour, recording and assessment of practice-led research outputs. Indeed, this discussion is well under way (for example, the Carrick Institute has funded some research concerning teaching and assessment in the area, and the Hatched ’07 Arts Research Symposium partly addressed these issues [Green 2007]).

In terms of Electronic and other Performing and Visual Arts in particular, and practice-led research in general, academics start from a situation where fifteen years of Australian discussion and engagement (eg Richards 1995, Strand 1998, Wissler 1998, Wissler et al 2004) have failed to get non-traditional outputs characteristic of research in creative fields measured and rewarded as part of the university sector’s research output. Australian academics are being asked to participate in the evaluation of the quality and impact of research that has been nationally constructed as ‘not really’ being cost effective to measure.

The use of peer review to assess practice-led research constitutes a huge investment of resources in evaluative processes. Indeed, this was the primary reason given by the Australian Vice Chancellors’ Committee for the non-inclusion of such outputs in previous Department of Education, Science and Training assessments of research quantum. The significance and importance of the qualitative assessment of research is evident in the extensive changes made between each round of the UK’s RAE. Since 2006 (RAE 2006), following discussion with the sector, a 12-point evaluation framework is to be applied to all research outputs – traditional and practice-led – in the Creative and Performing Arts areas. The evaluation framework is driven by the 70% weighting to be applied to the outputs themselves (RAE 2006, p. 20), but also addresses research environment and esteem:

<table>
<thead>
<tr>
<th>Research outputs</th>
<th>Significance</th>
<th>Originality</th>
<th>Rigour</th>
<th>70%</th>
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<tbody>
<tr>
<td>Research environment</td>
<td>Strategy</td>
<td>People</td>
<td>Structure</td>
<td>20%</td>
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<tr>
<td>Esteem indication</td>
<td>Recognition</td>
<td>Influence</td>
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In a further departure from the 2001 RAE, higher education institutions will not be allocated a single grade, but will be assessed according to performance against a continuum of four benchmarks: world leading; internationally excellent; internationally recognised and nationally recognised. The upward revision of these standards (‘internationally excellent’ was the highest accolade in 2001) is attributed to the high quality of work offered for evaluation in the last RAE round where over half of the inputs assessed in these fields were judged to reach international excellence. Results for both Research outputs and Research environment will be represented by a continuum (eg 30% world leading, 30% internationally excellent, 20% internationally recognised, 20% nationally recognised etc), whereas the Esteem indication will be assigned a single value. These kinds of refinements are unimaginable in the current RQF context.

Haseman has argued (2006) that practice-led research constitutes a new methodology alongside quantitative and qualitative research. Such debates will have far more purchase once Australian researchers have expended the work required to integrate practice-led research within the panoply of accepted research methods. With a world looking for new answers to established research questions, and with pressing requirements for developing integrative and transformative understandings in social, cultural and environmental contexts, we cannot afford to ignore practice-led research methods. Indeed, it maybe that the kinds of perspectives that can be generated from
practice-led approaches might have disciplinary impacts well outside the certain value to be derived by Creative and Performing Arts research clusters.

The stillness of humanity amidst the hustle, bustle and speed of the electronic – the motivating theme for the BEAP/CADE conference – may yet prove a useful metaphor for the stillness of the qualitative evaluation of practice-led research outputs amidst the confusion and competing demands of the RQF. We can only hope that we will not still be chasing a moving target this time next year.

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**Biographical Notes**

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Digital Daydreaming as Stillness: a ‘disappearance’ from the everyday into the art

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Dr Barbara Rauch; Chelsea College of Art & Design, University of the Arts London

Abstract
As researchers and practicing artists we are currently collaborating in an area where our interests merge - the associative thinking apparent within the dreaming and the conscious mind. With Rauch as Ms Dream and Harrison, Ms Real, we have explored a conceptual co-joining into one mindset through a number of projects, including Physical_Chat 1 and 2, and are currently working on Physical_Dream, which involves the possibility of ‘flocked’ thought trails and dreamscapes. We are interested in weaving together the conscious and the subconscious, the rational and the emotional, the awake and the dreaming brain using computer technology in our attempt to compound a creative mind. And wish to present to you our ideas to date.

Contemporary understandings within our separate interests have enabled us to meld these binary mindstates via the interim position of the ‘daydream’, in which one is neither awake nor asleep. We see daydreaming as the dovetailing of dreams and real-take into an holistic understanding of a compound thought arena. It is a conceptually suspended duration of time, a liminal space at the threshold between consciousness and unconsciousness. A stillness of being, an interruption in our daily life flow of focussed activity, that can be paralleled with Virilio’s ‘moment of inertia’ and state of ‘picnolepsia’. We would like to put to you that the daydream is a ‘stillness of duration’ and argue that it could be a necessary and positive attribute to modern life in our technocratic culture. Specifically for an artist concerned with a viewer’s experience of their digital work.

Keywords
Daydreamscapes, thought-trails, free time, dreaming and emotion.

Introduction
Within the global village we are nearing a position of continual surveillance. Where can we go to avoid our sense of being watched, escape from the present, have moments of absence in a stillness of time? We can always daydream, but to what extent does technology enable us this state of disappearance? Within our research collaboration we are exploring the extent to which new technologies allow us a space of consciousness where we can meet and engage with our audience in an unthreatening arena of activity, the free-associative liminal state of the techno-daydream. The daydream can be seen as an in-between position where thinking is liberated and allows for free-form connections. The body is awake and active but the mind is open to drifting dream-like thoughts on the threshold of being fully one or the other. Neither dreaming nor awake the ‘daydream’ is a state of consciousness where the awake and dreaming mind can meet.

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We intend to ‘flock’ thought trails according to the semantic relationships between words and the strength of those relationships. This furthers the idea of ‘priming’. The brain is primed to recognise related words by activating semantic networks of associated concepts as in direct word pairs such as black and white, or cat and mouse. Another such pair is hand and finger, a less related optional word would be the word handshake. (These ideas are discussed further in Harrison & Rauch 2007, see bibliography.)
Working as Ms Dream and Ms Real, we are two artists collaborating to form a common ground – to unite the left and right sides of the brain, the awake mind of rational thought with the emotive dreamstate of the sleeper. We are currently working in partnership with the Virtual Landscape Theatre at the Macaulay Institute, to create a daydream experience. Individually we continue to follow our own specifics. Barbara researches into the neuroscientific model of the unconscious brain and the non-linearity apparent within dreaming narratives. I remain interested in holding complex inter-connected ideas electronically in line with the human mind, which stores concepts through the semantic association of idea and thought. My preliminary contribution to our daydreamscape will be the production of a moving painting of ‘flocked’ thought trails around a specific subject, offered for contemplation and deep thought with minimal physical action required of the viewer. The first section of this paper, ‘Rational Thinking’, goes some way towards positioning the daydream as a valid space in which such art can happen. The second part, ‘Emotional Thinking’, takes a deeper look at what daydreaming is, a combinatory area of emotional and rational thought.

**Rational thinking**
As an artist and researcher I am aware of how technology is reconfiguring our relationship with the world and our own sense of being and consciousness, our thinking. I prefer to work with collative methods, often collaborating to find an interstice between formal constructed and observed social spaces where unorthodox art can happen to engage with its audience. The daydreamscape could be such a space.

I am currently engaged with ideas of daydreaming with regard to Paul Virilio’s work on inertia and picnolepsy to inform our daydream experience. Initially through physical inactivity and later with repetitive actions. His argument for the acceleration of modern life, the immediacy of information and an understanding of distance as time, led him to the statement “Now everything arrives without any need to depart” – “Polar inertia” (Virilio 2000, 20). Virilio observes that the arrival of dynamic vehicles carrying people or information such as the car, has been replaced by the arrival of multimedia items into static vehicles. Telecommuncations have brought in the era of “staying on the spot” or “housebound inertia” (Virilio 2000, 22). This is reflected in car design where speed is a selling point even when over the lawful limit. Within racing car performance the ultimate extreme, according to Virilio (Virilio 2000), is to make the starting and finishing line coincide, and this can be paralleled with the idea of teleportation into the architecture of the intelligent home. It is this understanding of “movement without moving” (Virilio 2000, 25) facilitated by new technologies within our ordinary everyday life, which has informed the making of three digital non-linear films.
The series of Digital Action Paintings comprises of digital looped films which remain more painting than film in that they are each seen all-at-once and projected at painting scale in painting positions. Each film is a collation of over-lapping still environmental images incorporating two QT movies of human action, all of various transparency levels combined into one piece. The collage effect is enabled by new lens technologies and combinatorial software for the interweaving of moving and still images. The work therefore bridges new media and traditional practice in that they are digital but address the conventional values apparent within flat surface picture making designed to move the eye around the canvas. They are films of social sporting activities, cricket, swimming, cross-country ski-ing, representing the leisure time of a small community in rural N.E. Scotland without access to a cinema or theatre. As a spectator, there are moments of concentrated focus on the event, on the action, and lapses of interest where the eye meanders around the scenery – daydreaming ensues until brought back to the action. The films exist as faithful memories of events where leisure and daydreaming are encouraged as legitimate forms of time out and therefore allow us a “disappearance” (Virilio 1991) from the everyday.

Our leisure or free time is our official stillness from our everyday activity of work but continues to be organised for us by the cultural industry, now firmly in the hands of global corporations. Corporate globalisation rather than art or philosophy now determines our culture and lifestyle and also directs our everyday life by designing our work patterns and allotted free time. Theodor Adorno’s pessimistic predictions on the culture industry’s goal of homogeneity (Adorno 1991) are still relative today and in particular with regard to the phenomena of free time or life outside work, our work-less time. His critique addresses the work ethics of wage labour with its distinct work and
free time, and highlights the dilemma within “And yet, in secret as it were, the contraband of modes of behaviour proper to the domain of work, which will not let people out of its power, is being smuggled into the realm of free time.” (Adorno 1991, 164) He focuses on the inanity of leisure activities and in particular the hobby supplied by the leisure industry for profit while keeping people as amateurs. If labour power has become a commodity then the expression hobby amounts to a paradox where “Organized freedom is compulsory.” (Adorno 1991, 165)

We are given time for leisure and relaxation in order to work more effectively afterwards, without distraction or the need to lark about, but we are then provided with activities to prevent total inaction which would lead to boredom and objective desperation. Those activities are never too demanding i.e. Sunday cricket, or they would become work, can be essentially passive i.e. watching T.V., or quasi-active i.e. recent spectator sports which, according to Henri Lefebvre, (Lefebvre 1991) allows the supporter to attend, participate and play sport via an intermediary. Lefebvre sees leisure and work as the interlocked elements of everyday life and insists that we cannot step beyond or escape the everyday in its entirety “the marvellous can only exist in fiction and the illusions people share…And yet we wish to have the illusion of escape as near to hand as possible.” (Lefebvre 1991, 39) However, leaving us on a more optimistic note, Adorno suggests that individuals will continue to resist contrived free time and find ways of approaching freedom proper (Adorno 1991). To some extent more flexible working hours and changing lifestyles are merging work and social time allowing for shorter, more frequent pockets of free time. Computers in the work place allow for gaming and online social interactions under cover of work and although we may feel constantly under surveillance in our Big Brother world, we are aware of deviant ways out. Employing daydreaming as a method of escape from work and contrived organised leisure time offer small episodes of stillness in the chaos of contemporary life.

According to Nicolas Bourriaud “The Aura of contemporary art is a free association” (Bourriaud 2002, 61), he is referring here to Relational Aesthetics and so makes a case for social engagement within an art practice. This free association is a wider contextualisation outside the gallery spaces and into the everyday which can be seen as “Parachuting artists into given situations.” (Doherty 2003), a conditional result of the globalisation of art. This free association can also be taken as an extension of the semantic net-worked artwork continued out into the daily lives of its viewers. New technologies can come into play here and position artists within social niches and specific sites to find new audiences. However, perhaps a reversal of roles is now imminent where our techno-savvy audience will be searching for us, the artists, in unobserved places as a way of participating in Guy Debord’s “free creation of events” (Debord 2002, 244) thus finding actual moments of escape, of disappearance, from within their legitimised free time. We hope to meet them in our constructed daydream space where they can rest, still for a while at their own leisure.

Such resting, however, is not mere leisure time, it is also the time for positioning thoughts. When daydreaming the brain does an emotional balancing of diverse thoughts and can form new connections between them which, in accordance with current understandings of daydreaming (Jones 2007), improves thinking. Daydreaming therefore keeps the network of internal and external information handling in tact, and indeed, could be considered as the default setting of the mind where our thoughts can wander and position themselves in the brain’s network.

**Emotional thinking**

The concepts of daydreaming and emotions are interrelated issues. Margaret Boden (1990) linked the subjects of human motivation, creativity and free association in her book ‘The Creative Mind’. Furthermore, Mueller and Dyer (1985) have pointed out, “emotions trigger daydreams and daydreams modify existing emotions and trigger new emotions, which trigger new daydreams, and
so on.” Daydreaming is an activity where we plan, play through imagined scenarios, replay and reflect memories. I suggest daydreams are the coming together of emotions and rationality. (Different to the dreaming brain when the amygdala is hyperactive and dominant, while the prefrontal cortex does not work to its full capacity, as consequence planning and reflecting suffer during dreaming.)

Daydreaming has been researched relying on retrospective reports and reflective introspection, similar to dream reports this is a backward recall of thoughts, where one verbalises a stream of thought as it occurs. Daniel Dennett does not refer directly to the term daydreaming but he explains how human beings developed a habit of “‘replaying events in [their] minds’ over and over” (Dennett 2005, 169). He suggests further that this behaviour provides the important source of episodic memory and cannot be considered wasteful or useless at all: we rehearse, repeat, train, to later recall the lesson or episode. This instant replay and reverberating is needed to store episodic events he explains. Furthermore he elaborates, that this explains “infantile amnesia” where the child was too young to use verbal language to replay events. This act of self-conditioning that relies on self-stimulation, is not available in animals. Dennett explains this condition as “echo-capacity”, a situation that facilitates long-term episodic memory. To finalise this thought train: replay and rehearsal mean reflection on several levels, this relates to a methodology explained by Alvesson and Sköldberg as reflexivity. (Alvesson and Sköldberg 2000)

While, as explained above, daydreaming offers replay and rehearsal under conscious conditions the dreaming brain has been suggested to be its unconscious counterpart. Antti Revonsuo (2006) elaborates a Threat Simulation theory (TST) for the function of dreaming; a theory that the world-simulation we know as “dreaming” is specialized in the simulation of dangers and threatening events. Revonsuo (2006, 111) presents an understanding of these mental fictive worlds that make us understand the real world, and even assumes that this function might go back to early stages of human development. He also argues that a model representation is needed for matching real and imagined memories and details. He argues that creativity and flexibility are required in the brain to find possible answers to match old ideas with new incoming data/experience to be able to rebuild the model of the “world-for-me” (Revonsuo’s expression (Revonsuo 2006, 182). Threat simulations in dreams are activated mostly when they are needed, i.e. when something threatening or stressful has been perceived. In these circumstances we construct an artificial situation within which to rehearse for emergencies. This is to practice, in advance, for any potential threats in the real world. Revonsuo claims that the “world-for-me” is primarily a “navigational device in the brain”. With this theory, Revonsuo offers an understanding of “reality as an illusion” made entirely by the brain. The human body is understood as an interface which delivers a model of this “world-for-me”. He further proposed that a personal view of the world exists in the brain as a model where we can rehearse dangerous situations, including obviously also social threats; he points out that we are in the end social animals (Revonsuo 2006, 418/9).

Revonsuo (2006, 237) insists that this natural virtual reality model is also used to navigate real situations, since we cannot, every time we encounter something in the outside world, reinvent the experience itself. It is easier to build on our existing model as representation of the real. This model, of course, is constantly being updated and I suggest daydreaming plays a part in the process of updating our model of the world. My research into the dreaming brain (Rauch 2005) led me to the issues of emotion. Dreaming is driven by the forebrain system of the brain, and, as Hobson justifies, it is primary emotion that seems to shape the dream plot. The limbic system and, in particular, the amygdala shown in PET-scans are hyperactive, causing emotional direction in dreaming (Hobson 2001, 77). One of the leading figures in emotion research is Antonio Damasio.
Damasio discusses the error of the Cartesian view wherein scientists studied only the body, while matters of the mind were left to religion and philosophy. Only recently have cross-disciplinary approaches emerged in the area of brain/mind study. Damasio’s concern about this mutually exclusive dualism, where the brain and mind are seen as separate entities, is of interest for consciousness research. “The organism constituted by the brain-body partnership interacts with the environment as an ensemble, the interaction being of neither the body not the brain alone.” (Damasio 1994, 88). Although consciousness arises within the brain it is still questionable whether this therefore situates the mind in the “physical realm” of the brain (Damasio 1994, 94/95).

Damasio considers the mind not only to be embedded in the brain but in the rest of the body too. He does not only challenge the notion of a separation between brain and mind, and the Western tradition of dividing brain experience from cultural experience, but also the division made between reason and feeling. He investigates issues of decision-making, and states that if there is an impairment of emotions, we would not be able to be rational either. He suggests that a correspondence between emotional feelings and the rational mind is vital. In the words of Damasio “the mind arises from activity in neural circuits” (Damasio 1994, 226). He does not say that the mind is in the body, but “that the body contributes more than life support and modulatory effects to the brain. It contributes a content that is part and parcel of the workings of the normal mind” (Damasio 1994, 226).

According to Damasio, mind is an integrated function of an advanced organism arising through evolutionary selection. The developing brain, when it became complex enough, produced mental responses (i.e. thoughts) that may have contributed to survival. As he states: “the minded brain minded the body” (Damasio 1994, 230). The survival mechanism can be thought of as a greater appreciation of external circumstances, with a “prediction of future consequences by way of imagining scenarios and planning actions” (Damasio 1994, 229).

Damasio concludes that the mind might not be conceivable without a body as “ground reference”, one which offers the spatial and temporal framework to an “absolute” reality (Damasio 1994, 235). He further discusses the importance of the “primordial representation of the body proper in action” (Damasio 1994, 235) and the role it plays in consciousness. The interconnectedness of brain and body is stressed and leads to an understanding of the human mind which needs a perspective of the entire organism. If, further, we take on board that rationality and emotion are interlinked, and that there is no split between body and mind, we enter Damasio’s hypothesis of the “somatic marker” (Damasio 1994, 173): a dynamic representation of what is happening in the body. The signals given by the body are of emotional value to the person and any future decision-making, even if not consciously acknowledged. “Somatic markers may not be sufficient for normal human decision-making since a subsequent process of reasoning and final selection will still take place in many though not all instances. Somatic markers probably increase the accuracy and efficiency of the decision process. Their absence reduces them.” (Damasio 1994, 173)

**Conclusion**
Our discussion of daydreaming has concerned an outer and inner view of it as a discrete, still place of dynamic thought. We suggest that it exists as a bridge between the rational and the emotional mind, between the awake and the sleeping brain, as a coming together of the conscious and the unconscious thought. Dreaming and daydreaming are regarded as the most creative potential mental states, exactly because the pattern of the activation of specific brain regions allows for unusual combinational creativity. Dreaming and daydreaming can also be regarded as the most extreme forms of spontaneous thinking, they allow for insights that would have been most difficult to reach by conscious logical thinking alone. Our future practical and theoretical research is concerned with
the fusion of stillness and speed in self-organised flocked thought trails, and in so doing, we are considering the digitally constructed ‘daydream’ as a potential art arena.

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Biographical Notes
Dr Harrison is a practicing artist and academic, currently working as a University Reader in digital media art. Prior to this she has been a researcher and lecturer in interactive art, multimedia and new media theory and was the research fellow on a funded 2yr digital art project. Her current research concerns her own work where she undertakes a critical practice exploring Conceptual Art, non-linear narrativity and multimedia mind-mapping. Outcomes continue to be shown internationally.

Dew has curated a number of international online exhibitions and also works as a co-director of PVA. MediaLab, an artist-led organisation which initiates and supports good practice in new media art, now renowned for its Labculture Ltd., residency programme. Her papers have been published and presented at conferences as diverse as Art History, Gaming, Museology and Consciousness Studies, and she continues to lecture, mentor artists and supervise PhD students in the field of computer-mediated art.
Dr Barbara Rauch is a research fellow in FADE (Fine Art Digital Environment - Surface, Layering, Memory), a joint research project between Camberwell College of Arts and Chelsea College of Art & Design, ICFAR + SCIRIA, University of the Arts London.

Her research focuses on new technologies and how they alter our current understanding of human consciousness. The research provided the basis for her PhD thesis entitled ‘Natural and Digital Virtual Realities – a practice-based exploration of dreaming and online virtual environments’. The research work that followed focused on 3D-surface capturing of animated facial expressions in animals and humans, attempting to map virtual emotions (AHRC Grant in the Creative and Performing Arts scheme, January 2007). Currently she is a visiting senior fellow at the McLuhan Program, FIS, University of Toronto.
Preliminary thoughts on the beauty of interactive artefacts

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Abstract
Aesthetics and the notion of beauty are playing an increasingly significant role in interactive art and design products, and consequently for the scientific research into these fields. This paper outlines a rudimental theory of the notion of beauty in interactive artefacts. My argument takes Kant's definition of the sentiment of beauty as an act of judgement as its starting point. This judgment unfolds on two very different but interrelated levels. The first level is made up of the participants' physiological aesthetic judgment over the digital system's output. This judgment predetermines the participant's next (inter-)action and it is the basis for performative “flow”. The second level renders beauty as an emergent phenomenon, which manifests itself as a reflective sentiment, meaning as the result of the interplay between already experienced “flow” and the idea of the interactive artefact’s potentiality. The idea of potentiality is on the one hand an intrinsic part of the artificial interaction system (interactive artefact), but on the other hand experienced as a transcendental phenomenon that seems to overcome the rigid limits of algorithmic systems. The paper concretizes my theoretical findings by analysing two very different interactive artefacts: David Rokeby's Very Nervous System from the early days of digital interactive art and the online community 'Second Life' as an example of a virtual meeting place.

Keywords
Performative aesthetics; Affect; Beauty; Communication; Interactivity;

Introduction
In recent years many attempts have been made to include aesthetics in theories on interactive artefacts, focusing on features such as emotional design or experience design (e.g. Norman, Bertelsen, Wright, McCarthy, etc.). Notions like simplicity, elegance, and pleasing-interface design are widely used. However, a theory of performative beauty proper seems to be underdeveloped, despite the recent recognition that aesthetics plays an important part in interactive artefacts. This paper’s objective is to outline a rudimental theory of the notion of beauty in interactive artefacts\(^1\). I am perfectly aware of that the notion of beauty is a hopeless, ephemeral endeavour that can be attacked from almost every side, but I have this feeling that interactive art can contribute to the understanding of beauty and vice versa.

Two examples of interactive artefacts
Newcomers to the digital world of the online community Second Life (SL), find themselves on a remote island, separated from the main virtual spaces that make up the world of SL. Their initial representation is a virtual figure wearing a white T-shirt and Blue Jeans that seem to be taken out of a machine producing average humanoid figures. The newcomer’s first task consists of modelling their pre-produced standard representation in their own image. While standing on the top of a tropical palm-fringed island, surrounded by the deep blue ocean, the player is given the possibility of adjusting nearly every parameter of the avatar’s visual appearance: the length and width of the nose, the ears, the breasts, the type and colour of the hair and clothes etc. This is done by means of sliders and buttons.

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\(^1\) I acknowledge that there are other vital aspects to the theoretical and practical understanding of interactive artefacts, such as the functional aspect, criticism, usability, etc. Hence I am not aiming at the construction of an all-enclosing theory on interactive artefacts, but to shed light on the aspect of beauty.
The more advanced players can later on design their own virtual clothing and even sell it to other players. The result is evidently a very personalized avatar. Clearly the majority of players in SL want to create a beautiful avatar oscillating between a culturally defined norm of beautiful appearance and their very personal desire to express themselves. A beautiful SL avatar seems to promise to be many things: a personality more true to an imagined self than the player’s experience of himself in everyday life; successful social relationships; or merely fun. The most obvious form of beauty involved is without doubt governed by the fashion industry. But isn't there another form of beauty at stake as well; a beauty related to virtual and interactive conditions of SL? And if that is right, how can we conceptualize this form of beauty?

In the 80's, the Canadian artist David Rokeby programmed an interactive system called *Very Nervous System* (VNS). His system creates an interactive art space, where the solitary participant's bodily movements are traced by a video camera and transformed into fluctuating digital data. The data is used to generate audible expressions. The participant's movements are actively ‘dancing’ the sound-scape. But the computational system works with a minimum of delay, resulting in the simultaneity of the participant's movements and the generated sound. In a feedback loop, the sound also seems to ‘dance’ the participant, triggering new movements. After the first minutes of testing the system, participants try to move in order to create interesting sound-scapes by constantly evaluating own movements and their acoustic effect. Beauty seems to become an evaluative method in the interactive process. But VNS establishes potentially another level of beauty; Rokeby’s objective is to eliminate the control-based interface (Rokeby, 1998) by creating a seamless interaction space, which in turn establishes an almost holistic, beautiful unity between the participant and her acoustic surroundings. Beauty becomes now an experience of “flow” (Csikszentmihalyi, 1990), where the conscious mind is always a step behind.
Thesis and method
Based on these incipient observations, I would tentatively propose that beauty in interactive artefacts can be understood as firstly a code and secondly an emergent ‘transcending’ sentiment. The first level is made up of the participants’ instantaneous aesthetic judgment over the digital system’s output. This judgment already predetermines the participant’s next (inter-)action and is the very basis for performativity. The second level renders beauty as an emergent phenomenon, which manifests itself as a reflective sentiment and therefore as the result of the interplay between already experienced “flow” and the idea of the interactive artefact’s potentiality.

My paper elaborates on these two levels of performative beauty by asking the following questions: how do the particular artefacts construct these aspects of beauty; and can these aspects be conceptualized by means of the philosophical heritage of beauty? Analogue to the fact that interactive artefacts are results of interdisciplinary processes my approach brings findings from very different research areas and discourse (aesthetic theory, social sciences, neural aesthetics) into a hopefully fertile interplay.

Interactive artefacts as communication systems
My investigation starts with the assumption that every interactive artefact consists of the relationship between the participant's actions and the algorithmic system's sensuous output. An interactive artefact is no longer an artist's (or designer’s) unique, detached expression, but a communicational system, that comprises the individual participant's (re-)action and the digital systems output. An interactive artefact is simultaneously based upon and creates an artificial and unique communication system. Each communication system constitutes a kind of social reality, a necessary framing that determines who interacts, how and what about. Artificial interaction systems are on the one hand clearly delineated from everyday inter-subjectivity, but on the other hand are often mimicking self-generating, autopoietic communication systems (Heinrich 2005).

The newcomers in SL see and know they are participating in a constructed virtual space that only exists as data on a huge server. In SL, the interaction with the system (usage of the keyboard and the mouse in order to modify his/her avatar or navigate the virtual space, etc.) enables the player to communicate inter-subjectively with other players in a virtual encounter; here the computer and the network is a medium in the classical sense of being a transmitter of data. The virtual community SL
clearly wants to simulate and improve as many aspects of social relationship as possible, but the virtuality (or un-physicality) of the avatars and the community clearly shapes the relationships between the players. Likewise, the participants in David Rokeby’s *VNS* are at no time in doubt of the artificiality of the installation space. They know that the audible response of the machine is programmed, and that the computer system only is measuring their movements (and nothing else) within a clearly defined space.

**Performative beauty as sensuous code: analysis of beauty**

Consequently an investigation into performative beauty must take the evolving relationship between the participants' proprioception of own actions and their sensuous perception of the computational system's output as its starting point. Beauty has since antiquity been seen as sensuously pleasing. Alexander Baumgarten - founder of aesthetics in modernity - defines the sensuous perception as lower recognition, implying that there is a direct relation between perception of beautiful objects and recognition (Baumgarten, 19, § 1; 14). In the wake of phenomenology, Baumgarten's focus on sense perception recently has received renewed attention from philosopher like e.g. R. Shustermann and his writings on soma-aesthetics. (He explicitly draws on Baumgarten's basic thoughts underpinning the importance of sense perception for a notion of aesthetics as a theory and praxis of “creative self fashioning” (Shustermann 1999)).

The phenomenological approach seems to correlate with the research of neuroaesthetics, which are investigating the sentiment of beauty as a result of neural activities. Even though much neuroaesthetic research is done in the field of visual art (that is based on the divide between artefact and beholder and not in performing or interactive arts), neuroaesthetic findings are useful for my argument. As described in their article *Neural Correlates of Beauty*, S. Zeki and H. Kawabata conducted an experiment where they wanted to the find the neural areas, which are activated by the feeling of respectively beauty and ugliness. They did not find separate neural areas; on the contrary, they found that the judgment of paintings as beautiful or ugly involved the same areas. The distinction between beauty and ugliness can be seen as a kind of on/off button depending on the change in relative activity in these areas. Furthermore, these neural centres are “engaged during the perception of rewarding stimuli” (Zeki, Kawabata 2004). Their findings seems to support the assumption that the difference between beauty and ugliness is a structural code enabling judgments of surrounding as positive or negative for the living being. This is in line with Donald Norman’s assumption that the visceral level of design artefacts deals with very basic distinctions like light and dark, hard and soft, sweet and acid, etc. that are (were) necessary for survival (Norman 2004). Zeki’s and Kawabata’s most surprising finding, however, was the involvement of the motor cortex: “Much the same pattern, though in reverse order, is characteristic of the motor cortex, where stimuli judged to be ugly produced the greatest activity and the beautiful the least” (Zeki, Kawabata 2004). These findings give rise to the assumption that processes of interactive artefacts are directly connected with the distinction beautiful/ugly. The judgment is an incitement for the participant’s further actions, being either a revision or an enforcement of past decisions.

Already, nearly 30 years ago, the psychologist Daniel Berlyne combined aesthetic pleasure with an increase and decrease of arousal (Berlyne 1971). Increase of arousal correlates with ugliness and the urge to change the situation, and decrease after en extreme increase seems to trigger the feeling of beauty. It is a reasonable assumption that oscillation between increase and decrease of arousal forms the basic means for the dramaturgy of interactive artefacts. At this level, the participant’s actions seem to be defined as automatic physiological reactions to shifting situations towards a final (secure) situation. Participants’ actions are perceived to be coherent if they pave the way towards

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2 See e.g. Sherry Turkles famous book on MUDs dealing with different forms of virtual self-representation.
this imagined state. Both Zeki/Kawabata and Berlyne’s findings resembles in a way the dialectics of T. Adorno, who writes that beauty only can be perceived via its opposite ugliness (Adorno 1973). This supports the assumption that the feeling of beauty and ugliness is a functional basic code for decision making in interactive artefacts (and, of course, elsewhere).

The participants in VNS are reacting immediately to the sound, as does the digital system. But the difference between the human participant and the digital machine is that the latter is controlled by mathematical rules whereas the participant’s decision is based upon the immediate sentiment of the code beautiful/ugly. Rokeby’s system provides an exemplary demonstration of this. By combining physical movement with instantaneously generated sound, Rokeby wants to trick the slower consciousness and create a trancelike, seamless space of soma-audible experience that dissolves the border between the participant’s notion of self and the space. The decision-making process must be very fast and therefore based on a reliable stable aesthetic binary code. At this visceral level the participant’s experimentation with sound triggering positions and postures seems to follow Berlyne’s oscillating dramaturgy. At this state, the conscious mind can only observe the interaction between the participants’ and the digital system’s outputs retrospectively as the experience of “flow”. Breaks in the flow experience are not caused by the sensation of ugliness, but rather by the unexpected incongruence between the participants’ actions and the systems output, e.g. missing feedback from the digital system.

In the same way, the process of creating an avatar in SL is an ongoing selection process. The interface reminds of a basic photo editing application with a few functions. Every imaginable parameter can be manipulated. In contrast to VNS, the player has plenty of time to get all the features right. I experimented for quite some time with the length of my nose, the positions of my ears, and the length of my whiskers, moving the slider back and forth until the perfect, meaning beautiful, proportion was found. Beauty and ugliness becomes a differential play that defines and refines a particular and subjective notion of beauty as a “promesse du bonheur”\(^3\) (Stendahl), a kind of imagined ‘safe and still place’.

**Performative beauty as reflective judgement: synthesis of beauty**

Immanuel Kant’s point of departure is also sense perception; but he is not satisfied with the reduction of beauty to mere sensation that he defines as agreeable but not beautiful. Beauty, he writes, aims at free a play of recognition capabilities (Kant 1979, §9) and is a matter of the conscious mind. Kant’s notion of beauty is bound up with his overall philosophical trajectory that aims to describe the transcendental conditions of recognition. Consequently, he defines pure beauty as the playful conjunction of the mind's categories of intuition and free imagination. Beauty is a formal play (‘purposivness’) that cannot be linked to any specific purpose. Beauty is a play with potentiality without the demand of either moral or sensible trajectories. The feeling of beauty is a consequence of unbound free reflection and imagination. That is why the sentiment of pleasure is a result of the aesthetic judgment of beauty, whereas the feeling of individual sensuous pleasure always comes prior to the aesthetic judgment that something is agreeable. Hence pure aesthetic pleasure is based on general communicability (Kant 1979, §9) of the sentiment, or with Schaeffer’s words: on the “autonomy of universalizable feeling” (Schaeffer 2000, 29).

Kant’s notion of beauty is insolubly allied with the divide between the perceived object (be it nature or art) and the onlooker. Direct interaction would definitely soil contemplative beauty with either mean sensuous pleasure or, even worth, purpose; both would endanger the finality of pure beauty. Thus Kant’s concept of beauty seems at first glance to be far too idealistic to be fruitfully applicable

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\(^3\) Promise of happiness

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to interactive artefacts. Beauty as the enjoyment of free imaginative play for its own sake seems no more than an analytical idea which ignores that every experience and every artefact is woven into an individual and social reality⁴. Contrary to Kant, I would stress that precisely the artefact and the perceiver’s entanglement with the world’s ‘here and now’ is the precondition for any autonomous play of imagination. The finality of a beautiful artefact, meaning its capability to render apparently endless imaginations and interpretations⁵, is based upon the paradox of the simultaneity of the concreteness of the artefact and the beholder’s reality on the one hand and on the other hand the artificial framing of the very same concreteness. In the case of interactive artefacts, the participants most certainly perceive their actions as real. But at the same they are always reminded of that their experiences are framed and in a way constructed. That holds true for Rokeby’s VNS and most definitely for Second Life both being artificial interaction systems. Interferences between bodily presence and the conscious perception of the situation’s constructedness constitute the platform for a second order observation, meaning a self-reflexive observation of one’s own interactions with the algorithmic system. But since we deal with interactive art that necessitates further actions, the second order observation can be nothing else than an observation of potentiality. Interactive beauty can therefore be described as the experience of potentiality that emerges from the interplay and the coherence between external stimuli (the digital system’s output) and own actions. Or said with other words: The sentiment of beauty is brought about by the coherence between an understanding of the artificial interaction system’s functionality and the sensuous experience of flow of ongoing interactions. Beauty being pure potentiality is, though, re-inscribed (via re-entry) into the visceral aesthetic process (as described in the last section) as more or less concrete expectations on possible⁶ interactions.

Due to the very tight feedback loop of VNS, initially external sound is deceivingly felt as the internal content of the participant’s physical movements. As already said, consciousness is tricked and seems to be superfluous for the interactive process. My own experiences with Rokeby’s VNS and similar systems however, is that the extreme short delay time constitutes an emergent perspective of observation. At moments it feels like being outside of the bodily interaction process, the result seems to be a split consciousness. A part of me is sensing the sound and my own movements in space and time, another part is observing from the outside, creating inside a ‘feeling’ (hunch) of the art installation’s intrinsic potentiality. Yes, the idea of potentiality is on the one hand constructed by the artificial interaction system VNS, but on the other hand experienced as a transcendental phenomenon which seems to overcome the rigid limits of the system’s functionality and underpins a feeling of pure time and space trespassing potentiality.

The process of creating an avatar in SL (and of course later on in the course of their ‘being there’) must evolve a mental space of potentiality and possibilities. Surely questions are asked however vague and unconscious: what do I want to obtain here in this virtual community - friends, escaping loneliness, experimentation with my ‘self’, money, etc.? The sentiment of beauty is still a contemplative judgment; its purposiveness is scrutinizing potentialities, which create the platform for concrete interaction possibilities. Performative beauty, contrary to Kantian beauty, is not free from constraints. The artificial communication system SL (like VNS or any other interactive artefact) comprises the necessary framing for the emergent phenomenon of beauty. In interactive artefacts, free play of imagination feeds back into the concrete interaction at hand.

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⁴ And he is painfully aware of this. In order to raise art into the realm of pure beauty he needs the ingenious artist, who is able to distance the art work from any personal or social intentionality.

⁵ Cassirer wrote, that aesthetic experience is “pregnant with infinite possibilities which remain unrealized in ordinary sense experience” (Cassirer 1992)

⁶ For the difference between potentiality and possibility see Gille Deleuze Difference and Repetition, 1994 or Brian Massumi Parables for the Virtual.
Conclusion
In the course of this paper I have tried to outline a tentative theory on performative beauty by describing two different aspects of beauty. The first aspect is bound to the participants’ immediate, physiological but nevertheless social judgments of the digital systems aesthetic output. At this level, beauty and ugliness is a binary code where aesthetic judgment is directly connected to physiological actions. The second aspect of the sentiment of beauty is a judgement on the potentiality of the singular artefact’s interaction space. The coherence between the systems output and the participant’s proprioception brings about a play of imaginative operations that constitutes a potential background for possible (and actual) interactions.

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Biographical Notes
Falk Heinrich is Assistant Professor, PhD, at Aalborg University Copenhagen. Heinrich offers courses in Aesthetics & Design as well as Interactive Systems. His dissertation is a theoretical and practical investigation into interactive installation art. His theoretical foundation is system theory, discussing its explanatory possibilities and weaknesses in the domain of digital and interactive aesthetics. His current research interest is 'performative aesthetics' and his work -- focusing on notions of beauty, affect, presence, and communication -- attempts to form bridges among certain discourses in the human sciences, sociology, engineering, and neuro-science. Falk Heinrich has worked as an actor and theatre director. His theoretical investigation continues to develop in close relation to practical, artistic work.
Silence As Stillness? Sonic Experiences in Art using Infrasonics

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Abstract
Is silence the ultimate depiction of stillness in a sonic environment? Not all music is audible, if it is created using a frequency range high or low enough. Developments in sound reproduction, measurement and creation technologies have allowed us to control the frequency and volume of sound more fully, challenging our idea of what silence is. There are certain ranges within the low frequency sound spectrum that teeter on the cusp of audibility, but are never silent. Rather, they involve entire structures or bodies in the ‘listening’ experience through vibration, ultimately allowing listeners an individualised role in their own experience of a work. This paper discussed some artists approaches to low frequency sound production in composition, installation, and performance.

A sound is all the possible ways there are to hear it. (Fontana, 1981)
Inaudible low frequency sounds, often called infrasound, offer a radical new tool in the construction of sound works that wish to involve the listener in new, centralised ways, creating new levels of embodiment in installation, performance and recording. Infrasound can be used to lace audible sound, imply sonic depth or to create controlled vibrations, the latter which can have a range of physical effects on human bodies and objects in general.

The experience of listening is something often aligned with stillness through ideas of contemplation, focus and direction. Silence as the absence of music is no longer possible, since history has redefined what music is. Concepts of timbre have enlarged to include electrical signals and environmental sound as well as acoustical instruments, and musical form engages much more than traditional elements of melody or harmony. John Cage performed a famous experiment with the anechoic chamber in 1951, where he found two sounds - a high frequency signal (his nervous system) and a low frequency hum (his blood) omnipresent in an environment that does not allow external sound, leading him to conclude;

There is no such thing as empty space or empty time. There is always something to see, something to hear. In fact, try as we may to make silence, we cannot... (Cage, 1961)

We have never lived without music then, as our physical bodies do not allow us to enjoy silence. In the late 1970s, English auditory physicist David Kemp first put a microphone to an ear and discovered the sounds of the cochlea at work, suggesting our very hearing mechanism produces sounds of its own. But there is a point in the human listening experience where our understanding of sound changes from a listening experience (with the ear) to a resonating one (with other parts of the body) - we cease to hear what we have called a sound and start to feel it as the vibrations that make up all sound. According to Hemholtz’s theory of sympathetic resonance, every object has a resonant frequency and will vibrate sympathetically in response to it – every tissue in our body has its own unique frequency at which it starts to vibrate sympathetically with an external sound vibration. This theory can be thought of in the example of the opera singers shattering glass – once the singer hits a note with the same resonant frequency of the glass, it will shake itself apart and shatter.

So when does sound cease to be sound, and start to be understood by us as a different sensation to listening? This is a complex question that can be answered more easily in scientific terms than in experiential ones. A healthy young person hears all sound frequencies from approximately 20 to

20,000 hertz (Hz)\textsuperscript{1}, so technically, we cannot hear below 20 Hz in most cases, depending on attributing factors such as hearing damage, age, reproduction volume and environment. For example, a sine wave tone at 20 Hz requires from 85 to 90 decibel sound pressure level (DbSPL) to be audible, 1 and 2 Hz needs over 120 dB SPL. Experiencing a loud rock concert or jet engine can give you an indication of the power of volume over frequency. Psychoacoustic healing is a health treatment that uses the low frequency sound range to resonate different parts of the human body, using different frequency measurements that they claim heal different parts of the body\textsuperscript{2}. We would hardly call the signals used for this purpose ‘music’ or ‘art’. So perhaps our understanding of inaudible sounds is about how the sound is delivered – is it intended for listening, or as a sensation, or finally - a more obvious combination of both? French theorist Roland Barthes describes how listening has changed from a fixed deciphering to a more active ‘signifying’ of sounds\textsuperscript{3}. If we take the dictionary meaning of listen as “to hear attentively; to pay attention to” and hearing “to perceive (sound, or something that emits or causes sound)”\textsuperscript{4} then we can indeed included the effects elicited by inaudible sound, and in the case of this paper, infrasonic sound, as sound for listening.

The way our body perceives sound vibrations offers up interesting avenues for sound in art – what perceptual modes are triggered and how these will exist for a listener. The way we locate and sense sound are important in our understanding of sound art works that focus on the hearing/vibrating experience, and allow audience to contribute to the experience of a work. These are works that will often explore physical resonances of the individual audience members body and/or the presentation site’s architecture. They may deal with ways of translating vibration in audible sound. They deal with thresholds, immersion and physiological experiences of acoustic space. There has been much written about the damage to the human body low frequency can create at high volume: including discussions on sonic weaponry such as those by robotics engineer Dr. Vladimir Gavreau, Nicola Tesla and the Nazi’s in world war two. Infrasound is shrouded in myth (as many ‘invisible’ things are, such as ghosts) but it is a sonic phenomena that is subject to the same issues of the other extreme in the hearing range i.e. high frequency: extreme volume can be damaging. The combination of pitch and volume is important, and controllable.

Many composers, sound artists and performers find interesting creative possibilities in the low frequency sound range, and artists have engaged with them in different ways. Investigating the lower edge of most human hearing thresholds, artists approach audibility and sensation in different ways.

The study of low frequency ranges between around 20 Hz and 0.001 Hz is what seismographic machines use for monitoring earthquakes, which provide a useful illustration for this discussion. The ‘rumble’ heard in an earthquake is the sound of things vibrating, not the vibrations themselves.  Japanese sound artist Toshiya Tsunoda translates inaudible vibrating objects into a audible range to facilitate a listening experience discoverable on a purchased recording, resulting in a radical rethinking of the concept of field recording. He creates recordings with a piezo-ceramic sensor that generates pressure with a weak current. This allows the vibration inside a solid object to change into a voltage which can in turn be recorded. He titles his pieces with what they are, and his album extract from field recording archive #3: Solid Vibration begins with a track entitled Metal –plate fence. Tauraminato-cho, Yokosuka city, Kanagawa which is followed by notes about the behaviours of the vibrations and the methodology of the recording.

\textsuperscript{2} It should also be noted that even through this technique has existed since the 18\textsuperscript{th} century, it has never been recognised by mainstream formal medical practice.
\textsuperscript{4} Oxford English Dictionary Online, accessed 22/4/07
In the micro-level, there's a pulse-like random vibration going on during the amplitude comparing to effectors that just draws simple smooth slopes. This is the reflection of the physical shape in space. The level of my CDs are low in general but that's because it includes the frequencies that are usually cut off on normal CDs. maybe it's a bit reckless in terms of audio since I don't use editing softwares etc, and I just use the recording as it is. You can understand the nuance when headphones are used. As an exception, I equalize and cut specific frequencies when i wish to focus more on particular points. (Tsunoda, 2002)

Tsunoda manipulates the media of CD reproduction to his own means, by extending the CD frequency range that is usually limited to 20 – 20 000 Hz, the generally accepted range of healthy human hearing. Tsunoda claims that locating the original source of sounds in an environment is not as exciting or important to as exploring how those sounds interact with each other and the space in which they exist even when that ‘space’ is a CD recording.  

Californian sound artist Randy H. Yau is also interested in translating sound – specifically infrasonic waves into audible fields for installations and live performances. He often uses only a small hand held device to generate the original tones which are then manipulated using frequency modulation on a laptop computer to pitch them down in frequency. Yau has collaborated with Scott Arford, a sound artist with an architectural background who uses low frequency to achieving spatialization of sounds. Together in 2001 these artists formed the Infrasound collaborative performance project, where they produced live concert performances that:

More than just creating and delivering an “infrasonic” effect, everything from composition to presentation originates from the principle mission of activating the body and space through sound. (Arford and Yau, 2004)

Prior to their live performances, which often happen in general spaces rather than concert venues, the artists test the spaces thoroughly to discover the acoustic possibilities and characteristics of each. This group’s performances saturate the body and surrounding architecture with subsonic vibrations, inviting the audience to experience their own body through the performance. They also focus on the way low frequency sound reacts and multiplies in a room, activating sympathetic vibrations in bodies as well as architectures. Vibration becomes acoustical effect, making the sound, space and listener inseperable. It becomes difficult to distinguish what is heard and what is felt, what is amplified and what is vibration. Body and ear become one:

The body is thus displaced in the multiplicity of overheard voices, against the layers of frequency and volume, giving way to psycho-acoustical occurrences, where body and ear short circuit their seeming division. Subjectivity is thus made “radiophonic”: cut up, thrown apart, transmitted and received, dispersed and doubled-up, sound agitates the very borders of body and mind, vibrating its limits and introducing a “difference”—that of bodily listening. (La Belle, 2003)

The idea of bodily listening is an integral part of New York artist Maryanne Amacher’s site specific installation work. Amacher explores the displacement of a body through frequency and spatiality, and the very loud sounds she uses are structurally borne, not air borne. Speakers are placed against architectural structures or in other rooms to allow sounds to reach the listener via these structural means. Her work aims to activate what the artist calls the ‘third ear’ – sounds created inside the ear as it resonates with certain frequencies, creating individualised sounds for different people in the

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5 Interview with the artist, http://www.inpartmaint.com/plop/effeature.html# accessed 22/5/07
room. Sounds and architecture are intertwined, as they are in Arford and Yau’s performances, but architecture bears and presents the sounds, encapsulating and articulating the work.

The virtual tones are a natural and very real physical aspect of auditory perception, similar to the fusing of two images resulting in a third three dimensional image in binocular perception ... I want to release this music which is produced by the listener ... (Amacher, 1999)

Here the focus of the work is on how we hear, and what that hearing can create. Amarcher claims ‘technologies of presence’ are making immersive installations easier, though also expresses frustration with the ‘mechanical souls’ of loudspeakers. Computing has offered an enormous amount of control function and operable interface to sound spatialization, measurement and manipulation, and yet sound reproductive technologies still maintain a very mechanical operational basis, residing in the physical ‘air shifting’ realm.

A number of experiments have been made lacing music with infrasonic vibrations to establish if low frequency sound can affect mood. These projects use a device known as a ‘sound canon’ a long tube made to move the large amounts of air required to produce an accurate effect. *Soundless Music* project leader, English composer and engineer Sarah Angliss added the infrasonic ‘effect’ at 17Hz to musical works as they were played during a concert in the Purcell Room, in 2003. The audience claimed to report a variety of effects from ‘coldness’ to ‘anxiety’. Works such as these attempt to attribute something of an ‘emotive’ effect to vibration, a concept that has been thought to contribute to the experience of so called paranormal events.

A more interesting outcome of these sorts of experiments is the way that certain inaudible sounds may effect the way we hear audible ones. The structure of harmonics work this way, where a fundamental frequency combined with overtones creates the timbre of an instrument. This is one area of infrasonics that could be investigated further from aesthetic point of view – where the vibrations caused by inaudible sounds create audible ones from other objects.

Through different approaches to stillness – of site, reproduction and the listening experience artists have used inaudible low frequency sounds to enable resonance to sculpt hidden acoustic potentials of all things material, including ourselves. In doing so they manage to embody the audience as part of the work in ways that provide new involvement for audience and creative experience alike.

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**Biographical Notes**

Cat Hope is an active performer, sound artist, composer and music researcher. She creates pure music, music for film, sound art, singer-songwriter material, noise music, video art, interactive art and has over 10 CD releases. Her music focuses on the low end of the sound spectrum, and she has a particular interest in the relationship between sound and image. She has toured her works in Europe, Japan and the USA. She is a PhD candidate in Sound Art at RMIT University Melbourne, and coordinator of composition and music technology studies at WAAPA, ECU.
Artists and designers as collectors: the aesthetics of digital journaling

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Abstract
The visual journal has been a constant companion to artists and designers. It fulfils the multiple functions of a scrapbook, a sketchpad, an observation notebook, a filing cabinet and an archive. Collecting ideas and artefacts using digital devices is an important process for artists and designers today. However, the accessibility provided by these tools also leads to problems in traditional visual journaling. The increasingly diverse formats (such as, audio, video, or digital codes) can pose difficulties when working in conjunction with tangible materials. The storage, access, and usage of materials also need to be reconsidered. The key question is not whether digital production tools or software systems can replace physical journals, but: how can digital artefacts be accessed fluidly along with other tangible materials? How can we further journaling by taking advantage of the possibilities offered by digital mediums? Can artists/designers reclaim the contemplative stillness of the visual diary in the ceaseless streams of materials?

This paper approaches these questions from a practice viewpoint. It explores the possibility of digital journaling by developing an appreciation of the aesthetics of interaction and association. This examination is supplemented by analyses of practices that assemble materials in response to their physical and digital environments. We conclude by discussing approaches in working across different mediums and materiality in the context of journaling.

Keywords
Visual diary, digital journal, collecting

Introduction
Artists and designers work in an open system of exchange, mining materials from fields of knowledge, cultural and social interrelations, economics, and political discourse. The interaction within and across different spheres is crucial to the creative process. The visual journal acts as a platform where active engagement between concepts, materials, mediums, and tools can take place. Collecting ideas and artefacts using digital devices is an important process for artists and designers today. The accessibility provided by these tools, however, also leads to problems in traditional visual journaling. For example, the increasingly diverse types of formats can pose difficulties when working in conjunction with other physical artefacts, and the storage and access of materials needs to be reconfigured. The key question is not whether digital production tools or software systems can replace physical journals, but how can digital artefacts be accessed easily along with other tangible materials? How can we further journaling by taking advantage of the possibilities offered by digital mediums? Can artists/designers reclaim the contemplative stillness of the visual diary in the ceaseless streams of materials?

This paper approaches these questions from a practice viewpoint. It explores the potentials of digital journaling principally in two ways. First, we focus on the key qualities of journaling by examining creative practices that assemble materials in response to their physical environments. Secondly, we examine the aesthetics of digital materiality and its possibilities by analysing works of digital artists and designers that explicitly deal with digital environments. We conclude by discussing approaches to working across different mediums, and materiality in the context of journaling.
Elaborating on the problem: relationships with technologies

As creative practice embraces different digital production including computers, cameras, audio recorders, and mobile phones, the artist’s/ designer’s collections become more diverse in forms but at the same time more complicated to store, access, and handle. A blunt ‘digital-analogue’ divide separates these artefacts and working across the divide necessarily involves translating from one form to the other. This translation process causes a loss of immediacy that makes it difficult to work quickly and intuitively.

Different types of digital systems such as blogs, vlogs, Flicker.com, Apple’s i-Life series, and Microsoft’s Entourage offer useful platforms to store and access materials. Software packages, like the i-Life series, are designed to make it simple to assemble digital materials for sharing. Beyond this, however, their capacity generally does not cater for experimentation. Users must also conform to pre-determined (and sometimes restricting) working methods and have little control over their design or functioning. Online systems like blog sites and Flicker.com provide useful formats for sharing ideas, thoughts, and works. They allow users to create entries and upload materials that can be accessed chronologically or through customisable tags and links. However, these sites are designed for the user to upload self-contained pieces and not for actually working on the materials. Moreover, despite random accessibility, blog sites tend to be displayed and retrieved in a linear fashion. In software systems such as these, although tagging, textual search, or random starting points suggest alternative experiences of content, organization of data rarely diverges from hierarchical systems. In addition, when accessing materials pauses necessitated by software, hardware and protocols (e.g. searching algorithm, communicating with databases, or limited processing speeds etc.) often interrupt the flow of interaction and concentrated thought.

Apart from the practicality of processing materials, there are deeper issues when working with analogue and digital artefacts. As educators, we encounter the problem where computer use greatly eases the production, while paradoxically reducing the involvedness in the actual creative process. Although students demonstrate competency and dexterity in digital production, their works exhibit a certain reduction in complexity (such as in the use of textures, contrasts and overall aesthetics). The limiting factors posed by approaches to digital technologies are apparent in the difficulty in reconciling physical gestures (of handwriting and drawing, for instance) with the fundamentally pixel-driven computer system.

Anne Odling-Smee explores the junction between digital and analogue methods of production in contemporary practices in *The New Handmade Graphics* (2002). She points out that graphic arts and design have a long history of responding to technological invention and innovation by challenging established conventions with renewed approaches. She argues that to successfully make use of digital materiality and its hands-on counterparts, ‘new ways of thinking’ are required. Such approach must take into account the following three aspects of technology’s role in creative production.

First, when the aim of the technology is to eliminate mistakes or to ‘save time’, possibilities are also limited. Instead of performing a task over and over again to allow natural variations in forms, the endless computer manipulation of elements overwrites previous work-in-progress leading only to one final version that is ‘just right’. The role of serendipity is therefore greatly reduced. Second, technological deterministic thinking subjects creative practice to the limits of the technologies employed. For example, one asks, ‘what can I do with this technology?’ instead of ‘what do I want to do and what tools can I use?’. Technology takes precedence over concepts and processes. This approach limits itself to the possibilities offered by the technology rather than the conceptual ability of the artist/ designer. Third, technology is not neutral. The dominant propriety software and
operating systems are laden with inherent aesthetics and ideologies. In particular, users are required to comply with ways of thinking pre-determined by the software’s design/er(s). This can be restrictive as testified by the designers interviewed by Odling-Smee, who congruously complain of being ‘fed up with using other people’s image-making systems like recipes, where ultimately any creativity is down to the software’s programmer’ (Odling-Smee 2002, 11-12).

The aesthetics of interaction and association
Journaling provides a potential key for finding renewed ways of thinking that allows fluid interaction with tangible and digital materials. In examining the practice of journaling, we identify two fundamental aspects for consideration: the aesthetics of interaction and the aesthetics of association. We interact with the world everyday conceptually and materialistically and make meanings through observation, exploration, reflection, and creation. A journal provides such a platform for interaction and making associations.

As human beings we are adept at finding patterns in our surroundings, and similarly, when supplied with raw materials we unconsciously create simple artefacts, working the materials into recognisable shapes or objects. This constant interaction is essential in creative work and is at the heart of journaling. The practice of Andy Goldsworthy presents an excellent example in examining this form of interaction. Goldsworthy’s practice takes the form of a daily activity, in which he responds to his surrounding by making a sculptural/ installation work. He writes, ‘I take the opportunities each day offers: if it is snowing, I work with snow, at leaf-fall it will be with leaves; a blown over tree becomes a source of twigs and branches’ (Goldsworthy 1990, unpaginated). This approach is sensitive to the seasons as well as the locations. His works take a myriad of forms such as a bright yellow dandelion circle hovering above a field of blue bells, or a chain of red Japanese maple leaves dancing along a waterway. He documents each work with photographs and notes describing materials used, methods of constructions, process, place, and date. For example, he writes of his knitted striated leave ‘cloth’:

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Horse chestnut leaves
sections torn out
pinned with thorns to sticks pushed into pond bottom
muddy black clouds stirred up around where I worked
over the week leaves fell and pond rose slightly
work gradually disappeared
LOUGHBOROUGH, LEICESTERSHIRE
22 September 1986
(Goldsworthy 1990)
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Inherent in Goldsworthy’s work is a reflection of rhythm, motion, and constitution of his environment. Each work is marked by the specificity of the day, the place, and his interaction with what is around him.

The works of Sarah Sze can be compared with Goldsworthy’s in their interaction with artificial materials and environments. Sze’s works are intricate constructions that result from working intuitively with common household products ‘to activate the poetry in these things’ (Kastner 2003, 147). She relates how her working method initiated:

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I was interested in anything that was around, but not trash; things that had a use […] So the next thing I did was take a roll of toilet paper and try to figure out how I was going to use it. […] I just decided I would sit down and make whatever came
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into my head; not name it, just make things, just be with the materials (Kastner 2003, 147).

This type of critical engagement with the surrounds and with materials at hand is a disciplined interaction that frequently takes place when working in visual diaries. The key here is immediacy – that is, an intimacy with the materials established through play where tactile interaction provides the avenue for working intuitively.

Joseph Cornell, like Sze, worked intuitively with the materials he collected, operating ‘in “an automatic or semi-automatic state” especially when beginning a series of boxes and collages’ (Hartigan 1999, 223). Joseph Cornell is the archetypical artist-as-collector. Lynda Roscoe Hartigan writes of his legacy:

At Cornell’s death in 1972, some three thousand books and magazines, hundreds of record albums, thousands of pieces of paper comprising his diaries and correspondence, and truly uncountable numbers of two- and three-dimensional ephemera all coexisted in his modest house – from cellar studio to attic, on shelves and table tops, along the floors and stairs (Hartigan 1999, 222).

For Cornell, the acts of browsing, collecting and making are fluid. ‘Exploration’ is an encompassing term he used to describe these activities. He housed his ever-expanding collections in handy household receptacles: folders, envelopes, paper bags, boxes, tins and so on. In addition to taxonomic groupings, his cataloguing processes were conceptually based, bringing diverse materials together according to his interests (such as actresses, historical figures, stories etc.). Logical ordering of materials was not important. The accretion of notes, photographs, illustrations, and scraps gave rise to random mingling and associations, allowing materials to congregate into expositions. He ‘associated […] the literal “sweepings” from his studio floor with “all the rich cross-currents ramifications […]” in his works (Hartigan 1999, 223).

Cornell’s artworks, mirroring his processes, take the forms of assemblages (in constructed boxes, suitcases, or slip cases). Working in a surrealist tradition, the idea of association is important in both their making and presentation. Nevertheless, Cornell ‘had no intention of leaving these encounters [between the audience and the works] completely to chance’ (Hartigan 1999, 233). He took care to provide keys or starting point for his explorations. In fact, he came to see his works (and his processes) as museums of a sort where viewers may freely make associations between the elements in the works, gaining ‘direct access to the projects browsing through them as if through a Victorian album, a bookstall, or even a second hand store’ (Hartigan 1999, 233). Cornell’s practice provides an ideal model for a visual journal.

The aesthetics of digital materiality
When working with digital artefacts, we are one level removed from the tactile immediacy offered by physical interaction and association. The linear presentation, hierarchical retrieval, and imposed pauses of current digital tools further interfere with our ability to mentally retain nebulous connections and threads of thought, vital to creative inquiry. When John Maeda writes that ‘computers […] have nothing to do with design skill, or design education for that matter’ (Maeda 1999, 19), he is advocating the necessity of developing a fundamental understanding of the mediums we use.

Yugo Nakamura believes that, ‘In the face of the many different concepts embraced by the Internet […] we should also be experimenting with different approaches to the field itself’ (Nakamura 2000, 293). His revelation that ‘things I see are determined by the relationship, the interaction, between
me and the environment’ is central to his work (Nakamura 2000, 290). Taking the essence of different interactions, such as inertial, connecting forces, actions and reactions, he transposes and translates their qualities into the digital medium. His programs are not mere ‘digitalisation’ of physical activities. Rather they are unique experiences that express familiar qualities through digital codes.

Nakamura’s inquiry into the interface environment, as absolutely intrinsic to an individual’s complete communicative freedom, has expanded to the development of ‘reactive fields’. Nakamura’s experiments focus on the development of an interface that responds ‘instantaneously to any user action, in a manner entirely appropriate to that particular user’s pattern of actions and behaviours…’ (Nakamura 2000, 293). His ideas on interaction are very close to descriptions of the use of a conventional visual diary. We can further this concept by suggesting that the ‘reactive field’ can be extended to the design of a digital journal where the user can enter content and develop the multiple associations as they occur to the user, or as the relationships of the content are perceived via customisable algorithms.

It is in this way that Josh On’s They Rule (1999 & 2004) allows hidden connections to be visualised through user interaction and online databases. The advantage of a database is its essentially ‘nonlinear form… a system of elements that can be arranged in countless sequences’ with the potential to favour spatial arrangement over linear flow (Lupton 2004, 69). When we consider that ‘[d]atabases are the structure behind electronic games, magazines, and catalogues, genres that create an information space rather than a linear sequence’ (Lupton 2004, 69) it is clear that they also provide for the special requirements of a visual diary. The greater difficulty is to consider the difference between linear flow and spatial arrangement, and the emphasis on interaction and association over sequence.  

Benjamin Fry’s thesis investigates visualisation processes of digital data along the line of ‘Organic Information Design’. He writes, ‘the resulting systems employ simulated organic properties in an interactive, visually refined environment to glean qualitative facts from large bodies of quantitative data generated by dynamic information sources’ (Fry 2000, 3). In the Valence Visualization Engine, Fry demonstrates the potential of his organic system to create elegant visual structures that represent thousands of ‘nodes’ of information, visually emphasising popular nodes and visually atrophying unused ones while still maintaining connected relationships. The data-streams considered by Fry generally belong to a single data type (e.g. text, numbers), which is evidently different from that of a visual journal. However, the wealth of data collected in a visual diary is also ‘large bodies of quantitative data’ whose qualitative associations can potentially be gleaned using a system like Fry’s given the appropriate settings.

His investigation into nine properties of primitive organic systems that can be ‘simulated by simple rules in a centralized system’ (Fry 2000, 43) provides an opportunity for interaction in a ‘reactive field’. As data is entered into databases, each of the nine properties: structure, appearance, metabolism, growth, homeostasis, responsiveness, adaptation, movement, reproduction, can be stimulated by simple rules determined by the designer of the system. In addition behavioural rules, such as the importance of the property ‘appearance’, can be mapped onto individual entities in the system allowing for individual ‘independent’ modification (Fry 2000, 43). The inclusion of user controls in altering the rules and determining links between items would allow two levels of associations – organic and personal.

The strengths of the digital medium lie in the potential for collection, data storage, and access to vast resources. Working at the level of codes, artists and designers, like Maeda, Nakamura, On and Fry, are able to sculpt the digital medium like the malleable raw materials manipulated by
Goldsworthy, Sze, and Cornell. Furthermore, programs written by artists for artists are proliferating. Pursuing the goal set by Maeda, Benjamin Fry and Casey Reas initiated and wrote the Processing program - a digital sketchbook of sort where simple scripting allows the users to manipulate the medium directly. Processing garners strong community support from artists, designers and programmers with contributors adding other open-source freeware such as Wiring. The lack of immediacy in the digital medium, therefore, can be compensated for through thoughtfully designed systems that allow for the formation of different types of associations as determined by the user.

**Conclusion**

The purpose of the visual journal is to provide a repository allowing for the multiple functions of filing sketches, scraps and images, thoughts and observations, and retrieving them in such a way that allows for active engagement of concepts and interactions between materials. It is a work in progress, a space that allows for the accumulation of data that incorporates the possibility of future collaborations. The strength of a physical journal lies in tactility and interactive immediacy; the proximity of the materials—overlapping notes, items clipped together, accidental collage—allows for unexpected relations to emerge. As recognised in Cornell’s work, it is the sifting of materials that gives rise to random or deliberate interactions. The journal fundamentally relies on the wealth of data collected—without which there can be no interaction and association—however, the ability to make and maintain multiple connections between elements can be limited.

In *Envisioning Information* Edward Tufte (1990) eloquently describes the potential of instant visual comparison. He argues for images placed within an eye span that ‘reveal, all at once, a scope of alternatives, a range of options’ (Tufte 1990, 68). The equivalence in a visual diary is the ability for comparison through proximity and, through interaction in the visual space, consideration of alternatives and options. The digital visual presentation methods developed and investigated by designers such as Yugo Nakamura and Benjamin Fry demonstrate potential for such comparative investigation, while their investigations into ‘dynamic queries’ have opened the potential for the user to create and maintain nebulous links. These are first steps toward the integrated use of digital artefacts and tactile materials in an open system where the possibilities of defining relationships allow users to interact and associate collected items in an intuitive way.

There is a growing recognition that a useful art and design education should guide students towards an approach that allows fluidity across the two modes of production (as suggested by the advocacy in art and design schools to re-incorporate and preserve technologies that have been deemed redundant such as photographic darkroom facilities, analogue film equipment, and letter presses, as part of the working process). By the same token, rather than replacing the physical journal, the digital medium can help extend both the useful and problematic aspects of journaling beyond expanding access to mediated artefacts. The possibilities of more organic representations of relationships and, more importantly, the potential for the user of the digital visual diary to add their own associations (and additional materials) would allow for a more intuitive interface. The development of relationship-driven visualisations reclaims playfulness and exploration, diverting the expectation of productivity associated with database retrieval to contemplative processing through association and interaction. Contemplative stillness can be reached in the heart of chaotic collation.

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Biographical Notes
Jo Law’s works include films, videos, photographs, installations, multimedia projects and critical writings.

Jo’s films and videos have been shown widely across Australia and internationally in screenings such as the 22nd Hong Kong International Film Festival and 45th Melbourne International Film Festival. She has received awards including the Silver Spire Award in New Vision at the San Francisco International Film Festival: Golden Gate Award. Jo’s installations have been exhibited in Australia, Mexico, Hong Kong, and Taiwan. She has published reviews, essays, and referred articles, in national publications, and recently received a number of grants to carry out practice-based research and development projects in the new media area.

Jo has a Master of Fine Arts (by research) from the University of Western Australia and is currently a phd candidate at Murdoch University. Jo teaches new media at the School of Art and Design, University of Wollongong.

Gonni Bruekers has 20 years professional experience as a designer and art director in a diverse range of creative fields spanning advertising, graphic design, publishing, multimedia and information architecture. She is the coordinator of the BA Multimedia Design course at Curtin University.

Gonni received a Master of Design from Curtin University, and has presented papers on design knowledge and design education at international design conferences.

Her practical interests and skills cover a number of design areas, with a particular interest in expressive calligraphy. Her research interests encompass design knowledge, visual rhetoric, articulation of practice, and research methods for design.

1 We use the term ‘system’ to infer a holistic way of thinking that is based on complexity theories. Bruce Mau also talks about design as systems of exchange or “design economies”. See Bruce Mau Design, Massive Change, (London and New York: Phaidon Press, 2004).
Most blogs do have an editor and like Word Press type systems they allow users to create html pages without having to code. Nevertheless, the control is only on par with a basic word editor.

Science fiction novelist, Neal Stephenson, offers an analogy between operating systems and cars: Microsoft represents the family car (perhaps a Commodore), Macintosh presents a European car (maybe a Saab), while Linux is a tank. See Neal Stephenson, In the Beginning is the Command Line (New York: Avon Books, 1999), 5 – 8.

These are the four categories identified in Jennifer New’s Drawing from Life. See Jennifer New, Drawing from Life: Journal as art (New York: Princeton Architectural Press, 2005).

A number of digital designers have developed digital equivalences for non-primary associations at different hierarchical levels. For example the Plumb Design’s Visual Thesaurus is a visual representation of the English language, rendering associative meanings in a three-dimensional form. The system of connections is just as enabling as the nebulous associations demonstrated in a physical visual diary; relationships of varying degrees are made visually apparent, through hierarchy of size, colour, tone, and atrophying words, but the organic and non-linear representation allow the user the sense of choosing personally meaningful connections. The Visual Thesaurus is purely text based with information extraneous to the relationships appearing in panels and popup information windows.
World Wide Soundscapes: Listening to the Local

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Abstract
In this paper, I will examine the Podcasting phenomenon as a “bubble” of communication space that has emerged in the electronic domain, allowing individuals to share local, varied, information rich soundscapes. Here, stillness characterizes both the listener, who must pay close attention in order to hear, and the acoustic space, which is free of the globalized noise produced by commercial media. In *The Tuning of the World* (1977), R. Murray Schafer describes noise as “sounds we have learned to ignore,” and he proposes the soundwalk as an exercise designed to increase our sensitivity to local sounds and our appreciation of the soundcape, a term that he coined. Using examples that include *The Soundscape Collection*, *Modulation*, and *The Ear Shots Collective Podcast*, I discuss how Podcasts can serve as electronic soundscapes, providing listeners with an intimate sense of another place through the medium of sound. The ability to download episodes on personal, mobile devices allows individuals to hear them at a time and in a place that assures attentive, reflective listening. I suggest that these compositions fit Barry Truax’s description of unique, “hi-fi soundscapes” that are “richly interpreted by locals who understand their contextual meanings” (2000). I also argue that, although podcasting developed out of a desire for individuals to share personal, local sounds, the practice is threatened by what Todd Gitlin describes as “the torrent of images and sounds” from the mass media that “overwhelms our lives” (2001).

Keywords
Soundscape, Acoustic Ecology, podcasting, portable audio

Introduction
In his *Handbook for Acoustic Ecology*, Barry Truax defines “sound” as “[a]ny vibration in the air or other medium, some types of which are able to cause a sensation of hearing,” and “silence” as “[t]he absence of sound” (Truax 1999). In this context, stillness would result in complete silence. However, as John Cage discovered during a visit to an anechoic chamber in 1951, it is impossible to experience the total absence of sound. In the supposedly “silent” room, Cage reports hearing the sounds that were made by his nervous system and by his blood circulating. James Pritchett explains that this seminal experience convinced Cage that silence provides an opportunity to appreciate non-intentional sounds and to hear sounds that might not otherwise be noticeable in the world around us (Pritchett 1993, 75). In 1952, Cage created *4’33”*, a composition in which a performer sits at a piano but makes absolutely no sound. The piece invites listeners to pay attention to the ambient sounds of the performance hall and to whatever sounds can be heard from outside. Increasing our awareness and appreciation of the acoustic environment is also a central concern of R. Murray Schafer, a well-known Canadian composer who coined the term “soundcape” in his influential book, *The Tuning of the World*, which was first published in 1977. He defines a “soundcape” as “any portion of the sonic environment regarded as a field of study,” which includes actual environments and “abstract constructions such as musical compositions” (1977, 274). Schafer has done much to encourage the development of the emerging field of Acoustic Ecology, which he defines as “the study of sounds in relationship to life and society” (1977, 205). He believes that an enhanced sensitivity to, and appreciation of, our acoustic environment is a crucial prerequisite for our ability to engage in acoustic design. As he explains:

[t]he soundscape of the world is a huge musical composition, unfolding around us ceaselessly. We are simultaneously its audience, its performers and its composers. Which sounds do we want to preserve, encourage, multiply? When we know this, the boring or destructive sounds will become conspicuous enough and we will know why we must eliminate them (Schafer 1977, 205).
Schafer promotes the use of soundwalks to increase our understanding and appreciation of soundscapes and to develop an ability to discriminate between desirable and undesirable sounds. He describes a soundwalk as an exploration of a specific sound environment with the help of a map that serves as a guide, pointing out unusual sounds and suggesting ear-training exercises (1977, 213).

The increasing use of inexpensive digital audio recording devices and the ability to share recordings over the Internet has made it possible for anyone with a minimum of equipment to create and distribute virtual soundwalks. Over the last few years, podcasts have provided another means by which individuals can document and publish their local soundscapes. Andrew Dagys and John Hedtke explain that the term “podcasting” is derived from “iPod,” Apple’s popular portable media player, and “broadcasting,” and that it refers to the practice of automatically downloading audio files in MP3 format from the Internet so that they can be listened to on a computer, as well as on cell phones and other MP3-capable portable players, when and where an individual chooses. They acknowledge that image, text, and video files can also be distributed in this way, but that audio is the most common format. Podcasting offers an attractive alternative to broadcast media, they argue, because podcasts are free and it is “two-way street”: individuals can easily create and publish their own content (Dagys and Hedtke 2006, 3-4). By 2005, it had become a popular grass roots medium, and Peter Lewis, writing in Fortune Magazine, described podcasting as “a rebellion against the blandness of commercial radio,” and “a celebration of the Internet’s power to let individuals offer their own voices to a global audience” (Lewis 2005).

Hi-Fi and Lo-Fi Soundscapes
In his book, Media Unlimited: How the Torrent of Images and Sounds Overwhelms Our Lives (2001), Todd Gitlin argues that our everyday world is “soundtracked” by institutions that use sound to brand space and to “orchestrate a collective mood” (60). He describes how customized music of the type pioneered by the Muzak Corporation is piped into stores and public spaces, and mood elevating pop tunes are “storecast” into niche retail environments (62). Radio and television similarly use sound and music to communicate a sense of urgency and reliability. The result, he says, is a global “wraparound sound” that accompanies consumer culture the world over (63). Although Gitlin points out that some try to escape this “institutional auditory control,” by selecting a different commercial soundtrack to play on a personal walkman or discman, he believes that this does little more than mask the more intrusive urban noises (64). Barry Truax would categorize these commercial, global soundtracks as “lo-fi.” He argues that lo-fi soundscapes are “uniform and about the same everywhere,” and are “created by the hegemony of only the most powerful sounds.” They are detrimental to both the soundscape and the individual, he explains, because they displace or mask local sounds, and they encourage a habit of non-listening. Hi-fi soundscapes, according to Truax, result from local conditions, are “information rich,” and are “richly interpreted by locals who understand their contextual meanings.” By creating hi-fi soundtracks, he believes that soundscape composers can help to re-integrate the listener with his or her environment in a “balanced ecological relationship” (Truax 2000).

Favorite Sounds and Soundseeing Tours
Although few podcasts consist of professional soundscape compositions, many are used to distribute local sound recordings. The website for the Earshots Collective Podcast describes this effort as a “world community project” that is about “sharing the sounds of life,” such as overheard conversations, a bird call, or urban street sounds (Earshots Collective Podcast 2007). Listeners are invited to contribute short recordings of found sounds for future podcasts, with a brief description of the location and time. The episodes document a variety of common sound events: a leaf blower, an overheard telephone conversation, a stream near the Rocky Mountains, kids playing in a water fountain, and a checkout clerk telling a customer to “have a great day”. Schafer points out that “noise” is a subjective term that is used to describe “sounds we have learned to ignore,” and
“unwanted sound” (1977, 4, 182-83). The fact that contributors to the *Earshots Collective Podcast* have chosen to share ordinary, everyday sounds that some would classify as noise indicates that sounds can be valued for their associations as much as for their acoustic qualities.

Many podcasts are personal audio journals that include music, comments on current events, and entertainment reviews, as well as recordings of the local sound environment. Ted Riecken’s *Island Podcasting* includes all of these elements. His half hour programmes feature what he calls “soundseeing” tours. These are live, narrated recordings of significant places and events, as well as more common sounds that he records as he goes about his daily activities in Victoria, on Canada’s West Coast. In more than 70 episodes, which have been published over two years, he documents the sound of ferries in Victoria’s inner harbour, bagpipes at a Highland Games, and street music performed at the Luminara Lantern Festival. More prosaic recordings include the sound of birds in his back yard as he cleans a small pond and the sound of a new horn that he installs in his Smart Car (Riecken 2007). He notes that many podcasters record their programmes outside, allowing listeners to hear other voices, birds, or the sound of crunching snow and ice as the narrator walks and talks. As a result, these amateur audio journals provide their listeners with a guided tour of local and very specific sound environments. Riecken, like most podcasters, uses inexpensive recording equipment and does minimal editing, so his podcasts do not exhibit the professional audio quality that we have come to expect from traditional broadcast media and commercial entertainment. However, these information rich, personal tours would qualify as “hi-fi” recordings as Truax defines the term. Unlike commercial studio recordings with high production values, these podcasts provide a more direct experience of real sounds from real events and places.

**Soundscape Documentaries and Compositions**

Some podcasters are active participants in the Acoustic Ecology movement. They use their programme to share soundscape recordings, and they post relevant information on their website. Lorenz Schwarz created his *Soundscape Collection* podcast to share soundscapes that he encounters in his daily life in Basel, Switzerland. Since the focus is on the acoustic environments that he documents in these short, high quality episodes, his audio comments are limited to information about when and where each was made. He records the sound of a park on a sunny afternoon, a tram ride, insects on a blooming berry bush, and the chiming of church bells. He recommends that listeners use headphones and play close attention to the wide variety of sounds in these environments. In one episode, he presents recordings of three different urban spaces and asks the listener to guess where they are, before revealing that they are a supermarket checkout, a bank lobby, and a car wash. His objective is to encourage listeners to develop a greater sensitivity to their own local soundscapes through more attentive listening, and to increase their appreciation of the relationship between sounds and different environments. While recording the sound of children playing in his backyard one evening, a rainstorm approaches, thunder is heard rumbling overhead, and heavy rain falls. A few weeks later, he records a similar weather event while visiting a friend at a farm in the middle of an extensive flat plain, and he invites listeners to hear how different the storm sounds in this rural landscape. A note that accompanies the podcast provides the following description:

I’m standing near an old Italian farm house listening to a thunder storm. Raindrops are falling on the plants nearby and on my head and shoulders. The landlord is talking to a tenant and feeding his dog. You can hear the openness of the area (Schwarz 2007).

*Scapecast* is another effort to publish high quality local soundscape recordings. Created by a sound engineer living in Manchester, the first few episodes of this recent podcast features the sound of a concrete pump at a building site and a recording of a tram near a busy street. “I like the way that the birds and wildlife cut through the distant rumble of traffic, become lost as the trams pass, reappearing with the calm that follows” comments the producer, who identifies himself only as Jon.
As a sound engineer, Jon reports that he could not resist publishing a version of a tram recording that he manipulated using a Pro Tools filter. The altered file maintains the duration and relative volume of the major sounds, while smoothing out the fine detail. The result is something closer to a memory or dream of an event, rather than a faithful reproduction. Other podcasters use sounds recorded from their local environment as starting points for musical explorations. *Modulation* is a podcast of soundscape compositions by Tomoyuki Sugimoto that are inspired by, and derived from, everyday sounds from Japan. These include the sound of buzzing insects, radio sports broadcasts, Kyoto Station, ringing telephones, and human and synthesized voices (Sugimoto 2007). By creating something musical from common sounds that form part his acoustic backdrop, he heightens our awareness of these sounds, and he invites us to consider how his local soundscapes compare with similar ones that we have experienced.

Schafer comments that, although the electric revolution enabled us to record, store, transmit, and reproduce sounds, these processes also split sounds from their original context, resulting in what he refers to as “schizophonia” (1977, 88). We might expect the digital manipulation of recorded sounds to increase this sense of disorientation and to separate us further from the acoustic environments that we wish to understand, to appreciate, and, hopefully, to improve. However, many leaders in the Acoustic Ecology movement are practitioners of the art of soundscape composition, and, although the electroacoustic works that they create often include synthesized sounds and the digital editing and reshaping of recorded sounds, their aim is to enhance the listener’s awareness and appreciation of environmental sounds in specific contexts. Hildegard Westerkamp explains that soundscape compositions are “always rooted in themes of the sound environment” and are never abstract (1999). The relationship between unprocessed and processed sounds should always inform the listener and the composer about place, time, and situation:

> In the face of wide-spread commercial media and leased music corporations, who strategically try to use the schizophrenic medium to transport potential customers into a state of aural *unawareness* and *unconscious* behaviour and ultimately into the act of spending money—in the face of such forces the soundscape composition can and should perhaps create a strong oppositional place of *conscious* listening. Rather than lulling us into false comfort, it can make use of the schizophrenic medium to awaken our curiosity and to create a desire for deeper knowledge and information about our own as well as other places and cultures. It is a forum for us as composers to ‘speak back’ to problematic ‘voices’ in the soundscape, to deepen our relationship to positive forces in our surroundings or to comment on many other aspects of a society (Westerkamp 1999).

**Speaking Back**

Gitlin describes the torrent of sound that demands our attention as a seamless collage of stories, commentary, sound bites, and increasingly short fragments of ads and musical soundtracks (2001, 7, 96), and he points out that it easier to avoid seeing something than it is to choose not to hear (2001, 60). Although we may not be able to escape the torrent, a two-way medium allows us to “speak back” in a way that helps us to reclaim our voice and to regain a measure of control over our
sonic environment. One creative approach is to capture the torrent, rob it of its narrative power, and send it back out. Christopher Ariza’s *The Babelcast* is a computer-generated podcast that he creates from audio samples of political leaders and commentators from the U.S. and around the world. These sounds are harvested from the electronic media every week or so and are mixed with dynamic noise textures to create an “ambient soundscape” that offers “a unique musical perspective on mass media, language, and current events” (Ariza 2007). Although the sampled segments are long enough for us to understand what is being said, they have been decontextualized, juxtaposed, and layered in such a way as to strip them of any political meaning. In these regular, five-minute episodes, powerful voices have been fragmented and rendered harmless in the creation of sonic poems.

The producer of the *1st Silent Podcast* follows a very different tactic, by providing an acoustic pause and “an opportunity for reflection” (*Silentpodcast* 2007). The 28 completely silent episodes that have been published since July 2005 invite listeners to consider familiar sounds that are evoked only through their titles and brief descriptions. One minute of “Silent Ringtones,” two minutes of silence “recorded at Las Vegas,” and three minutes and 14 seconds of information “presented live” from a sales conference suggest noisy acoustic events. More natural soundscapes are invoked by two minutes of “quiet silence from the mountains of Utah,” ten minutes and 4 seconds “recorded live at the great rainstorm of ’06,” and 5 minutes and 8 seconds recorded “in a Tuscan Vineyard.” However, all of the sound has been removed from these experiences, leaving nothing but their duration intact. One episode, which lasts for exactly four minutes and 33 seconds, is intended to honour John Cage’s famous silent composition, 4’33”. James Pritchett suggests that, by creating a piece that has structure but no content, 4’33” has a personal, spiritual purpose. Its literal silence, he argues, “reflects the silence of the will necessary to open up a realm of infinite possibilities” (1993, 60). He also points out that, four years before creating 4’33”, Cage expressed a desire to produce a piece consisting of four and a half minutes of uninterrupted silence for the Muzak Company. It was intended to serve as a kind of “silent Prayer” that would provide temporary relief from the canned music that was piped into retail stores and other interior spaces (1993, 59). By allowing individual listeners to take a break from their noisy playlists, the *1st Silent Podcast* seems to have a similar objective. The absence of intentional sound encourages the listener to take a break from continuous, commercial music and to pay attention to the ambient acoustic environment beyond the headphones.

As podcasting becomes a mainstream medium, the avalanche of commercial and institutional podcasts will make it harder for individuals to find the independent episodes that promote conscious listening, that make a positive contribution to our sonic environment, and that encourage us to take responsibility for improving the soundscapes that surround us. However, the popularity of two-way media is unlikely to diminish. Hopefully, the creative podcasts that are currently available will attract more listeners who have an interest in their acoustic surroundings, and they will inspire other community-minded podcasters to join in on the conversation.
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Biographical Notes

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The Sound of Silence in Spaces of Many Dimensions

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Abstract
We explore three-dimensional space by re-generating it as a body-mind experience. Our mind has invented even more dimensions. We experience them as purely mental constructs, far from any immediate sensory perception. We connect the sensual perception of three-dimensional space with noise, and the mental construction of multi-dimensional space with silence. Its beauty would then be the sound of silence. We show the visually exciting silence of that world in studying art work by Manfred Mohr. He has developed his distinct style strongly connected to the cube and hypercube in four and more dimensions. His art is not visualizing those structures but rather deconstructing their symmetry as an act of creating concrete aesthetic objects. We have designed a software tool, deviceX, to support the observer in developing an idea of the silent processes behind the algorithmic patterns governing the appearance of lines, shapes, and colors. deviceX allows to manually transform the geometric appearance of a Mohr picture into its equivalent topology.

Keywords
Semiotic machine, algorithmic sign, algorithmic art, hypercube, deviceX

Introduction
Is „computers in art education“ to be understood as art education enhanced by computers brought into the classroom? Or, perhaps, as an introduction to Adobe Photoshop in preparation for a cooperative student project on collage? It could go either way.

Art education is different in so far as it (i) is about perception and conception, and (ii) relies on doing much more than many of the other subjects. Art education helps develop a feeling for the concreteness of materials. Computers, programs, data, and interfaces are of a different kind. Starting in the early 1970s, the material status of software was heavily discussed. Is it of an immaterial or pseudo-material kind? The position we take on such issues influences the use of computers (or digital media) in art education. What is the right time to allow for computers in art education, was a hot topic but got run over by facts. What are subject matters from aesthetics and fine art that need computers for a proper treatment, appears to be a more appropriate direction to go.

In this paper, we introduce a view of the computer and of software that supports an independent position on the issue of computers in art education. We identify the computer as the semiotic machine, and software as algorithmic signs. The semiotic concept leaves behind as fruitless debates like „computers in the classroom – yes or no?“ The paper first studies an example of the algorithmic art of Manfred Mohr which we use to demonstrate a specialized software tool. It allows for an insight that is otherwise impossible to gain. We, second, explain the two concepts and interpret the example in the light of that theory. We hope that the strange title will become clear by reading the text.

Algorithm and art
A small number of exhibitions in the USA and Germany in 1965 started a movement that came to be called computer art. Those earliest and rather innocent manifestations were often belittled and, with exceptions, widely ignored by the art establishment. A few more events were put up by
prestigious places like discovery trips into the relation of art, science, technology, and culture. In their time, none of them was a great success. But in retrospect, each one of them left behind a legacy.


Researchers in art history or cultural studies are at times surprised to realize that an entirely new image science has emerged. The algorithmic revolution, as Peter Weibel calls it in a remarkably successful exhibition at ZKM (Karlsruhe, October 2004 to January 2008), happened without people noticing but with greatest effect. There are virtually no images any more that would not carry some algorithmic traces within.

We decided, for this paper, to concentrate on one particular case. We hope thus being able to demonstrate a principle, the principle of inherent capability. What is it? One of McLuhan’s most celebrated slogans was, „the medium is the message“ (McLuhan 1964, 23ff). Simply put, this says that a new medium gets used with an old medium as its contents (e.g., theatre – cinema). The message is reduced to stating „look here, I was done by whatever the new medium is“. The principle of inherent capability, however, claims that a medium becomes more than its own message when its inherent capabilities are used for new kinds of expression.

The inherent capability of the computer is computation. When the machine for computation started to reveal its media qualities, it first generated pieces of art that often looked like contemporary art. The challenge is to use the computational machine such that it does not just automatically compute what was done by hand before. The search was for the genuine expression.

We want to demonstrate this principle in the case of Manfred Mohr’s art. Manfred Mohr is a New York based artist of German origin who started using the computer in 1969, shortly after a few others had demonstrated the feasibility of writing computer programs to generate aesthetic objects and put them up in galleries. To avoid the term „computer art“ (which had gained some limited popularity by the time), Mohr for some years spoke of his art as „algorithmic art“. As it turned out, his effort was in vain. For many, the term „algorithmic“ may have been too alien. Outside of mathematics or computing it was simply unknown. But when you started to understand what it entailed, the term algorithmic art seemed to be a contradiction in terms.

For algorithm is more or less synonymous to computable function. Could art be generated by computable functions? Not really, general opinion would have it. Art came out of deep feelings, intuition, from the guts and not the brains. You knew how to do it or you left it. Following this train of thought, algorithmic art would have to be a result of computation without mercy, of automatic descent, but at the same time of aesthetic value. The world of algorithms is a mathematical world, a world of general laws and rules, of strictly logical derivation, of hard work to follow a proof. The world of art is a world of immediacy, a world of specifics and unique decisions, of judgement, critique, and contradiction, of quarrel and acceptance. Where mathematics defines, art interprets. Where art is subjective expression, mathematics is general law.

It may turn out now, a generation later, that the rejection in the 1960s of the term algorithmic art was an unconscious reaction against first signs of a development in culture that has meanwhile taken on form and gained tremendous momentum. The development and influence of digital media
requires people to be capable of thinking algorithmically and aesthetically at the same time. The fact that new study programmes, centered around digital media, have started to be offered at many places is an overt proof of the trend.

In the word „algorithm“ the first paradigm of computing appears: computability. It is still of lasting importance and influence, and will prevail. But it has become second to a new paradigm: interactivity. Interactivity had been a topic of research for a long time with some erratic achievements during the 1960s by Ivan E. Sutherland, Doug Engelbart, Ted Nelson, and, starting into the 1970s, Alan Kay and his Learning Research Group at Xerox PARC. With the appearance on the market, in 1984, of the Apple Macintosh, twenty years after the beginnings of algorithmic art, interactivity became the second paradigm of computing. Prix Ars Electronica, the most prestigious award available to artists of the digital era, soon adopted „interactive art“ as one of its prize winning categories.

There is quite a diversity now of genres in digital art. They could as convincingly be used for a demonstration of the principle of inherent capability. They all rely on algorithms, in some cases in the most beautiful and inventive ways. It is, therefore, justified to stick to the more traditional approach of studying a piece of canvas covered with paint, digitally printed.

Cube and canvas
Manfred Mohr began painting in the mid 1960s in the Informel and Hard Edge traditions. The chaos component of his creative spirits also surfaced in his jazz improvisations on the saxophone. Rather early, however, the algorithmic structure component gained priority over the chaotic one when he was allowed to use an automated drawing machine in Paris in 1969. In 1973 he conquered his life’s topic when he started to break the cube’s symmetry (Figure 1 is an example).

Just using the computer (instead of, or besides, other devices) would not turn his work into art. He had to turn the newly available technology into his instrument for an expressive purpose. Mohr’s idea was to use the computer as an algorithmic instrument to break the cube’s symmetry. The three-dimensional cube is arguably the most fundamental element of space. It definitely stands solidly for the Cartesian idea of space. Breaking symmetry would create a source of visual complexity. Mohr’s work of about 40 years is proof of the potential of this first intuition.

Mohr paints canvases (or has a digital printer do that for him). So he restricts his creative output to the flat 2D-image. But the 3D cube is not a physical object to him. It has rather become a mental concept. The mental concept, in order to be turned into the stuff of computation, must take on the form of algorithm and data structure. In the algorithmic world, this is not a voluntary decision. It is a necessary step. Nothing exists here unless it is made computable. In order that humans may be sensually affected by the computer’s results, the object of computation must be turned into perceivable form. This is the most trivial, yet fundamental lesson of computing: Computer things and processes must be sensually perceived by the human, and electronically computed by the computer. Everything on and in the computer exists in duplication. This will turn out to be the raison d’être of the algorithmic sign, and the peculiarity of the computer as medium.

Whether Mohr was aware of this theoretical insight, doesn’t matter. He did what he did with a good deal of secure intuition. From Max Bense, one of the founders of information aesthetics, who had a strong early influence on Mohr, he had learned that the work of art may be described as a sign. When such signs are generated by the computer, they become algorithmic signs (Nake 2001b). The art is to create creatures that traditional drawing or painting does not dream of. Traditional painting appears as immediate, direct, haptic experience: brush on canvas, pencil on paper. Algorithmic art, in comparison, is painting from a distance, with the brains, and eyes shut. Not the individual piece
occupies the artist’s thinking. It is rather the entire set (or class) of pieces that this particular one belongs to.

The voluminous book by Keiner et al. (1994) tells Mohr’s story. Two catalogs (Nake 2001a, Herzogenrath et al. 2007) are on his more recent art. After having been an addict to the 3D cube for some years, his art was in need of greater complexity. He turned to four and more dimensions. In \( n \) dimensions, the hypercube is a purely mathematical structure. Its defining components are hypercubes again, but of reduced dimension, \( n-1 \).

**Geometry and topology**

We have designed an interactive software tool capable of transforming the geometry of a particular class of Mohr’s paintings into the corresponding topology. The tool works only for the space-color class of Mohr’s art. We here indicate what the tool is supposed to do.

We must outline the algorithmic generation of an instance of the space-color class. Take a hypercube in six dimensions. Choose two opposing vertices, say A and B. The diagonal from A to B cuts through the interior of the hypercube. A *diagonal path* is a path from A to B running along edges of the hypercube. Each such diagonal path consists of six edges. Between two given vertices, there are \( 6! = 720 \) different paths.

The program randomly chooses four of those paths. They are ordered from first to fourth. A straight line connects the first bends of the first and second path. This applies equally to the third and fourth paths, and back to the first. Analogously, connections are established between the sequence of second bendings, etc. This procedure creates 24 quadrilaterals cutting through part of the hypercube. Each one of them is randomly colored. This way, a complex situation of colored quadrilaterals in space is constructed. The construct is purely mental. It can easily be described algorithmically and carried out computationally.

Mohr’s interest is not visualizing the space situation. He rather projects the colored quadrilaterals down to the flat image plane (in some pre-assigned sequence as to avoid problems of hidden faces). This projection creates the image (Figure 2). In our implementation, the hypercube rotates in space, creating incessant changes of color-form in the image plane.

This is the starting point for deviceX. It can be used to explore this sort of image. In its current form, deviceX (Figure 3) appears on the screen as a slider without having the typical visual form of a slider. It is a miniature replica of Mohr’s algorithmic space-color image. You move the slider by moving the mouse. Ist position between the geometry and topology of Mohr’s picture is turned into an interpolation of the two extreme views. The slider itself shows the state of the object or process it is applied to. Contrast this to the typical slider to control the volume of your radio set. It is used to physically reset the value of the volume, and to change the radio state accordingly.

Similar in our case of a semiotic (or semantic) slider. When you move it, you immediately observe on the slider the change of state. So the slider stands for the control position and the controlled state variable. This collapsing of the two sides of a control (setting the scale and changing the state) is only possible in the semiotic domain. Figure 4 shows a series of twelve states of deviceX applied to a particular 6D-situation.

The device allows for a few more functions to help understand some of the relations in Mohr’s paintings. You can select colored areas, or their border lines. When selected, an objects starts to flicker. Flickering helps you concentrate on selected parts.
Mohr offers a little computer and LCD screen running one such situation in permanent rotation in very slow motion. He can almost guarantee a situation never re-occurring during a collector’s life time.

**Semiotic machine and algorithmic sign**

Art education has always been manual and mental, material and form. This may in part be changing. A semiotic transformation is the necessary pre-condition before anything can be processed by computer. Objects lose their materiality when substituted by signs. The semiotic transformation emphasizes operations and structures: operations to be applied to, structures to organize, the resulting signs (really this refers to the representamina of signs).

deviceX can help develop a deeper insight into a complex image. What is the trick? We observe that the image exists as an algorithmic sign, i.e. a sign resident on the computer. As such we observe its visual appearance, while the computer is manipulating the structure of that appearance. Our action is moving the slider. Our observation is that the slider’s content leans more to the geometry or more to the topology of the image. The immediacy of this semiotic (quasi-immaterial) situation is due to the actual manual movement of the slider’s physical device and its computational interpretation by the software. This immediacy is of high educational value. In the semiotic realm it figures *in place of* the application of a physical tool to some physical material. The tool literally becomes a mediator.

Our lesson is that immediacy in handling an interactive device and perceiving the semiotic changes, may substitute for the physical immediacy of tool and material. In the material world, when we apply a tool to a physical object of interest, we change the state of that object irrevocably, and in parallel observe the change. In the semiotic world, we change the state of a physical device and in parallel observe the change of the *representation* of the object of interest. It is changed because the computer intermittently reads the device’s changed state, interprets it according to the currently active software, and thereby changes the state of the representation. This is possible only because the object appears visible to us and manageable to the software: it has become an algorithmic sign!

At the same time, the computer has become the *semiotic machine* (Nöth 2002). This type of machine changes the semiotic, rather than the physical, state of objects. As the semiotic machine, the computer has over the last two decades revealed its media qualities. It has made objects and processes grow semiotic skins before they can be manipulated by algorithms. Those skins create a distance, they remove us from the objects, allowing only for mediated encounters. Some of that mediation may be gained back in immediacy – in a more abstract immediacy, of course. That would become the sounds of silent spaces.

**Space and silence**

Since stillness is the motto of this conference, instead of a conclusion we end on stillness. Thinking of it brought up the following thoughts. We see, in all honesty, connections between algorithmic travel in abstract space, silence, and noise.

To Immanuel Kant, *space* was an inner subjective imagination and yet a formal condition *a priori* of our experience (Kant 1956, 270). The naive idea of space is a box surrounding us: we go to a building, enter it, and leave again. Kant’s concept of space is, of course, not as simple as this but he supports it.

Space as a container to be filled was the idea of Aristotle. To Descartes the physical world was out there with all its myriads of things: *res extensa*. The soul and thinking were in here with all the names and concepts: *res cogitans*. Thus he created the utterly successful split of body and mind.
It was needed to invent abstract mathematical spaces: axiomatically defined space became a sign.

Three dimensions became a mathematical concept, and once that had been introduced, it was easy to have any number of dimensions. The abstract concept was clear, clean and powerful. You don’t see those dimensions. You think them.

Can we think of time and space without noise and silence? Does not all our experience result from our bodily movement in the world? From home to work, from day to day, through dark and light – all forms of time-space experience are tied up with noise and silence, with sound and stillness.

Silence is the „complete lack of noise or sound“ (Oxford Dictionary). Stillness is „the quality of being quiet and not moving“. Moving creates space, not moving is location; their parallels are noise and silence. Silence is the zero extreme in the auditory domain: total absence of any audio signal. Noise – as in white noise – at the other extreme stands for the mixture of all possible audio signals. Sound is what we perceive most of the time.

Sounds are events in space traveling in time. Each one tells us of near and far, out and in, left and right, front and back. Space is not empty of sounds. Real space is also sound.

What about abstract space then, imagined, mentally constructed, mathematical space? There is clearly no sound there. Metaphor doesn’t sound. Yet, in older times, the stars and planets screeched, squeaked, rumpled along their eternal mechanical paths because the metaphor for outer space suggested so.

To the extent that space is void of matter, it must also be void of sound, we believe. Space out there is governed by silence. And yet – is it not a pleasant idea to listen to silence? John Cage’s composition comes to mind. Listening to the sound that we cannot hear, and after a while we discover it, the sound of silence.

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emphasis on computer art.
Figure 1: Manfred Mohr, P-202-f (Cubic Limit I) 1977 (artist’s permission) – 6 stages from a 3D development.

Figure 2: Manfred Mohr, P-707-f (space.color) 1999-2001 (artist’s permission) – diagonal paths in 6 dimensions.

Figure 3: deviceX. Lower row, geometry (left) and topology (right) of typical Mohr image from space.color program. Upper row, small replica of geometry, slightly moved top the right.

Figure 4: deviceX. Twelve stages of moving the slider from geometry (left) to topography (right). Image different from that of Figure 3.
The Polymorphic Intelligence

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Abstract
The aim of this paper is to reconsider the idea of human intelligence and machine intelligence as two separate entities. To do so, we define a new concept that we call Polymorphic Intelligence [1]. Such a concept comes up as a possible answer to many ‘false’ paradigms and philosophical and conceptual orientations that for decades have pervaded many research fields, such as education, art, literature, psychology, pedagogy, science, technology and A.I. We believe, indeed, that in this exact moment of human history, it becomes necessary to clarify with a strong theoretical paradigm what is the real relationship between machines and humans. Therefore, we propose to abandon the mental scheme by which intelligence is an exclusive prerogative of the humans to embrace the idea that machines have started to express a real collaborative and/or competitive force, they are able to produce ideation, inspiration and contribute to the wealth of ideas.

Keywords:
Art, Mind Psychology, Intelligence, Darwinian Writing

Introduction
Being conscious of our own final goals is one of the most important rules to follow to achieve good results while conceiving and implementing ideas. Despite this, it is our feeling that for much too long A.I. researchers and experts have had a “wrong” target in mind when focusing on ‘how to make a machine intelligent’ or ‘as intelligent as humans or other forms of life’. At the same time, those who study the mind have been neglecting the influence of machine intelligence over humans. It is not by chance, indeed, that the word intelligence itself has gained dozens of additional meanings and has had to incorporate so many extra aspects that today one could almost rename it as “everything”. Obviously, this overall tendency is not good and it is leading to a sectored, molecular, and consequently neutral and senseless portrait of the mind at work. This is true, although intelligence for certain categories of scientists - that include Psychologists, Pedagogists, Computer Scientists, Engineers and etc. - should be the core-business of their disciplinary research and, therefore, the highest conceptual ideal to aim to, with the maximum caution and adequacy.

This might be due to the inheritance of old paradigms, ideas and approaches that are strangling the upcoming need for new definitions in fields such as robotics and AI as well as in literature, art, and education. Let’s take as an example the human-machine interaction and interaction design concepts. These two paradigms are basically out of date since they approach the human relation with the machine with a sort of alienation and with a limited level of relational complexity, since they take for granted that machines express a well defined, limited and finite number of responses. This is not true any more.

In this perspective, the first step to take consists in rejecting the scheme that the constructive (and, symmetrically, destructive) intelligence is an exclusive prerogative of the humans (or, more in general, biological), to fully recognize and admit that artefacts are able to create and express collaborative and/or competitive acts. In other words, machines, with all their new artificialities based on electronics and digital devices are becoming decisive and decisional, creative and clever, and, under all circumstances, co-interpreters of the reality we live. Because of this, we think that it
is time to move to a *human-machine interrelation* concept that is to be based on a deeper level of human-machine *involvement*.

### Inheritance

As said above, old ideas - originated from a few, but very popular, scientific, philosophic and artistic theoretical constructs - have been simply prejudicing and polluting the entire domain of human thought and the way we’ve been thinking about intelligent artefacts in the last century.

![Image](image.png)

**Figure 1.** One of the first editions of the famous Isaac Asimov’s *I, Robot* [3].

Amongst all, the most *dangerous and mining* were those theories popping out of Turing’s [2], Asimov’s [3], Orwell’s [4] manuscripts where, paradoxically, the distance between humans and machines is thought as absolute. Their notion of machines (and therefore *machine-intelligence*) is of a somehow isolated *external device*, while the relationship they thought we could build is extrinsic, both physically and mentally. In our opinion, such an idea is to be demolished because it generates a conceptual and structural approach to machine-thinking *disintegrated* into what is to be considered the evolution of the human species. Indeed, for many years humans and machines have shared the same spaces either physical and geographical, or cerebral and virtual and, in other words, machines are an integrated part of our *Ego* or, at least, part of our own world and everyday life.

To overcome the old way of thinking artifacts it seems to be necessary to step back to old schemata, which are typical of Oriental, Indian or Native American cultures, and integrate them with most recent western psychological and philosophical theories like those postulated by G. Bateson [5] in *Steps to an Ecology of Mind*, or by J. Gibson [6] in *The ecological approach to visual perception*, theories that can be seen as the bases for *Ecological Psychology* [7] or *Environmental Psychology* [8]. In short, the idea that lays behind these theories is that the whole world takes part in our own computational intellectual potentialities and brain. The world is, in other words, an important component of our sensory motor system. If so, it becomes essential for those who study the mind (as well as AI), to inherit the Bateson’s [5] principle which states that the “blind man’s stick is part of his sensor-motor system of his associative areas, and of his mind”. Researches have to face the idea that artefacts might be an integral part of our abilities of elaboration processing, besides our perception and action.

Indeed, while modern *Psychotechnologies* [9] differentiate from the traditional ones - i.e.: motor (e.g. bicycle) and sensory (e.g. telescope) - and accordingly with the famous De Kerckhove [10] classification, including radio, television (i.e. connectivity) and computers and Internet (i.e. interconnectivity) it is to be noticed that nowadays many automatons are even more complex.
Indeed, latest tools represent, more than integrative processes, pervasive ones. Even more, they are substituting human cognitive processes, even at a high level, like creativity and problem solving.

**New perspectives**

Now, although the fusion between natural and artificial intelligence is becoming a reality, it seems that we are not fully conscious of the changes that are taking place. Indeed, while we are aware of the fact that the agenda found in mobile phones is replacing part of the functionality of our long-term memory, we find it hard to realize how the famous “cut&paste” or “undo” or “text input” are changing the way we write and, therefore, think and communicate. In short, the symbolic system we are inheriting by the electronic culture is affecting our minds and is revolutionizing our entire semiotic system.

For example, as students we used to write out our own documents - maybe copying or borrowing sentences from others every now and then. Today, our students, do a Copy&Paste of their full thesis – maybe adding something personal every now and then. And some of us started to do that, too. But that’s not evil. Not necessarily so. On the contrary, it reminds us of the DNA evolution, where the outcome is the mixture of old pieces with crossovers and, sometimes, mutations. This attitude has become so popular - it is the way 90% of the writers express themselves today - that we need to define it. Let’s call it Darwinian Writing. The Darwinian Writing exists and, inevitably so, being the final output of a text represents what we usually read and comprehend when we let written information go through all levels of our society. The Darwinian Writing is a clear example of a clear consequence of how basic A.I. (or IT if you prefer) can influence human thoughts.

Furthermore, elements like hypertexts, global searches, internet maps, GPS, wearable computers, autonomous robotics, and so on represent an increasing number of functions the biological brain is enriched with and, at the same time, delegating to machines. In other words, while modern artifacts push the brain to restructuring its functions, they also represent an increasing level of “dependency” the human intelligence is destined to machines. Practical examples might be seen in the recent growth of such disciplines as *Psychogeography* [11] (i.e.: how to create geographical maps linked to human emotional experiences) or tools like *Brain Training* [12] (computer based exercises that help revitalize cognitive functions).

Essentially, intelligence has doubled its evolution speed and hugely enlarged its domains. That’s happening because, besides the natural genetic evolution, intelligence is also evolving in its own definition. This is due to both the power of the new technological achievements to improve our ability of self observation (and self-consciousness), and to the fact that algorithms can evolve their artificial intelligence. To take it a step further, we need to point out that our minds are influenced by the advent of “intelligent” artifacts. Indeed, as G. Rizzolati pointed out with is *Mirror Neurons* [14] theory, humans mostly learn by imitation. Computer scientists, AI and Robotics experts use that knowledge to apply to machine learning. We must become aware that by doing so we have initiated a never ending loop in which learning and teaching is somehow simultaneous (in terms of a society extended to intelligent machines).

These facts, are taking us straight to the first forms of hybridized intelligences.

To sum up, if on one hand it is very easy to predict that “the ability of future machines to directly share experiences and knowledge with each other will lead to evolution of intelligence from relatively isolated individual minds to highly interconnected structural entities” and that “the development of a network of communicating mobile and stationary devices may be seen as a natural continuation of biological and technological processes leading to a community of intentionally designed and globally interconnected structures” [13], on the other hand, what is much harder to comprehend is that the human brain is not extraneous to all of that but, on the contrary, it...
gets deeply influenced by A.I. in action. Part of this is what we can call the Polymorphic Intelligence.

**Polymorphic Intelligence**

As far as we know, humans are the most “intelligent” organisms since their brain functions are complex and sophisticated at the very same time. Indeed, when in *Frames of Mind* [15] the psychologist and neurologist Howard Gardner tried to define intelligence he came out with seven different substructures:

1. **Linguistic intelligence** (sensitivity to spoken and written language);
2. **Logical-mathematical intelligence** (the capacity to analyze problems logically, carry out mathematical operations, and investigate issues scientifically);
3. **Musical intelligence** (encompasses the capacity to recognize, compose and perform music);
4. **Bodily-kinesthetic intelligence** (the potential of using one's whole body or parts of the body to solve problems);
5. **Spatial intelligence** (the potential to recognize and use the patterns of wide space and more confined areas);
6. **Interpersonal intelligence** (the capacity to understand the intentions, motivations and desires of other people);
7. **Intrapersonal intelligence** (the capacity to understand oneself, to appreciate one's feelings, fears and motivations).

Certainly, also thanks to such a refined biological evolution of their computational functions, it has become possible for human beings to reach a high level of social and technological evolution that, only recently, is flowing to such a stage that might be defined as the intelligent machines age. Amongst us few great artists (e.g. W. Shelley [16]; G. Orwell [17]; P.K. Dick [18]) envisioned that we were about to get to this point and consequently depicted a possible scenario to try to prevent the moral and the ethical decay of our societies and species. In particular, Asimov [3] who tried to define the three famous A.I. constrains:

1. A robot may not injure a human being or, through inaction, allow a human being to come to harm.
2. A robot must obey orders given to it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

So, while artists were anticipating crucial philosophical goals for the future human-machine relationship, on the other side, many different scientists were defining practical objectives. Amongst them a special mention goes to A. Touring who tried to define through the famous *Turing Test* [2] the meaning of A.I.

1. A human judge engages in a natural language conversation with two other parties, one being a human and the other being a machine; if the judge cannot reliably tell which is which, then the machine is said to pass the test.

For what came later all these conceptual paradigms were very significant for any further theoretical development and worked as lighthouses for thinking about AI.
Despite this, as it often happens in the history of ideas, what was a fundamental and inspiring landmark in the past might represent an obstacle for further evolution, and, most likely, both Asimov’s and Turing’s (and similar authors) principles today are still being followed too much and believed, while they actually seem to be fully outdated.

Figure 2. The *Atron* modules [21].

Things have changed because the definition of AI itself has changed. Indeed, it is clear how the Turing Test has been surmounted and AI is moving towards the idea of *Collective Intelligence* - e.g. Swarm [19], Boids [20] and etc. – as well as that robotics is moving away from the basic concept of mono-shaped body structure and the ‘prison’ of its canonical aspect – e.g. *Atron* [21], *RoboMusic* [27].

Even more, A.I. has started opening to such problems like interfacing humans, hence taking us to a *Polymorphic Intelligence* state where Artificial Intelligences deeply interact with biological ones. This is occurring at all levels. In virtual worlds (SecondLife [22], Gazira Babeli [23] and Marco Cadioli [24]) in real world (MipTiles [25], I-BLOCKS [26], RoboMusic [27]), and in mixed realities (Stelarc [28], Talkers [29], Ambient Addition [30]).

Figure 3. Stelarc [28]. *ExoSkeleton*

In other words, what is happening is that we cannot point at A.I. as the result of a single, linear artificial process but, on the opposite, the new picture tells us of a multidimensional non-linear process which is difficult to handle and, more or less, impossible to fully control. Things get even more complex when, instead of the old fashioned interactivity (i.e. the switch on activate/deactivate rule) we insatiate a run-time multi interactive dynamic (i.e. interrelation) with a single ‘species’ of
AI artefacts or even “worse” a multitude of them, simultaneously. Obviously enough, the outcome is a scenario where Asimov’s laws don’t really make sense, since machines themselves are loosely controllable (i.e. often dealing with non-linear maths and non-complete problems) and largely interconnected and therefore non directly responsible for the general system outputs.

In this perspective, we both need to renew our methodologies and move from the idea of Human-Machine Interaction (or Interaction Design) to the concept of Human-Machine Interrelation where the basic principles of interactivity are a bit more aleatory or, at least, less predictable and, even more important, are completely different from what we have been dealing with in the past, since the interactive procedure moves from a one way to a bidirectional intelligence flow. Indeed, what we will call here Imitational Intelligence, is a factor, neglected by the Howard theory [15] but indirectly consecrated by Rizzolati’s recent discovery, which seems to be a crucial issue that must be taken into consideration and that will play a large role in future human-machine theories. Theories that will inevitably lead us towards a new conceptualization of the meaning of Intelligence as a domain hybridized by machine and therefore multiple, multifaceted and Polymorphic.

Conclusion
When looking at all the ideas and definitions of AI and Computer Science of the last century it becomes evident that there is something wrong regarding the philosophical approach that has been developed in the so called machine (or android, or cyborg, or robot) thinking. What seems to be missing is the idea of feedback that machine intelligence imposes upon biological intelligence, creating brand new forms of intelligence (either natural or artificial) that we define here as Polymorphic Intelligence. This form of intelligence might be dominant and lead both artificial and biological way of thinking. As a consequence, to look at intelligence as polymorphic might be a key point of view that will - and should - influence the way we pursue research and education, in the next future.

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Biographical Notes

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Dispelling the Ghosts of the Past: Stillness as a Gate to the New

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Abstract
This paper will argue that notions of artist, audience, creative practise and participation need to be redefined if substantial change is to be affected via the digital. Central to the redefinition of these concepts will be the status of participation within the creation of interactive products. This will be explored by drawing on the author’s experience of teaching games technology and developing games related products as well as drawing on research that investigates service users’ involvement in the commissioning of new work within the National Health Service.

Keywords
Play, Participation, Consultation

Introduction
Above all else, this is a position paper. The reason for this is that the demands of true interactivity are so radically opposed to traditional forms of artistic practise that another approach to these issues is now required. This paper aims to challenge these traditional forms of practise, these ‘ghosts’, through an engagement with the issues of play and participation. To this end it will explore participation as a central tenet of play (via computer games), leading to a wider consideration of participation and the consequences that this might have as a principle within new media. It is our contention that artists’ appropriation of games technologies have so far missed participation as a creative principle and its experiments have been limited to the subversion (or the legitimisation of a craving for) popular culture and the political agendas adjacent to these issues. In fact the status of even the most traditional categories of ‘art’ and ‘design’ have become clouded when we are faced by the issue of interactivity. As a result we will first consider whether these terms are applicable to such an endeavour.

Simplicity
Within the world of interactive applications one demand now stands out, the call for simplicity. In The Laws of Simplicity Maeda addresses this by stating that

Perhaps this is the fundamental distinction between great art and great design. While great art makes you wonder, great design makes things clear. (Maeda 2006, 70)

The iPod’s jog wheel has become the unofficial mascot for this call. The clarity to which Maeda refers is bound to an instrumentality that cuts directly from intent to action. But can such instrumentality facilitate a sense of wonder? Although we may not accept that we are passive when confronted by ‘great art’ - our ability to reciprocally interact with it rarely exists. ‘Wonder’ therefore appears to be directed at what we cannot grasp, a fugitive sensibility; where a sense of ‘involvement’ appears to arise from the insights provided by the work, leading to a ‘remaking’ of oneself and one’s relationship with the world, rather than any interaction that affects the work itself. However digital media may be capable of moving us beyond this impasse; utilising complex and emergent phenomena we may discover that we are now capable of actively involving participants in the unfolding of such events.
But given this, one still has to ask whether interactivity has a place within the creation of ‘great art’. The present lack of digitally based candidates to receive the accolade of being great art does not suggest the contrary. Indeed many of the advocates for digital art have tended to proclaim what ‘will’ be achieved once technology has reached a certain level. Those doing so ought to note Bolter and Grusin’s observation that “they have inherited from modernism the assumption that a medium must be new to be significant” (Bolter and Grusin 1999, 270). Such claims can be seen in the multitude of terms invented by those seeking to further these assertions. Ascott’s invention of a plethora of terms has led to the need for glossaries to inform readers of their ‘meaning’. However this has always remained speculative and rarely goes beyond these terms - a problem that necessarily exists within the context of a practise that is not yet existent; but as Bolter and Grusin point out there is a need to “resist the urge, so tempting when writing about new media, to make predictions” (Ibid).

William Gibson states in *Burning Chrome* “The street finds its own use for things” (Gibson 1986). Rather than pursuing the various forms of futurological speculation that have grown around this assertion, it is towards the reality of ‘the streets’ use of computing that we now turn.

**What’s in a Game?**

When a group of MIT students used the PDP1 computer to program *Spacewar!* (1962), gaming arguably became the original subversion of computing. After the introduction of the Sinclair ZX81 (1982), a machine intended to “to teach people about computers” (McCandless 1998), it became a phenomena as the street found its own use for this new technology. As soon as many learned to program, they began creating games (leading to what is often referred to as a generation of bedroom coders). Sinclair was dismissive of this claiming that “Games are a problem you solve… I have real problems in my life to solve. I don’t need games” (Ibid). But in contrast to Sinclair’s rhetoric the economic reality of this new industry solved many problems for those who made small fortunes by selling their games by mail order.

This model seems to have become increasingly removed as the industry has grown to economically outperform Hollywood. Whereas a lone coder used to create a game, the new generation of consoles require teams of over 200 to create games for them. However the hacker ethos still pervaded aspects of the industry. Many titles contained modding utilities buried away with the games directory. Games like *Unreal Tournament* (1999), a first person shooter, installs UnrealEd, an application that allows users to create their own environments as well as a scripting environment allowing users to modify the way in which the game itself is played.

However this is not an isolated approach. Known as ‘sandbox’ games, rather than providing an overarching narrative structure players are free to wander and create their own pathways through an environment. One of the first was *Elite* (1984) a game written for the BBC Micro. This led on to more notorious titles such as *Grand Theft Auto* (1997). What one must remember that even within the most traditional of games it is the creativity of the player that brings the game alive.

Simulation games also lack defined narrative structures; with games such as *Sim City* (1989) and *The Sims* (2000) and *Viva Pinata* (2006) that play with alternative worlds and the logic of simulation. Having previously pursued the graphic capabilities of computer systems, the now high graphic performance of gaming systems has meant the growth areas in the industry are now AI (artifical intelligence) and physics. New titles such as *Bio Shock* (2007) create worlds with perpetual AI agents that wander virtual environments rather than having them spring to life when we enter a space wishing to play the game.
The logical partner of sandbox games involve multiple players to develop and evolve a world via Massively Multiplayer Online Games (MMOGs). Originally text based, these were first played on mainframe systems, then as connectivity improved these began to be played over the internet. These are persistent worlds that are maintained by the publisher. As of 2006 the number of players subscribed to these worlds were in excess of 12.4 million (MMOGCHART.COM). These titles have also developed their own economies that have bled into the real world as hard currency is exchanged for virtual goods. More infamously this has even led to a gamer being given a suspended death sentence after stabbing a competitor to death in revenge for the theft and sale of a virtual artefact (Reuters, 2005). Despite such extremes, strong social groups have also emerged as players form clans in order to achieve their goals.

But is this sense of participation anything but illusionary? Within a highly competitive industry, game features are often a closely guarded secret until a game’s release. For this reason, ‘user testing’ only occurs near a game’s completion. Up until this point testing is conducted in house, largely to address bugs in the code; tests usually refered to under the rubric of quality assurance. As a result, user testing usually addresses previously unseen barriers to playability, introducing help at points that had been obvious to in house staff but that were opaque to those unfamiliar with the system. Ironically this seems to be one of the more limited forms of participation within gaming.

It is another form of play that shows us how a more involved relationship might be developed. When Lego introduced their Mindstorms (1998) robotic system its CPU was rapidly hacked and alternative programming environments and hardware hacking guides produced. Lego’s initial inclination was to sue those involved; however they soon realized that this furthered the possibilities of their system. As a result when they developed the Mindstorms NXT (2006) system, they invited a group of these people to become involved in the early stages of the products development, affecting playability at a grassroots level.

Although often viewed as the bête noir of the software industry, Microsoft has been instrumental in trying to bring this kind of thinking to gaming. Their approach results from the fact that the economic success of games has not been without its problems. The dominance of dedicated games consoles has led to a situation where proprietary development environments are needed to create content; consoles are manufactured as loss leaders and profits made via royalties on games published (and the tight control of their means of production). Much like the film industry, games have tended towards predictable formulae and sequels to try maximise the returns on a publishers investment. In an attempt to bring back the innovation and creativity that originated in bedroom coding and with a view to the creation a YouTube for games Microsoft have been giving away the XNA Framework (2006) for the creation of games on their console and PCs.

From the publication of XNA to UnrealEd and MMOGs the aim of this survey has been to reveal the sometimes hidden levels of participation that are intrinsically bound within games. Far from an industry based upon the mindless consumption of entertainment, gaming generates a form of interactivity that goes beyond ‘pointing’ and ‘shooting’. Participants become involved with the creation of worlds at a number of levels, from its creation through the activity of play to the creation of original content itself.

**Clarity and Wonder**

If participation and an involvement in the unfolding of events is central to play, we can begin to move beyond the false dichotomy of clarity and wonder that Maeda asserts. In fact given this, the clarity required in games is such that we almost never see it – a fact I often point out to students learning to program these systems: the better the standard of your work, the less it will be noticed. A little like Heidegger’s broken hammer, it only becomes evident when it doesn’t work. If a player...
can move through an environment and perform their desired actions, it is what happens as a result of those actions, the way that they unfold to affect another world, that interests them.

Designing and building interactive ‘worlds’ that generate this sense of involvement and wonder has now become a goal that can be achieved. Indeed the capacity to achieve this state may be intrinsic to play itself. As Huizinga points out

> Playing is no “doing” in the ordinary sense; you do not “do” a game as you “do” or “go” fishing, or hunting, or Morris-dancing, or woodwork – you “play” it. (Huizinga 1950, 37)

The benefits of this are not simply limited to how we might conceptualise interaction as play rather than just doing. Even though play ‘creates order, is order’ (Ibid, 10) it possesses its own logic. This does not mean it is an everyday logic, it is in its freedom from the everyday that play becomes capable of transforming its own rules. We need only think of games of make-believe to recognise the way that play can transform itself.

> Play only becomes possible, thinkable and understandable when an influx of mind breaks down the absolute determinism of the cosmos. (Ibid, 3)

The importance of this play element is often central to much of our work. As artists involved with technology, our work is often cross-disciplinary in nature. A benefit of this is that another discipline challenges the assumptions, if you like the unspoken determinism, of our own practises. Play provides us with a means to creatively question and transform the tenets of our own discipline.

> Play is a thing in itself. The play-concept as such is of a higher order than is seriousness. For seriousness seeks to exclude play, whereas play can very well include seriousness. (Ibid, 45)

If we accept that play forms a central tenet of interactivity, how should we move from being artists who have explored the nature of their inner voices, to becoming interactive designers where participation comes first?

**Play and Participation**

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In invoking the notion of participation we have to be aware that participation means different things to different people. Although primarily concerned with issues of social deprivation in 1960’s America, Sherry Arnstein’s paper *A Ladder of Citizen Participation* introduces us to a set of fundamental issues concerning participatory processes. A cornerstone of her analysis is that participation without redistribution of power is an empty and frustrating process for the powerless (Ibid, 216).

Put fundamentally our involvement in the unfolding of events has no meaning for us unless we are involved with the unfolding of events. Games make varying attempts to articulate this and some mechanisms have become cliches as can be seen in the notion of ‘power ups’. But what’s really at stake here is that the player has a variety of choices and strategies available to them at any one moment. Real power isn’t about exercising more of ‘it’ but an ability to exercise choice as to what one affects.

Over the past two years I’ve been involved with the evaluation of a commissioning program of new artworks within a Private Finance Initiative build of new health care facilities for Avon and Wiltshire Partnership (AWP). Although at this stage research protocol does not allow me to deal the outcomes of this research, there are a number of interesting documents already in the public domain. As a part of this Willis Newson, an arts consultancy specializing in healthcare and the built environment, were commissioned to write an arts strategy for AWP, and as a part of this service users were invited to become a part of this commissioning process. Within this documentation service users were presented in a number of different ways: as active participants in the arts programme; as people who needed to be consulted about the strategy; and as people with needs that had to be met through the strategy. Given this the documents identify a diverse range of consultation and participation.

In order to address these issues the strategy combined Commissions, Transition and ongoing Arts programmes. These were devised to encompass the provision of new work, the process of moving and the development of an ongoing arts provision in the new facilities. Whilst the commissions were a part of the secured capital funds, other strands became dependent upon a fundraising strategy after there were unexpected extra decommissioning costs. The result was that where there had been the expectation of participation in the production of artwork with the artists consultation was left in its place.

The problem is that where participation had left residents feeling that they might have some say in their environment, the notion of consultation left them feeling that they only had scant say in the approval of what was in effect an already done decision. If play is about the unfolding of events we can clearly see that consultation does not meet what we expect from participation. As Arnstein’s points out, consultation is often used to "prove" that "grassroots people" are involved in the program. But the program may not have been discussed with "the people." (Arnstein 1969, 218)

Identifying this as mere tokenism we need to ask ourselves how many interactive artists and designers have used even this level of consultation in their work, if they don’t already view such an approach as unwanted interference? This has led to issues surrounding the commissioning of
traditional forms of practise, never mind those forms where such an involvement is meant to be central to its rationale. Positing partnership, delegated power and citizen control as the highest forms of participation, Arnstein moves many artists out of what might be considered to be their comfort zone, but the question needs to be asked whether this is precisely what interactivity requires?

Conclusion
If we return to the problem of art and interactivity, issues of ownership and participation become central. For participants to involve themselves, to experience a sense of wonder, they need to ‘own’ the experience in the sense that they are implicated in the unfolding of events; this requires a genuine playfulness and involvement that has no intermediary, no stepping stones between action and involvement.

However, with its focus on individual vision and expression, traditional art and design disciplines often coerce viewers into adopting a particular way of seeing. The notion of involving participants in the development of new work has been seen as an imposition upon the insight an individual creative voice is assumed to provide. However given the nature of interactivity it is precisely this involvement we should be encouraging in order to work creatively with interaction; an openness to these possibilities should be a cornerstone of interactive design.

The danger of pursuing digital media as if it were a traditional form of practice is that rather than leading to the genuinely new, it reinforces an artist centred approach. If we are to make the leap into dealing with genuinely interactive practise, artists need to open up in such a way that they are more playful, and involve participants in defining the nature of projects. This moves beyond the playfulness artists often involve themselves (as can be seen in shows such as Serious Games) towards a more serious commitment to the transformative power of play. Artists needs to to stand back from a desire to be seen as a primary force within the creation of the new, to be still and see what is at play; only then can we experience the productive forces that lie at the confluence of genuine participation.

References

Biographical Notes
Mark Palmer is a senior lecturer in Games Technology in the Faculty of Computing, Engineering and Mathematical Sciences at the University of the West of England. His undergraduate and masters degree were within Fine Art but his research degree saw him working within Modern Continental Philosophy and Virtual Reality. Since then he has worked on a number of collaborative projects as diverse as a New Technology Arts Fellowship at the University of Cambridge, research into the affect of commissioning processes for new artwork within PFI projects and new AI routines within Games Technology. These projects have been framed by a philosophical interest in complex systems and the need to move away from notions of creative practise based around notions of individual creativity towards the generative potential of collaboration.
ArtAbilitation®: An Interactive Installation for the Study of Action and Stillness Cycles in Responsive Environments

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Abstract
The paper presents an exploratory investigation that features computer technology use where non-formal learning is targeted through action and stillness cycles. Six workshops designed for accessible participation attracted 91 attendees; including 61 from special care institutes, of which 39 had profound disability; and 30 who were from music teacher higher education. Stillness issues were addressed in a hall size interactive installation designed to enquire two questions; (a) whether, and how, a private space could be optimised for participant personalised interactive expression through progressive temporal intuitive understanding that originated from a stillness confrontation with multimedia, and (b) how a specific graphical interface could be created as an element in a public space and used to questioned participant recognized associations and subsequent choices in respect of scalar and axial dimensions. Participant perceptual abilities and associated learning curve when confronted with control of an interactive environment was in focus for the research. Evaluations of user experience were based on triangulated qualitative methodologies, including interviews, questionnaires, and observations. Results from the analysis of use showed the power of the participants’ increased ability to express themselves as well as problems according to the experience of stillness. Furthermore the results indicated associations with minimal learning curve.

Keywords
Responsive environments; non-formal learning; interactive experience; learning experience and outcome; action and stillness cycles; creative expression.

1. Introduction
New technology has gained increasing importance within different sectors of the society, including that of people with different forms of disabilities. Individuals with disabilities enjoy interaction as much as the next person. Designing responsive environments for learning implies interactive experiences, which concern active participation in activities (meaning making), leading to knowledge or skill (Rogoff, 1990). These experiences of meaning making and interaction encourage engagement in the activity out of interest and curiosity (intrinsic) rather than an activity introduced by someone else (extrinsic). In this sense, design is a way to configure learning resources and interaction (Kress & van Leeuwen, 2001).

In this paper, designing for learning is to emphasise action- and stillness cycles as intertwined aspects of non-formal learning processes. In doing so, we have transcended beyond mere use of the responsive environment towards exploration and transformation, which means that we consider every action and stillness cycle as new creations. Bruner (1973) states that patterns of action that emerge through exercise become constituents for new patterns of action directed at more complex tasks. Exploration goes along with play, but is not the same as play. Bruner (1972) describes how play involving manipulation of tools, requires a degree of competence, which is achieved through a learning process starting with exploration of the characteristics of the tools. The absence of negative consequences encourages the exploration, which in turn, can result in the development of unemployed skill (Beach, 1942). By this, the focus is on both the attributes of the responsive environment and the learning process/outcome (Petersson, 2006). This offers a new approach to learning and rehabilitation by emphasising user’s creation of meaning and production of expressions.
Our approach does not take any aspect of the learning process and outcome for granted neither being coerced, but rather strategised into play and creative activities that are inherent to e.g. games and art making (Bloom, 1968; Krentz, 1998). By this, play and creativity at the user level conceal the embedded learning and training available from the designed interactions with the feedback media. In this sense, learning is at a ‘subliminal’ level for the user as he or she is engaged in the responsive environment. Thus, motivation is suggested as optimised through action and stillness cycles where the user iteratively is exploring and transforming the feedback media. This process contains choices and decisions that indicate learning, e.g. in the form of increased repertoire of expressions, changes of skills, new patterns of social interaction.

Previous research (Brooks et al., 2002) has shown how certain individuals prefer to explore, play and create without any others being present. The chain of exploration-play-creation began with a curiosity that evolved out of the privacy and initial stillness that was first encountered within the interactive space. Thereby, stillness became part of the action and vice versa. Furthermore, Brooks and Petersson (2005a; 2005b) state that interactive play, which offer choices between interaction and rest in a silent space, create a sense of control. In other words, the responsive environment should not be configured to generate multimedia without participant intervention.

The action and stillness cycles, which consist of iterative loops of exploring and transforming, constitute one part of a theoretical map for the purposes of analysing critical incidents in a non-formal learning process. These cycles are related to the user’s learning experience. The other part of the theoretical map concerns design issues in the form of use qualities relative to the user’s interactive experience; transparency, social-action space, user control/autonomy, pliability, playability and seductivity. The Figure 1 illustrates the map of learning and design aspects involved in the evaluation of the use of responsive environments.

During the whole cycle of action and stillness, facilitators make interventions and have the possibility to reflect upon the indications of learning that occur during the process. The user profile influences the facilitator’s decisions on how to set up the attributes of the responsive environments.

Figure 1: Model of non-formal learning attributes within a interactive environment ©
relative to the desired learning process and the expected outcome of that process. Once these prerequisites are set, the user is expected to experience as a result of the interaction as well as from the learning.

Hence, the aim of this paper is to investigate the user’s performance in using responsive environments designed so as to experience learning through action and stillness cycles. A sub-question concerns the ability of perception and the associated learning curve of the attendees with cognitive disabilities to be able to easily correlate across dimensions of scale and plane – a matter which influences the participant’s interactive as well as learning experience.

2. The design of the interactive installation
In April 2007 a week of performances, installations and workshops under the theme ‘Music, Technology and Disability’ took place in Casa da Música (figure 2), Oporto, Portugal. Six research workshops (interactive installations) were hosted.

![Figure 2: Casa Da Musica, Oporto, Portugal, venue of the ArtAbilitation workshops](image)

The workshops were created in a room 238 square meters floor area and approximately 20 meters high.

In order to address the research questions stillness attributes (nul content areas) were designed in a public space and a private space within a responsive environment.

The stillness attributes within the public space were designed by assigning digitally reproduced musical tones to unencumbered movement data sourced via a camera-based interface. Drawn active data zones representing floor areas were presented to the user groups on a vertical large screen. Outside of these zones was stillness, i.e. no sounds. A second large screen gave a visual manipulated feedback based upon the interaction within the active floor area. Portuguese national football team stars images were also used as an element of the installation. The programming of the image located it behind a solid colour masking that was uncovered through participant movement (walking, crawling or rolling) in the public space. Other strategies with abstract imaging were also used including an interactive body painting algorithm (Brooks and Hasselblad, 2004; Camurri et al., 2003).

In a private space a participant experienced stillness with no sound and a muted projected image that evoked attention and exploration. A participant positioned between the camera and screen abstractly affected the feedback loop (appendix). Upon the participant exiting the private space
again returned to stillness.

Figure 3 illustrates the location 'Sala de Ensaio 1'.

![Figure 3: Sala de Ensaio 1 in Casa da Música, Oporto, Portugal](image)

Area 1 in figure 3 designates what was referred to as the public space floor area. 3 microphones were installed at approximately 1.8m from the floor on the screens (marked as X in the figure). An infrared surveillance camera was set up central to the floor area (marked as C in the figure) so as to track the participants from above.

The private space (area 2) had a large back projection screen with a microphone (X) set up at around 1 meter high on a ‘magic arm’ that permitted immediate repositioning according to participant preference. This microphone was routed to the Max/MSP graphical programming environment. The algorithm generated an echoing sound effect that related to the image effect confronted by the participant. The algorithm also changed the screen backlighting sequentially between the primary colours of red, blue and green according to utterance amplitude. A video camera was set up adjacent to the microphone pointing at the screen so as to establish a video feedback loop (C). The technique of creating a video feedback loop is illustrated in figure 4. The interaction opportunity occurs for the participant in video feedback when a body interferes between the camera and the screen (figure 4).

![Figure 4: Video feedback loop](image)

Figure 4: Video feedback loop is where a video camera ‘sees’ or receives the same image as it is transmitting – in other words the camera output is routed directly into a projector that presents the same image to the camera as it is outputting. Defocusing, zoom and camera angle are used in combination. RGB lighting is controlled from voice utterance.
3. Method
A total of 91 attendees participated in the interactive installations; including 61 from special care institutes and 30 in music teacher higher education. The 61 from special care institutes consisted of 39 participants with profound disability and 25 special teachers/carers. Age range of the people with disabilities was from 10-37 years-of-age. The music students were between 21-35 years-of-age. The range of disabilities covered a wide spectrum including: Autism, Down syndrome, Angelman’s syndrome, Cerebral palsy, Microcefaly, and other developmental disabilities.

3.1. Procedure
The study was explorative and conducted during six different workshops with an average of 15 participants per workshop. The duration of the respective workshop was one hour. The nature of the workshop was such that the participants were free to act or interact – alone, together with staff/family members or peers – for as long as they wanted up to an hour within the responsive environment. Data from the performance was collected through video recording and manually through observations by two researchers.

After the session the participants were asked to fill out a questionnaire with questions regarding the psychosocial impact of the interactive experience including a user profiling part so as to be able to have knowledge of the user’s daily living (home or institution) and diagnosis. It was also noted if the participant was filling out the questionnaire or required any help. Finally, three participants within each workshop were interviewed (totally 18 participants) about his or her experience (if the participant had no speech he or she was interviewed together with the facilitator/family member). By this, we targeted a triangulation of the data collection. A designated professional translator assisted and ethical issues were covered through signed permissions by users or those responsible for them.

4. Preliminary observations from the study
Although the study has not been completed, a number of interesting observations have been made and can be reported at this stage. In the public space it was observed that in respect of both scalar and axial dimensional and user’s perception correlation most of the participants were at ease with associating the 8m x 4m horizontal floor area to the 4m x 4m vertical screen. The stillness interface with seven boxes representing the sonic hotspots was facilitating playful interactions evident throughout each session.

4.1. The power of being able to
The participant’s possibility to experience a sense of control and autonomy within the responsive environment was an important aspect that was emphasised by the participants as well as by the facilitators. For example, the ‘ability to freely express’ was highly emphasised in the questionnaires. Furthermore, some of the participants asked to be taken out of their wheelchairs and positioned on the floor where they reported an experience of “a passionate sense of freedom and autonomy”. Progressively, the participants became aware of the empowerment of the control, either through digital techniques as in the public space or through analogue means as in the private space with video feedback. A high degree of concentration was observed, which also was supported by the results of the questionnaires where the experience factor ‘concentration’ was stated as being increased by all the participants.

Another interesting factor that was observed was the speed of association and comfort with the graphical interface overlay in the public space. The various graphic animations all engaged the participants equally and the recognition of the animations being made with surprising little information. It was in this session that two female participants with profound physical disability and
no verbal competence, on different occasions, requested their helper the opportunity to interact without their wheelchair and they proceeded to roll around on the floor to ‘unmask’ the image (see figure 5).

The simplicity and flexibility of the system supported the participants’ exploration and they developed a fine-grained control of the situation. This resulted in personal achievements, which is a rare commodity for these participants. The overall meaning of being ‘able to participate’ was stated with an increased value by all the participants and the carers.

The participants consciously used the stillness attributes of the responsive environment, especially in the private space, where it was observed how the ability to choose between action and stillness facilitated the sense of being in control. Related to this, the participants’ experiences of being able to explore and their eagerness to try new things were highly emphasised in the questionnaires.

The direct and immediate feedback from the system, which created action-to-stillness-loops, enhanced the sense of ‘being able to’, which was shown through the questionnaires where the experience factors of ‘curiosity’ and ‘capacity’ were all stated as being increased. One of the facilitators expressed the significance of the participants’ increased capacity as follows:

“It made me feel really small compared to their abilities, wondering what was going on inside their heads as I could see they were really enjoying that space of their own ... difficult to put into words...makes you think about the whole world and the way our society is organised”.

The participants showed engagement in every workshop through an observed concentration and consciousness of intent, which was especially notable in the private space. The results from the questionnaires stated that the experience factors of ‘enjoyment’ and ‘engagement’ was marked as highly increased by all participants. The translator, who took part in all the workshops, stated that:

“The feeling was the same – freedom and fun. Some of them were really tired but that did not stop them from exploring the space with the same enthusiasm.”
All in all, these results points towards the participants’ awareness and enjoyment of the situation.

One of the facilitators stated that people with disabilities generally cannot explore and enjoy installations or exhibitions like this as much as others do:

“It was amazing to see them on the floor, trying so hard to move and accomplishing. It is very good because we do get the idea that this installation and what they are exploring elevates their self-esteem. Very beautiful!”

The private space was reported as being good for participants as it enhanced concentration and they became less tensed, and more relaxed and concentrated.

4.2. The problem of experiencing stillness in the public space

An important finding from the study thus far has been the difficulty the participants had to identify the stillness attributes in the public space. One of the facilitators expressed this problem as follows:

“But there were too many people in the room and the general idea was that it was a bit complicated because some were playing and there was little time to everyone to explore the space and its potentials.”

By this, the social action that supposedly was inherent in the environment instead was experienced as confusing by several of the participants, especially those with the diagnosis downs syndrome and autism. For example, a male participant with downs syndrome entered the public space and walked back and forth crossing the active and the stillness zones. From start he was not aware of the visual feedback on the big screens. He was more aware of the sounds and his body in the space as he was exploring and enjoying the changes from action to stillness. He noticed that when he stepped out of the active area the sound stopped. He paused for a while in the stillness space and after that he walked back into the active space where the sound started again. Later on he came back to these zones and repeated his previous actions; he walked back and forth through the active and stillness zones and stopped so as to notice the changes between action and stillness. But, at that time a lot of participants were actively exploring the space as well and, consequently, when he stopped different sounds came from all over the public space. The moment of the participant’s curiosity, special awareness and perception disappeared and the participant did not continue to explore these features. This fact could be one of the reasons to why some of the participants experienced the responsive environment as not so private and neither not so self-guided.

Accordingly, the action-stillness cycles were positively explored and experienced by the participants within the private space. It was also observed that when other participants entered the space the sole ‘performer’ in the majority of cases continued. Caregivers were also instrumental in introducing and encouraging the participants to perform. On occasions interaction of image and sound were achieved. Once the microphones were located and they heard that their utterances were amplified they became more active and laughing, sometimes even making sound screams for effect. The assumption is that in the private space, the directness of the feedback in the form of sounds (echoes of the participant’s own voice) and visuals was much more transparent through the privacy (one-to-one scenario). This situation could be one of the reasons to why some of the participants experienced well-being and a decreased frustration.

Appendix 1, 2 and 3 show sequential images from one participant who became deeply engaged in the private space interactions with the video feedback.
5. Conclusion

The exploratory study highlighted adequacies and inadequacies of the learning from action and stillness cycles. The results gained from the research articulated that in order to achieve adequate learning, all system attributes need to be in harmony so as to correctly address the participant where the challenge presented matches the ability of the participant. The public space illustrated an inadequate action space, whereas the private space emerged to be more flexible for the participant.

Findings were that the responsive environment contributed to curiosity and highly involved processes of explorations where the loop between perception and action was quick and physical. Through the action-stillness-cycles the participants experienced and played with the sensation offered by the interactive attributes. Initially the exploration was not goal-directed but developed into play. This exploration-to-play process facilitated the discovery of interesting and surprising content. The interface was flexible enough to facilitate the participants’ unanticipated desires.

The masked images (e.g. the Portuguese national football team stars) that was uncovered by the participants’ different movements clearly showed that the elements of surprise and control were inter-related. Thus, by uncovering the masked image via the participant’s control evoked his or her interest and motivation. The action-stillness-cycles inherent in e.g. uncovering the images, created a process of enticement by attracting the participant’s attention, the ability to make progress and experiencing fulfilment by ending the experience in a positive way. In this way, the quality of seductivity (Lövgren & Stolterman, 2004) extended the understanding of the system’s playability; offering surprise and the creation of emotional responses through the visual and auditive interactional qualities – the interactional beauty.

It was important to note that the participant’s actions were not merely ancillary, but central features of the learning. The movements and gestures had a communicative and narrative function as well, connecting the gestures to the feedback (visuals and sounds). Thereby, the action and stillness cycles were main, rather than subordinate, status in the interactive experience and as such crucial ingredients in the learning activity. All in all, the learning was indicated especially in the form of increased repertoires of the participants’ expressions.

Conscious use of stillness attributes in the design of the responsive environments enhanced the experience contributing to the interactional beauty (seductivity and playability). The balance between challenge and skills targeting aesthetic resonance supported fun experiences through which the user extends his or her actions to new limits of achieved skills. This can be equated to open-ended play and how experience develops into play (Bruner, 1973).

Both symmetry and asymmetry were witnessed as important factors in the interaction between the user and the facilitator as it created a foundation for the facilitator’s adjustments of the balance between challenges and skills.

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References

Biographical Notes
Dr. Eva Petersson is an assistant professor; coordinating/managing the Medialogy Bachelor and Master Education Program (see [http://www.aaue.dk/medialogy/uk/index.php](http://www.aaue.dk/medialogy/uk/index.php)); and vice chancellor at Aalborg University Esbjerg in Denmark. She is member of the research group SensoramaLab (see [http://sensoramalab.aaue.dk](http://sensoramalab.aaue.dk)). She has a background in Education Science and her PhD is focused on ludic engagement (playfulness as a foundation for engagement) within virtual environments and the potentials in associated non-formal learning (see [http://dspace.mah.se:8080/dspace/handle/2043/2963](http://dspace.mah.se:8080/dspace/handle/2043/2963)). Petersson has been coordinating research
Associate Professor Tony Brooks has a background in performance art, and was born into a family of the invited projects in inclusive and participatory design, storytelling, and creativity and learning processes through the use of new technology in education and rehabilitation contexts. She has been leading projects on physical and virtual toys, the design of toys for children with disabilities, and the use of computer games (interactive environments) in educational and rehabilitation contexts involving flexible methods of delivery for local, national and international users. Petersson is member of the International Toy Research Association (ITRA) and the Toys for Tomorrow Forum. Furthermore, she is a board member of the Pan-European Game Information (PEGI) and expert member of the Interactive Software Federation of Europe (ISFE). She was one of the founders of International Toy Research Conference recently organised by the International Toy Research Association (ITRA).

Associate Professor Tony Brooks has a background in performance art, and was born into a family with disability. He has advocated the use of digital technologies in intervention for people with a disability and founded Handi-MIDI in 1987 which later became SoundScapes non profit organisation. He is on the management team of the Medialogy education and is director of the SensoramaLab at Aalborg University where he leads a team of post-doc assistant professors. He was awarded the European Eureka prize for SoundScapes in 1999 and the Danish research prize in 2006. There are approximately 50 publications associated to the concept including achieved international degrees citing the work. As founded of SoundScapes he has realised the annual ArtAbilitation international conference and undertakes international workshops where he is invited to work with local artists and research students. SoundScapes has been been featured at for example, the cultural Olympic/Paralympic events 1996 and 2000; the European Culture Capital of Europe 1996 and 2000; the Danish NeWave, New York 1999; the UNI/NGO World Summit 1995; and has been a featured exhibitor at leading Museums for Modern Art. SoundScapes has been responsible for published patents and national and international research funding.

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Appendix 1. Video feedback in the ArtAbilitation® workshop private space.
Appendix 2. Video feedback in the ArtAbilitation® workshop private space.

Appendix 3. Video feedback in the ArtAbilitation® workshop private space.

This series of images illustrate the intense engagement with the visual feedback loop from the workshop private space. Upon entering the space the participant encounters no sound and no change in the visuals. The options are to use the microphone to change colour of the RGB lighting behind the screen; to play with the camera hardware to create various effects, e.g. focus, zoom and
direction; to manipulate the feedback via movement immediately in front of the camera lens or closer to the screen (as in this figure). The video feedback loop creates a phenomenon of image change relative to change of body position.
“A Full Innocence”: The Paradox of Stillness in Movement

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Abstract
This paper explores reactions to the authors’ performance installations and workshops where participants have repeatedly described their experiences to projected digital light forms as “magical” and the technical interfaces as “transparent”. The authors became intrigued as to why these words were used so frequently, and decided to investigate the roots of these experiences. Initial investigations resulted in an article on the Dancing in the Streets interactive kinetic light installation, which proposed the “sensuous manifold” as a useful concept for experience design (Palmer & Popat 2007). This paper expands upon that argument in relation to the authors’ research project, Projecting Performance.

The paper presents the authors’ findings in relation to the notion of the pre-reflective “body-hold” (Crowther 1993), proposing this as a type of stillness, where the viewer is arrested by the aesthetic effect of the artwork with which he or she is engaging. In this moment of stillness, the artwork is experienced in a state of “full innocence” (ibid), from which the rest of the world is held remote. The authors apply this notion to the experiences of participants as performer-dancers and performer-operators in their movement-based workshops. They propose that participants find the moment of stillness, paradoxically, through movement, facilitated by the embodied experience of the interface between participant and technology, the digital and the aesthetic. The authors suggest that this stillness is what the participants are describing as “magical”, as it engages them in a position of innocence and thus intensifies the experience while all else is held remote.

Keywords
Performance, interface, experience, transparency, embodiment

Introduction: Projecting Performance
Projecting Performance is the authors’ research project at the University of Leeds, in collaboration with commercial digital artists KMA Creative Technologies Ltd and funded by the Arts and Humanities Research Council, UK. The project uses digital images projected into the stage environment and manipulated in real-time by an operator in relation to on-stage performers. The research project seeks to explore relationships between the performer-dancer, projected image (sprite) and the performer-operator, and through these interactions challenge dominant perceptions of the roles associated with performers and technologists.

Workshops with dancers and scenographers participating in the role of ‘performer-operator’ have repeatedly demonstrated that operators quickly become absorbed in the experience of controlling the projected sprites. After a period of operating, they are often unable to recall consciously being positioned behind the operating desk. Some describe an experience of being located on stage with(in) the sprite, and some are unable to pinpoint the location that they experienced. In this short paper, we are attempting to understand the responses of these participants.

Technical description
Projecting Performance workshops take place within adaptable theatre spaces that promote a playful immediacy in the iterative process of performance-making and technical programming. This supports an improvisatory approach to making theatre in a manner not normally associated with technology (Popat & Palmer 2005). Ideas can be tried out, tested and developed quickly, using traditional theatre equipment and materials. The gauze (scrim) is the primary surface in the stage
space onto which the abstract digital images (‘sprites’) are projected. The projection surface can be
made to appear opaque or transparent depending upon both the stage lighting and the colour of the
gauze itself. Dancers and other performers are seen behind this surface where they can interact
directly with the projected digital images. (Fig. 1)

![Figure 1: Snake sprite (with delay) and dancers 2007. Dancers: Keziah Mallard & Laura Blazy. Copyright: the authors.](image1.png)

The digital sprites are created in Macromedia Director MX2004 and controlled by the performer-
operator in real time via a Wacom graphics tablet and pen (Fig. 2). The resulting output is projected
into the stage space through a standard data-projector. The precise parameters of each individual
sprite can be modified in performance mode through keystrokes or more intuitively by using a midi
interface, allowing elements such as delay times, rates, shape changes and subtle colour alterations,
to be achieved with an instantaneous effect. Tom Wexler, the technologist from KMA, has created
the sprites through programming that is “rooted in the modeling (sic) of the physics of nature, using
the mathematics of swarm behaviors (sic), springs and masses, cellular automata and chaos.”
(http://www.kma.co.uk) Ultimately these principles define the characteristics of each individual
sprite, dictating how they are able to move and the extent to which they can be manipulated by the
performer-operator. Many of the most engaging sprites appear to have an inherent natural fluidity
that is easily understood and controlled. However, the laws of gravity and space for the projected
image differ significantly from those of the human dancer, which challenge both dancer and
operator to develop new approaches to theatrical space.
Research workshops

Through experimentation in our workshops, we have gathered responses from a wide variety of participants in the roles of performer-operator and performer-dancer. We have worked with sprites that have a range of different behaviours, and for the purposes of this paper we are concentrating on two which demonstrate different characteristics. One is the Snake sprite, which is a line made up of segments (Fig. 1). One end is controlled by the operator through the graphics pen and tablet, and the rest of the segments follow it like a chain. The other is the Star sprite, which is multi-limbed and has a central point that is controlled by the operator. When it is in a state of stillness, its limbs spread around the centre point evenly, but the limbs react to even the tiniest movements of the operator. The limbs are interconnected and respond to each other’s position and they react once the centre point of the sprite is moved, which makes its quality fluid and graceful, rather like a jellyfish. When the centre point is moved quickly, the limbs fold back so that the sprite is streamlined.

The performer-operator works most directly with the technical/digital interface in our work, as he/she is using the graphics tablet and pen to manipulate the projected sprite. For initial workshops, computer monitors were placed in front of the operators but these quickly became superfluous as the operators preferred to focus on the image projected onto the gauze within the stage space. This had a major impact as it engaged the operator directly within the stage environment. The decision to move from mouse control of the sprite to graphics tablet and pen provided freedom and flexibility to achieve a dynamic range of expressive movement input, enabling both fine control and broad gestures. The pen provided an intuitive input mechanism that functioned as an extension of the body along the lines of Heidegger’s hammer, where the engagement is haptic and becomes subconscious so that the operator thinks only of the results and not of the action. Humans have a natural understanding through constant physical experience of the Newtonian principles underpinning the modelling of these sprites, which enables intuitive engagement with their motion.

The sprites were largely predictable in the ways that they responded, but there were elements of the movement that were chaotic within fixed parameters. The tail end of the Snake tends to swing, as the tail end of a rope or chain might swing. The arms of the Star have some random elements in the speed and pathways that they take to come to rest when the operator stops moving the sprite. The Snake looks like a snake and appears to have a head end, which the operator controls, and a tail end, often causing both performer-operators and performer-dancers to anthropomorphise. This combines with the limited movement potential in the single line to lead to a tendency for operators to play a role or character that interacts with the performer-dancer. The Star has a greater level of complexity and slightly more unpredictable behaviour because of the multiple arms. The design makes it less initially attractive to first-time performer-operators, but it enables greater aesthetic immersion for those with more experience. These inherent behaviours give the sprites characteristics of their own that affect the ways in which they can be operated. The modelling on springs and masses means that the sprites move easily in curving, fluid pathways but resist jerky or staccato motions. There is also a very slight delay in the transmission of the operator’s pen movement to the sprite’s motion, which is more noticeable when making small detailed movements. One of the greatest restrictions, and probably the one that is most frequently noticed by participants, is the use of the two-dimensional projection screen. Experiments with haze, smoke, clothing and other projection surfaces have so far failed to supply a solution that supports an intuitive engagement for performer-operator and performer-dancer, although current trials with screens in front of and behind the performer-dancer to catch the projected light ‘spill’ have produced interesting results.

The level of intuition involved in operating the sprites allows even first-time operators to achieve complex motion and to experience themselves as performer-operators. There is excitement in
seeing their instinctive motor skills translated to the screen in a way that can be understood. Some scenographers working as performer-operators have commented on the feeling that they were dancing as equal stage partners with the performer-dancer, even though they have little experience or skills in dancing with their whole bodies. Operators often quickly develop a preference for a particular sprite, and with experience they will begin to prefer particular settings of the sprite parameters (where available). They will usually begin to develop a movement vocabulary with that sprite that has habits and personal quirks, much as a dancer develops a vocabulary that constitutes a personal movement style. Performer-dancers and performer-operators engaging in improvised movement together over a period of time will come to know each other’s movement vocabulary and be able to respond more easily to each other, just as dancers who improvise together regularly will ‘learn’ each other as dancing partners and be able to increase their sensitivity in responses over time. Despite the restrictions in the sprites’ programming that tend to push the operator towards particular types of movement, performer-dancers can consistently tell when the performer-operator changes, even if this is disguised from them by swapping operators secretly. They notice the changes in the sprite’s behavioural patterns, even if they are inexperienced dancers themselves. It is telling that the performer-dancers describe the sprite as “alive” and “intelligent”, seeming to indicate that they can sense the intention/attention of the operator in the sprite, yet they almost never report thinking of the sprite as being controlled by the operator. The dancing sprite exists between the sprite’s inherent programming and the performer-operator’s personal movement, mapping closely to the tripartite models offered by Castronova for digital game avatars (2003) and Zich for the “stage figure” (McAuley 2000, 94).

A full innocence

To return to the key purpose of this paper, how could we account for the experiences of dislocation or transportation that the performer-operators described after operating? As both operators of the technology and performers via the sprite, what did they experience of the digital interface and the moment of performance? In Palmer & Popat (2007), we combined ideas from Bolter & Gromala (2003) and Crowther (1993) to consider the nature of the interface in our interactive digital performance projects. In that article, we aimed to discover what it was about the digital interface in the Dancing in the Streets installation that caused participants to describe the interface as “transparent” and the experience as “magical”. We noticed that similar words were used by performer-operators in relation to Projecting Performance, so this paper revisits those ideas and progresses them.

Bolter & Gromala argue that it is a common error to assume that the goal of design is to achieve transparency at the interface. Instead they suggest that the goal should be “to establish an appropriate rhythm between being transparent and reflective” (2003, 6).

We should be able to enjoy the illusion of the interface as it presents us with a digital world [transparency]. But if we cannot also step back and see the interface as a technical creation [reflectivity], then we are missing half of the experience that new digital media can offer. (2003, 27) Authors’ additions

There were elements of this rhythm in the design of the Projecting Performance sprites, which had transparency in terms of their Newtonian modelling and organic motion, but also contained elements of reflectivity in the restrictions that were inherent in their programming. The combination of these elements served to give them interesting performance qualities and mannerisms, and led to operators often developing preferences for a particular sprite. However, we suggest that the binary nature of the rhythm between transparency and reflectivity that Bolter and Gromala imply in this description frames the technology as a ‘window’ to another (digital) world. While this duality might
be appropriate for some types of digital artwork, it assumes an externality to the experience that promotes an auratic perspective reminiscent of Walter Benjamin. We propose, therefore, that Bolter and Gromala’s perspective is better suited to the viewing of digital artworks rather than the experience of participation or performance within an art installation. The terms used by our performer-operators, “magic” and “transparency”, are not rationalized but closer to instinctive “gut-reactions”. They suggest experiences of the interface that are more akin to the Deleuzian concept of the “objectile” (Deleuze & Guattari 1988), where the experience of the object is predicated upon fluidity between transparency and reflectivity in the simultaneous tension and resolution of becoming. We began to suspect that the performer-operators’ experiences of transparency and reflectivity might not be wholly located at the technological interface, but might be equally sited in the mode of aesthetic experience where the binary switching of viewpoints proposed by Bolter and Gromala might be too objective to explain their subjective reactions. As performer-operators ourselves, we noted the embodied nature of our experiences, and we turned to Paul Crowther’s critique of Merleau-Ponty to explore embodiment and aesthetic experience.

Crowther, in his thesis on Art and Embodiment, describes a phenomenological mode of experiencing visual art, which he terms “a sensuous manifold” (1993, 4):

[The sensuous manifold] is this integral fusion of the sensuous and the conceptual which enables art to express something of the depth and richness of body-hold in a way which eludes modes of abstract thought – such as philosophy. (1993, 5)

The experience of the sensuous manifold requires a state of pre-rationalization in order for the fusion or folding of the sensuous and the conceptual to take place. Crowther describes the artwork as “mute” (1993, 114) in that it cannot express or comment explicitly on our relation to the world in the manner of philosophy and literature. Yet Crowther sees this quality as “a positive virtue, in so far as it is able to return us to our primordial historicity with a ‘full innocence’”. These concepts of “full innocence” and “body-hold” that Crowther draws from Merleau-Ponty provide a valuable insight into the way that the sensuous manifold is experienced, because they indicate something of the quality of the moment of engagement. The fusion of the “sensuous” and the “conceptual” leads to the “inseparability of the visual and tactile in the pre-reflective perception” (107). This fusion involves our “sensory, motor, and affective capacities, operating as a unified field” (107) where engagement as body-hold is a fully embodied experience of being there in the moment, which in turn might be likened to stillness. Indeed, Crowther’s use of the term “body-hold” implies stillness as the body is held absorbed in the experience, innocent of all else. This moment of intense absorption in the event is such that the perceiver’s awareness of their immediate surroundings recedes; this constitutes a moment of rapt contemplation or stillness.

In this paper, we are concerned with the experience of the participant, and particularly of the technical operator in the role of performer. We acknowledge that Crowther is writing about the experience of viewing artworks, and there is a potential contradiction between notions of stillness derived from the concept of “body-hold” and live performance. However, we assert that our conception of the role of performer-operator incorporates elements of both the stage performer and the audience; the performer-operator simultaneously performs in and experiences the stage picture visually. Is this why the performer-operators were unable to pinpoint their physical location whilst operating? Some felt located on the stage, performing in the stage picture, and some were unsure of their location, caught in a state of suspension somewhere between viewing and performing. We propose that the interface that we were using for operational purposes had something to do with this transportation or multi-locational existence that the operators describe.
How, then, does the performer-operator experience the interface? Merleau-Ponty’s theories of embodiment have been developed in dance theory by Fraleigh, who discusses the states of reflectivity and pre-reflectivity in dance performance through the concept of the “lived body” which, she argues, does not recognise “dualism of body-mind” and assumes “an invisible unity of body and mind” (1987, 4). This corresponds closely to Crowther’s definition of the sensuous manifold where the sensuous and the conceptual are experienced as being folded into each other. Fraleigh describes a state of being where:

I live as my body spontaneously … not noticing it, not looking back upon it, and not anticipating or imagining it in some future state. (Fraleigh 1987, 14)

The innocence in which that moment of movement is lived is fully centred in the performer rather than being directed externally, but it is still an aesthetic experience (albeit experienced kinaesthetically rather than visually). We thus suggest that body-hold can be felt through the lived body despite or even because of the fact that the body itself may be in motion, and therefore it might be seen as synonymous with Crowther’s “full innocence”. In modelling Fraleigh’s concepts in relation to our work, we realised that the lived body for our performer-operators extends to include the digital interface. The experience entails the “invisible unity” of body, mind, graphical interface and sprite, since the lived body is experienced in the performance as a folding together of all of these elements. We propose that this is why performer-operators so often fail to recall being located behind the operating desk with the graphics pen in hand.

Our workshops to date suggest that the distance inherent in offstage operation of the sprites has the effect of creating a duality of the aesthetic experience of visual engagement with the stage picture and the feeling of embodiment and ‘being in the moment’ often associated with improvised dance performance. The former suggests that the attention is centred outside of the body (i.e. on the artwork); the latter suggests that attention is embodied. The “collapsing inwards of the sensuous and the conceptual” that occurs in the sensuous manifold provides us with a metaphor that seems to represent more closely the descriptions of our performer-operators. The performer-operator’s attention is centred upon the distanced stage space, experiencing it through embodied engagement with the sprite. The resulting potential, we propose, is a place of stillness that occurs as rapt attention to the visual experience folded together with pre-reflective performance via the digital interface.

**Conclusion**

Our investigations lead us to conclude that our performer-operators who described themselves as being located entirely within the sprite, or else were uncertain of their location, were actually reporting a lived body experience that enfolded their own body, the graphical interface and the sprite. Many participants see this experience of transportation as evidence of interface transparency. However, we suggest that the two-way impact of the sprite on the operator and the operator on the sprite is not the same as transparency. If the interface were entirely transparent then the operator’s movement would be directly represented in the sprite rather than being mediated by the sprite’s inherent behaviours. Neither is it as simple as the binary that Bolter and Gromala propose, since the participants do not experience the interface as either the presenter of an illusory digital world or as a technical creation in its own right. Instead their awareness of the interface is folded into their embodied experience of performing, influencing and influenced by their behaviour in the manner of the constant tension and resolution of the Deleuzian “objectile”. The performer-operator is in a moment of stillness where physical location does not figure as important because, even though he/she is in motion, he/she is simultaneously also in a state of body-hold, embodied in the moment of rapt attention. The folding of transparency and reflectivity of the technical interface is facilitated.
by the stillness of body-hold in the aesthetic experience. Stillness becomes a metaphor for the aesthetic experience that, for our performer-operators, is both visual and kinaesthetic.

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References

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Still Here – the moving image in the static gallery

Dominic Redfern; Video Artist & Senior Lecturer in Media Arts, School of Art, RMIT University

Abstract
My paper interprets the theme of stillness as one of stasis, connoting tension rather than understanding stillness as a quality of quiet or calm. Stasis is a useful lens through which to consider the three components of the video installation experience: the static gallery; the ambulatory audience; the moving image. I explore stasis through the video installation work that makes up my own PhD research, placing it in the context of historical and contemporary video installation practices.

I begin with the tension between an audience’s expectations of the moving image and the conventions defining contemporary video installation practice. Video art has a long history of defining itself in contrast to the dominant codes of television and cinema. Through its initial rejection of linear narrative and its use of repetition, video art has historically challenged mainstream notions of screen time. Movement and stasis are discussed as defining properties of video art’s unique temporality.

Video art’s rejection of television began to shift in the late 70’s, with increasing co-option of popular televisual and cinematic tropes. Experiences of video outside the gallery have come closer those within it, however there remains a schism between the two modes of spectators. I frame this schism as a taut moment, a point of stasis, between two possibilities that can be prised open by artists to elicit a dialectic response from audiences. I discuss ways of creating a critical relationship between the ambulatory engagement with the static gallery and the sedentary engagement with the televisual screen.

Key words
Video, installation, audience

The gallery is not going anywhere, or if it is, it is going there very slowly. For all its 20th century hangovers of avant-gardism, it is a conservative space: it quite literally conserves. The gallery presents, protects from decay, and in so doing privileges art objects and experiences for the purpose of exchange, both cultural and commercial. The gallery markets artists and their work to an audience. As a market driven space, it is politically conservative, invested in the culture of property rights and social hierarchies that belong to the free market fundamentalism that is the prevailing wisdom of our time. The gallery is not only static culturally and politically but as an environment it privileges the object over the viewer, the sign over the experience, calling upon its audience to walk quietly upon its polished floors lest they disturb the art.

There is a perversity to the fact that video has wound up in the gallery at all. Video emerged in the 1960s when artists were turning their back on galleries, critiquing both art institutions and the commodification of the art object. Forty years on, art is still being bought and sold. However, video remains relatively difficult, or at least unsatisfying, to commodify and collect. Whilst often expensive to produce, video is eminently re-producible, which lessens its value (video editions being just a case of ‘me-too’ism). More importantly, video is not an object. This fact is crucially important, a defining quality to be exploited for critical gain rather than ignored through pretending video is a kind of photograph that moves. Whilst the gallery has come up for a great deal of critical re-thinking, paradoxically video, in its current renaissance, is all too often treated as though there had not been an explosion of the apparatus of the gallery with video art present as a significant participant. We see too much video presented with no consideration for the spatial specifics of the gallery and the manner in which it is to be viewed. Often there seems little reason for such work to
be seen in the gallery and the most cynical analysis would ask whether much of this work could survive selection for film and video festivals or broadcast.

Clearly for some, the gallery is the lounge room of the slacker artist, a place to let it all hang out. Over the last fifty years, the gallery has been increasingly conceived as a vacuum of sorts, an architectural plinth with pretensions to a neutral supporting role, a type of non-space where all bets are off and art can be considered from first principles (O’Doherty, 1976, p.11). Given the space the gallery has occupied socially and culturally the last thing it can be is neutral, however art has always had the capacity to enter into contracts of suspended disbelief with its audiences. We can behave ‘as though it were the case’ that vampires exist and not let their non-existence get in the way of our identification with them or their victims, and so too we can behave as though the gallery is a non-space, a fertile void. Like a town in a western film, the gallery is all façade, indistinguishable from the last one, a medium whose message speaks of meaningless mutability. It is a conceit, but a critically useful one.

Video is also a void. Electronic rather than mechanical, when I turn it off there is no “there” there, and even when turned on it is depthless, flat. Video space, however, is elastic; a single image can create physically impossible spaces which morph in infinite variations. Video time is also elastic, and this potential was immediately recognised by artists. Video art began by asserting itself in contrast to the dominant codes of television and cinema. As outlined in Jon Burris’ insightful analysis, the first generation of video artists deliberately defined themselves in opposition to the linear narratives of television, in a mode reminiscent of an angry teenager rejecting the parent (Burris 1996). The rapid uptake of video technology by artists was arguably a response to the ubiquity of television, a completion of the communication cycle. But artists chose not to respond in kind, not to adopt the language of television. That would come later. Instead, early video artists rejected not only the content of television but also its formal conventions. Instead of fast-paced, diverting narratives, artists experimented with tempo, rhythm and duration. Whilst such experimentation was alive and well in the hands of the post-war film-making avant-garde, video technology’s immediacy obviously gave artists something they had been looking for: a ‘real time’ responsiveness in the material combined with a range of sculptural, or spatial, possibilities.

Bruce Nauman seemed to really ‘get’ this about video straight off. His closed circuit installations, like those from the Performance Corridor group (begun in 1968), offer a meditation on the possibility of a real-time system amplified through the psychology of the viewer. Nauman offers more than a set of perceptual experiments. He adds a playful paranoia to the mix by sending the audience back upon itself, looking over its shoulder to catch a glimpse of the just past, ‘surveiling’ some spaces whilst cutting off access from others entirely. These works are profoundly still, yet full of narrative and metaphoric content the moment they are encountered. Similarly, Dan Graham created contained and perversely static works. He added temporal dislocation to Nauman’s spatial dislocation of the image’s input and output. In Graham’s six variations on the Time Delay Room (1974) he plays with an 8-second delay between the recording of the image and the audience seeing the image played back. In two rooms with two monitors each, audiences encountered a real-time view of the other room on one monitor and a view of themselves from 8 seconds previous on the other monitor. In cascading feedback relationships, these perceptual rat mazes make unwilling performers of audiences, confronted by video’s potential to amplify the self-consciously performative nature of social space.

Artists like Dieter Kiessling continued in this vein with installations such as Two Cameras (1998), a work in which two cameras video each other with their respective outputs fed to two adjacent monitors. The cameras ‘hunt’ focus in the low light and the constant noise of their auto focus motors are amplified as a soundtrack. Kiessling continues the work of defining the formal
parameters of video, shutting the system down further to exclude participation of the audience. Cameras function as surrogates for the audience, trying, but failing, like Graham and Nauman’s audiences, to ‘see’ each other. Rendering the frame even more static, Darren Almond’s *A Real Time Piece* (1996) relayed a live video feed of his empty studio to London’s Exmouth Market. Passing time stands still as there is nothing to ‘fill’ the moment, nothing propelling the work forward, nothing to see here.

Closed circuit works offer a Greenbergian distillation of video’s formal properties, but video’s attraction must also surely lie in its potential to bring a critique of broader moving image culture into the gallery. To this end, early video artists utilised the greater flexibility brought about by video’s electronic malleability. They could easily slow down and arrest the flow of moving image time, bringing it down to the ponderous ‘speed’ of the gallery. The timing of the emergence of video installation as a medium is critical, offering a profound example of technological innovation and culture coinciding to provide a response to the historical moment, perhaps combining to create it. Whatever the causal relationship, at the precise moment when McCluhan posited the embedding of the meaning of a medium within its technological infrastructure, so appeared video installation to prove his case eloquently (McCluhan, 1994. P.7-22).

The demands of intersecting the static gallery with a time-based medium simultaneously provided not only a potent formal challenge but re-stated a philosophical position over and over…and over. For just when modernism’s grand narrative was looking shaky so emerged the video installation loop, a formal rejection of the notion of development inherent in the cause-effect progressions that propel linear narrative. Video installation has embedded within it the structural kernel of existentialism, an endlessly repeating and thus timeless moment where existence precedes meaning because of an inherent incapacity to build patterns of developmental progression. The video loop thrusts us into the midst of a work at the moment we enter it; no status quo is assumed and no resolution can last. Video installations deny dramatic development, rejecting not only the form but the possibility of linear narrative.

In a perverse, if rather limited, rendering of this potential Douglas Gordon’s 24 hour *Psycho* (1993) with a loop time of one day presents the audience with narrative time stretched beyond their capacity to perceive it. Whilst comparisons may be made to Warhol’s ‘Empire’ it is the fact of installation’s loop that sets the two works apart. Gordon’s work is not a feat of endurance for there is no need to stay - it doesn’t end and so there is nothing to stay for - indeed one may argue that there is nothing to arrive for. Gordon’s work does not seem to be ‘about’ cinema in the same sense as works like Isaac Julien’s *Baltimore* (2003) or Pierre Huyghe’s *L’ellipse* (1998) which seem not to critique or question so much as celebrate, or indulge in, the spectacle of cinema. To take Isaac Julien’s *Baltimore* for example, does the device of the 3 screens really expand this ‘cinema’ beyond the multiple screens of Warhol’s *Chelsea Girls* (1966) or Scorcese’s edit of *Woodstock* (1970)? The danger inherent in utilising the language of cinema is that artists succumb to diversion as the key function of the moving image, allowing an audience to fall into a passive mode of spectatorship.

Much tougher, albeit humorous works that de-rafted the flow of television were Dara Birnbaum’s *Technology/Transformation: Wonder Woman* (1978-79), *Kiss The Girls: Make Them Cry* (1979) and *Pop-Pop Video* (1980) which collectively comprised 3 of the 4 channels of her installation for Documenta 9 in 1983. Their critique of the gender politics of 1970s broadcasting and the tropes of TV was made possible through her arrest of TV time. Birnbaum used appropriation and repetition to stretch and abstract the televisual moment, like repeating a word until it falls apart in the mouth. Then as now, quotation helps to bridge the gap between experiences of the moving image outside the gallery and those within it. But there remains a schism between these modes of spectatorship that often leaves audiences with an unsatisfying experience. Perhaps video art, in its current
emphasis on narrative and quotation, can be seen as sliding into a more populist attempt to co-opt or ‘be’ cinema, leaving behind the more difficult work of ‘not being’ TV.

Audiences come to the moving image with formal expectations around pace and narrative development. When viewing conventional narrative or documentary works, the revelation of information is managed in conventional and regular ways. Audiences’ formal expectations are based on this experience outside the gallery, with number of hours and visual literacy hugely outweighing their experience within the gallery. Some art audiences are overly generous, searching and scanning video work for all manner of significance. However, the general audience is not fooled: they judge video art next to cinema and TV and find it wanting, and fair enough. How many of us have been in the gallery watching time-based art and had other audients wander in and back out within 30 seconds of arriving, sometimes less. There are several factors that may account for this. Galleries are uncomfortable places for many people, historically the province of the elite and the privileged. Combine this with the strong strain of anti-intellectualism that runs through Australian culture and you are on the back foot to begin with. But the popularity of venues like ACMI indicates that audiences are indeed interested in video art. The schism between what an audience expects of a gallery and what they expect of the moving image leaves them hovering at the gallery door between two possibilities. This static moment can be prised open by artists to elicit a dialectical relationship to video installation.

In my own creative work I have employed a variety of strategies for re-invigorating and re-complicating the three-way relationship between audience, moving image and gallery. My work has lead me to isolate and exploit the physicality of gallery experience as the point of differentiation from more familiar viewing environments and modes of spectatorship. The gallery is a space in which audience members are self-conscious, both of themselves and their bodies. This is the opposite of the cinema, the darkened space in which the audience becomes immersed, and as such disembodied, with their usual cues for spatial orientation all subjected to audio/visual re-direction. Television’s mode of spectatorship is disembodied in a different way: it takes place within our homes, where one lets go of the social self to a far greater extent than is possible in the gallery. Video installation gives us an audience in a heightened state of self-consciousness in the presence of the moving image.

In the work non/un (2001) I created an installation that floated, a white field whose edges matched exactly those of the wall on which it was projected. Floating white within the white cube, it played with an audience’s sense of depth and the location of the screen. For the subject matter I appropriated all the movies I could find that utilised the white void, whether it be in a depiction of heaven, the mind, a dreamscape or a whited out snow field. Using this ganzfeld, or undifferentiated space, I proceeded to combine the appropriated images together in a fashion that emphasised the lack of any point of registration or orientation. In its installation form, the work segued seamlessly between different configurations of figure and non-ground, all of the characters caught in endless disorientation. This was the first work in which I began to utilise figures as means of drawing out an empathetic relationship from the audience, attempting to create parallels between the disorientation of the audience and those of the figures within the work. Whilst this was partially successful, I felt the quotation of cinema also kept audiences at a ‘safe’ distance and offered an illustrative echo, or compounding, of screen space rather than a real re-direction of the audience’s experience. One of cinema’s most profound capacities is to edit space and elide time, but this also serves to place the viewer in a physically ‘unreal’ situation, detaching the viewer from an embodied, haptic sense of physical location. I became interested in making the audience corporeally implicated in the work, rather than safely disembodied.
It is a given that the body is elaborated and re-constituted through technology, as articulated by Causey (Causey 1999 p.384). But perhaps at a moment when digital malleability means the indexical relationship of image to reality is no longer possible, there is reason to re-inflate time and space, to re-inhabit the material body. In “OW!” (2004) I used three monitors to split not only the space of the gallery but also my body. The use of monitors, ‘boxes’, gave the work a physicality that began to locate it in the gallery more firmly than a projection could. Two of the monitors ‘contained’ a life-sized image of me cut in half and trapped within a giant air-conditioning vent. The architecture of the gallery was linked to the space within the screen such that the air-vent in the monitor appeared to come from the gallery’s bulkhead. This spatial linkage was emphasized by the third monitor, depicting an image of the bottom of the door that was immediately behind it in the gallery, again represented at life-sized scale. The time depicted is ‘real-time’ with an invisible looping that further ‘traps’ the figure. The work achieved a greater confluence of the body of the viewer and the body on the monitors, creating a televisual magician’s box with the artist not only confined but also cut in half.

Tragic (2004), is the next work in which I attempted to make apparent the schismatic gap between world and image by pushing them closer together. In Tragic, once again utilising one-to-one scale and ‘invisible’ edits to achieve the appearance of real space and time, I dispose of my own body and then clean up afterwards. As with “OW!” there is an additional monitor on which nothing happens, simply displaying the bracing arm of the shelf supporting the monitor’s weight. This monitor was placed between two windows to further subvert of the illusory function of video. These sets of echoes and destabilizations between video and physical space were extended for Drama (2006). For Drama, the audience was drawn more completely into the work through the use of a mirror and the soap opera convention of the ‘2 shot’ in which both characters face the same direction whilst speaking to each other. By projecting an image onto one wall at life size and then providing a mirror on the wall opposite with footprints as a guide for where to stand, the audience was drawn into an endlessly rehearsed melodramatic confrontation with the self or other, a nemesis, a twin or lover. The endangered ‘self constructed as other’ in the various doublings of “OW!” and Tragic was now projected on to the audience as they were dragged into the mirroring psychology of the protagonist. Further, the convention of the loop, like scale and time, were also made ‘real.’ That is, rather than looping a single take of the performance, 9 subtly different takes were chosen and linked together in a longer loop.

In echoing the audience’s own discomfort at how to ‘be’ in the gallery, my work seeks to activate a consideration of the language and function of screen, gallery and viewer. I hope to create a dialectical response in the audience, a re-direction of their own self-consciousness into an identification with my body locked in stasis.

References

Biographical Notes
Dominic is an artist and academic based in Melbourne where he is a senior lecturer in Media Arts at RMIT University. In addition to his art practice and teaching he is actively involved in his
community, working with West Space from 2000 to 2004 and undertaking committee work for Gertrude Contemporary Art Space and Arts Victoria. In recent years his work has been seen at Sydney’s MCA; Melbourne’s ACMI; the Art Institute of Chicago; the Museum of New Art, Detroit; Art in General in New York; the Interface Festival, Sparwasser HQ and Hamburger Bahnof in Berlin; Kunstnernes Hus, Oslo; in the UK at Norwich Gallery and S1 Salon, Sheffield; at Platform, Istambul, Turkey; and Signal in Sweden. His work was part of the ‘Move on Asia’ program which screened in various locations in Korea and Japan as well as the ‘Sun Stroked’ program that played in Rotterdam and Berlin.
Concepts of Stillness

Michaela Reiser, University of the West of England

Abstract
In Western culture we place great value on the creation of commodities. As a result we emphasise the production of artefacts, but much less the quality of social interactions and user experiences we initiate. This demonstrates that we still tend to see practitioners as creators and audiences as consumers. However, users and audiences have changed, and in order to develop the more engaging modes of interaction and participation they demand, we need to critically appraise the theories and practices we teach our students and promote a more comprehensive and integral view of what constitutes design activity.

This means shifting our focus from problem solving to evaluating the quality of user experience and how to pass this on to our students. ‘Stillness’ allows us to focus on human interaction and creativity. It is not inactivity, but the decision to leave standard procedures and established notions of the design process behind, in order to allow for new responses to emerge.

In practice, this means revisiting our approach to process-based pedagogy and extending the range of teaching methodologies by studying recent design research, Human Computer Interface design research, as well as examples from practices not directly related to design. Adopting user-led design, collaborative evaluation and other strategies that value the responsiveness of an audience or partner will allow us to work with more open processes which will in turn promote a higher quality of social interaction. The paper concludes by outlining the benefits of adopting some of these strategies.

Keywords
Interaction, User experience, process-based pedagogy

Introduction
In Western culture we place great emphasis on the creation of objects. We evaluate the production and consumption of artefacts, but much less so the quality of the social interaction and individual experiences we initiate through it1. Practitioners are often portrayed as creators and audiences as consumers. Not surprisingly, undergraduate art and design students2 often place much emphasis on the design and production of work, but less on understanding the qualities of the experiences they initiate or the complex social systems these are situated in.

Evaluating the user experience is often taught as an added extra, but not as a founding rationale for production. Shortcomings in students work therefore include lack of user testing, audience responses not feeding back into the production phase, neglect of long-term effects of production, or the lack of continuity and maintenance of multimedia projects. These omissions are often considered to be less grave compared to technical glitches, reduced functionality or lack of originality in the work. This malaise affects areas such as interaction design, multimedia design, media practice, product design, software design, installation art, and 3D modelling.

Especially amongst media practice students it seems there is a tendency to create work for those sectors of society they are familiar with or know through the media, but not for others they find difficult to deal with. Work is produced that echoes existing media products and aimed at a receptive consumer society. This is problematic when learning is no longer discovery and transformation, but an exercise in imitation and representation, a circular approach that only affirms the conditions for its own existence. This conserves already established identities and overlooks those currently emerging.
All of this has a detrimental effect on future professionals, because by rating these shortcomings as less important during their studies, we implicitly further the notion amongst students that this is an acceptable practice. We indicate that it is tolerable that new products have a limited lifespan, that fast or temporary fixes are viable alternatives to thoroughly evaluated solutions, and that - for aesthetic reasons perhaps - our designs do not always meet the emotional needs of our users. This feeds into the expectation that creativity and technological expertise is still the domain of designers who provide solutions rather than empower users to find solutions themselves. In promoting this thinking we affirm a status quo that is more and more detached from social reality.

Users and audiences have changed over the past decade(s): whilst multimedia technology has come to permeate more and more aspects of life and work in Western society, we now deal with more diverse user groups that have technical expertise and are willing to use it in the creation of cultural output. The increasing popularity of web sites such as Wikipedia, eBay, Youtube or Myspace that thrive on user participation illustrates this point very clearly. Conversely, systems where users perceive that their participation has little or no effect suffer from user apathy; for example, the number of young voters in the UK has steadily declined over the last decades³.

Closely linked to audience participation is their sense of presence. Undoubtedly there is a qualitative difference between those audience members who feel compelled to act or can lose themselves in play, and those who feel awkward and forced to perform a ‘correct’ action. According to Mantovani and Riva (1999), a sense of presence is increased when participants feel in control, when they execute a task they want to do and which they can divide into sub-tasks. It is important to leave decisions about action to the participant, to allow participants to take from the environment what they need, to proceed in the order they choose, and to provide situations where actions have a cultural meaning and value. The result of this is that one should respect the social interchanges that occur between participants or participant and reactive environment.

If we want to see more engaging ways of interaction and ‘real’ participation, we need to start questioning how we currently prepare future designers.

**Designer-led processes**

The ‘engineering approach’ – a top down designer-led process still popular in design education - is awkward at best, as it understands design as problem solving. Here the design process is broken down into pre-production, production, post-production (or analysis – synthesis - evaluation). It is a cognitive tool that often relies on modelling an environment rather than providing the conditions for its emergence, on knowledge about users rather than knowledgeable users; and on averaged user feedback indicators such as box office numbers or hit counters rather than verbalised individual evaluation. This is problematic if we want to develop more engaging ways of interacting, because although we can determine how efficient applications work and what users do with them, it does not help us to gauge their engagement and enjoyment.

Modelled environments often hinge on methods such as cause and effect or simulation. This human-centered and mechanistic view is limited as it excludes the complex and interdependent relationships that exist between parts in a responsive system, at least some of which are unpredictable at the outset. For this reason the well-known ‘Game of Life’ by John Conway⁴ for example needs to be played through to see what will happen.

Also in simulated environments every object and stimuli needs to be either pre-constructed for the user, or the parameters for their construction pre-decided. And often only those interactions that were considered as useful or meaningful cause an effect. All of this restricts users, as there is little
space for individual expression, improvisation, dialogue, chaotic behaviour and play; as effects only occur when users follow the pre-programmed rules. In order to allow for more open play and self-expression, actions without direct purpose would also need to cause an effect, which means the amount of programming required increases dramatically. It becomes an attempt to remodel the world in its complexity.

A prime example of this is the development of virtual reality experiences that represent space through Cartesian coordinate systems. Richard Coyne, Professor and Chair of Architectural Computing at the University of Edinburgh, mocks the drive of researchers and artists to ever greater representation and mathematical precision: “VR research […] appears to be driven by the quest for greater quantity and higher quality of data input to the senses. Ignoring the constructed nature of perception suggests that a virtual reality system for a frog would be little different than one for human” (Coyne 1994, 66).

The constructed nature of perception Coyne refers to has been discussed extensively by Norretranders (1999) from a neuro-scientific view, according to whom we process most sensory stimuli non-consciously (the ratio is said to be 1.000 000 to 1), we have experiences only after the brain has created simulations from sensory data; and that only in unusual or threatening situations we employ conscious decisions. From a philosophical and psychological viewpoint it is also important to at least mention the role memory plays in interpreting experience. Previous experiences often construct a habitual scheme of references (‘a worldview’), which is only questioned when a situation arises that is so new or traumatic that the framework no longer fits.

In short, the designer-led model shows great shortfalls when it comes to working with real life situations.

**Different approaches**

Much can be learned from researchers and practitioners who look into how social systems change over time, how to value individual user experiences and how to design for open-ended play. From this we might be able to derive new teaching methods that are more capable of acknowledging users’ complexities within an interactive context.

Research at the ID-StudioLab, Delft University of Technology (Overbeeke et al in Blythe, 2003) has revealed that in order to move the focus within interaction and product design from usability to ‘funology’ (user enjoyment), a user-led design methodology needs to be applied that involves cognition, physical experience and affect in equal parts. It concludes that a traditional art-school approach that elevates a designer’s vision and ignores the experience of audience members can not provide for deeply engaging user experiences, but an approach where both designers and users work alongside as equal team members can. The research places also great emphasis on *in situ* design, where design is developed within the local context involving the people concerned.

Another strategy is a stronger integration of interviews, focus groups, direct observation, or situated participation into design education. By applying one of these methods in a ‘real’ context, where a particular aspect of interactivity can be explored in depth and in collaboration with a target audience group, students learn to concentrate on the social processes of interaction that are actually occurring rather than those they might have predicted. Stuart Nolan, a researcher, lecturer in multimedia design and consultant in training and change management, for example recently conducted a series of participatory design workshops involving 216 young people, aged nine to 16. In ‘Building magical realms: responses to pervasive and locative media technology’ he discusses their responses to existing and proposed locative and pervasive media technologies in gaming, mapping, gifting, game design, bodystorming, and collaborative storytelling activities (Nolan 2006).
In ‘The taxonomy of thrill’, Brendan Walker, a researcher at the Royal College of Art, explores whether a designer can actually control the flow of emotional engagement and related feelings of its users (2005). Walker refers to Zuckerman (1994) who maintained that rather than by genetics alone, thrill seekers are influenced by their sociological environment. Novel stimuli cause both arousal and anxiety, and it depends on the character of the individual where the threshold lies (Eysenck’s optimum level of stimulation theory, Hebb’s optimum level of arousal theory). Thrill seekers take more risks because they need higher levels of stimuli to experience arousal, which is linked up with increased experience of pleasure (Elster 2000). Walker conducts fifty interviews based on Zuckerman’s questionnaires, and analyses how respondents verbalise their emotions after experiences of thrill, giving a great insight into individual user experiences. Unfortunately, he then devices a formula (‘The Walker Thrill Factor’) to be used as a design tool for thrilling experiences, and with that returns to a top down design strategy.

Conducting even a small-scale qualitative research project with students requires space, time, and good preparation. However this yields more than an academic rewards, especially since the application of qualitative methods has become popular with the industry: Brendan Boyle, creative designer at IDEO for example holds weekly focus groups with children that feed directly into the development process of new toys and games (Boyle in Moggridge, 2006).

Another strategy we can adopt is to enquire more deeply into how sensory perception is said to operate, especially if we consider this as the basis for interaction. It exceeds the scope of this paper to go into cognitive science in any detail, however it is worthwhile pointing out that there are theories like the Gestalt psychology developed by Max Wertheimer, Wolfgang Köhler, and Kurt Koffka or direct perception by James J. Gibson that tackle perception from ‘bottom up’. Without making claims for their accuracy, introducing theories like these in design teaching will help to shift the emphasis from a purely cognitive towards a sensory and physical approach to perception. In this way we can open students’ thinking about perception as basis for interaction.

Another helpful approach is Gardner’s (1999) list of eight personal intelligences: linguistic, logical-mathematical, musical, bodily-kinesthetic, spatial, interpersonal, intrapersonal and naturalist intelligence. In recognising that knowledge and experience are gained in a multitude of ways, we can reap many benefits: by looking beyond the restraints of skills testing in our curricula, we can help our students to apply all their intelligences and hence achieve their best potential. Instead of wanting our audiences to think like designer-engineers, we can value the various ways in which clients and audience members experience and respond to our work. By applying this attitude to the way we design and converse about design, we can learn more from our users and can develop more mindful interactions.

Although at this point it is not possible to discuss the relationships between these alternative methods in greater detail, it is worth pointing out that being introduced to a greater variety of methods will be helpful for many design students, especially towards the end of their studies. It will help to challenge the dominance of the traditional approach, increase awareness for the diversity and complexity of user groups and value different ways of thinking.

Further strategies reveal themselves when we look into creative practices that already use different intelligences, or methods that operate with the responsiveness of a partner or environment.

Other practices
Non-rational design strategies as discussed by Wakkary (2005: 74) are often found in disciplines where play and physical improvisation are practiced. Butoh is a prime example for such a practice,
as it arrives at its creative output entirely via a non-cognitive approach. Butoh (from Ankoku Butoh, ‘dance of utter darkness’) is an avant-garde improvisation method that originated in Japan in the 1950’s and is now practiced worldwide. Its main focus is on working with a ‘dead body’: moving without intention, without thinking, without decision-making; the body is being danced (Roquet 2004).

In Butoh there are no ideal forms, no sequences or structures to learn, no analysis and synthesis to conduct, no physical ideal to aspire to, not even a cohesive training methodology. In spite of this, Butoh is capable of working with change and transformation to an extent many other practices cannot. What could we learn from this practice that might feed back into design education?

Butoh’s bottom up approach exposes future practitioners to intense experiences of physical conditions, memories, and proximity to other life forms. In this way it interlinks physical experience and affect, since processes are not broken down into thinking first and experiencing afterwards or vice versa, but are taught and experienced as a unity to such an extend that practitioners begin to ‘think with their bodies’, i.e. generate responses that bypass cognition. Butoh has remarkable similarities with the way complex generative systems operate, but is capable to exemplify how responses arise from sensation in a very practical way. Butoh also promotes a direct understanding of how interlinked one’s existence is with one’s natural and social environment, and how hierarchies between life forms are only socially constructed.

An understanding of a practice such as Butoh can be beneficial when working in collaborative situations, where many different voices need to be heard. It helps to let go of one’s original design intentions and aesthetic preferences and allow for form and content to emerge out of an equal and open dialogue. It also helps to find a way of working more comfortably with artefacts where unpredictable interactions might occur, and provides a language to describe change and transformation.

Stillness in Butoh
Stillness in Western artefacts often defines absence, disappearance, or death. For example the text accompanying Camille Utterbeck’s installation ‘Luminous Flux’ declares: “Alternatively, if a participant stands still, her image will disappear, dissolving in a ghostly fashion. Motion becomes presence, and stillness absence.” (Utterbeck 2001 online)

In other cases, stillness is used to offset (inter)action: “… Untitled (Dying Bull) … by Kevin Yates contain[s] no movement or obvious interactivity apart from looking. … Despite their sharp contrast with the electronic installations, the small figurines also act as a complement with a sense of stillness and scale. The stillness reminds us of the inactivity between interactivity, and although diminutive, the work commands no less a reaction than the other installations. The equity of response reflects the difficulty in measuring interactivity.” (Yates online, emphasis by the author). Stillness here describes a passive body but an active and contemplative mind. This is problematic as it begins to draw a distinction between the two.

In Butoh, stillness is perceived as ‘no mind’, the cessation of wilful activity, a point of mental or physical exhaustion. This does not literally mean ‘no activity’, but an often uncomfortable breach into experiences that are out of one’s control or break social limits. Beautifully grotesque movements and absurd performances can emerge from this.

At the same time this kind of stillness increases one’s awareness of time, and problematises how existence is linked to it. This stillness is a source from which Butoh practitioners draw. Frances Barbe, choreographer and researcher at the University of Kent describes how it changed her
approach to practice: “a lot of movement is thrown away in dance, undigested by its audience, and in some cases ‘un-experienced’ by the dancers. It’s as if the dancer only exists when moving. Butoh has taught me the power of existing on the stage in stillness, and the way that can challenge a dancer’s presence and draw their audience in. Through Butoh I have come to appreciate stillness as an essential starting point for dance.” (Barbe 2002: 31) Using stillness in this way, Butoh practitioners can be responsive and active, and less limited by intentions or expectations that often surround performance making in an art historical context.

Stillness in Butoh can be beneficial for design activities and creative processes when we understand it as cessation of wilful, but nevertheless intense activity. The Butoh method of exposure to extreme situations, which requires students to immerse themselves into challenging environments for periods of time, is just one example: living through these situations, students experience how changes in location, climate, or social environments resonate through their senses. The experiences let students explore their physical limits or challenge social conventions. Logical judgment is exhausted and ‘thinking with the bodies’ begins; from this new creative responses arise intuitively.

To incorporate this into the existing art and design curriculum we would need to work with a wider definition of design that is not linked to a production of an object, but includes dynamics within social systems. Students’ observations of how creative solutions arise could be assessed through open briefs. By immersing themselves into challenging and unfamiliar environments, they could explore the qualities and constraints of these, and observe how responses emerge. “Prisoners’ Inventions”, a touring exhibition that showed how prisoners design everyday things (Temporary Services, 2005), illustrates this point quite well.

Conclusions
Emerging technologies pervade more and more aspects of our lives, and users demand more engaging ways to interact with each other. In order to accommodate that, we need to rethink current standard procedures and notions, and allow for new responses to emerge.

In our teaching we need to promote a more comprehensive and integral view of what constitutes design activity. We need to shift our focus from problem solving to valuing the quality of shared experience and to convey that more successfully to our students. Whilst retaining what is positive about models such as action research, experiential learning (Kolb), or reflective creative practice (Donald Schoen), and tried and tested tools such as real client briefs, student design competitions or group work, we need to strengthen process-based pedagogy.

This can be achieved by promoting collaborative design methods and user-led design. Methods adopted from recent interaction design research and HCI research can enable us to place greater emphasis on diversity, indeterminacy, and dialogue. Other, non-design practices might provide strategies that help us to open our way of thinking and to embrace change and non-predictability. Adapting the essence of these strategies for design practice is beneficial, as it can allow us to work more comfortably with open processes and facilitate a higher quality of social interaction. As a result we might be able to value each other’s complexities, contradictions and irrational responses, especially within an interactive context.

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ID-StudioLab, Faculty of Industrial Design, Delft University of Technology, Room 10-2A-11 to 23, Landbergstraat 15, 2628 CE Delft, The Netherlands. Also online: http://studiolab.io.tudelft.nl/about/

A good example for this is a research report by the Arts Council of England (Fenn et al. 2005). The aim was to find out “who is attending what kinds of events and how often, what types of people take part in a range of artistic and cultural activities, and how the public feels about the arts and how they should be funded” (Fenn et al. 2005: 3). What is problematic with reports like these is the quantitative approach to attendance, participation and attitudes. Attendance was measured via ticket sales, and in the wording of the report it became clear that it was predominantly understood as passive consumption. Participation was measured as consuming art, buying art, or taking part in its production. Finally attitudes were measured through to agreeing to statements such as ‘the arts play a valuable role in my life’. There was no scope for assessing the qualities of social interaction or individual experiences that were initiated through artworks.
This and the following statements about undergraduate students refer to observations made during my teaching involvement (1998 - 2007) on a wide range of UK Art, Media & Design courses, some of which are: BA Digital Art, BA Multimedia Design, Thames Valley University; BA Digital Media, London Metropolitan University, BA Media Practice, University of the West of England.

 “…voting behaviour may be linked to young people's attitudes. A third of those aged 18 to 24 interviewed for the 1998 British Social Attitudes Survey felt that 'everyone has an obligation to vote'; this compared with four-fifths of those aged 65 and over. Further analyses suggest that this attitude to voting held by young people may not change as they get older. According to the Young People's Social Attitudes Survey, political interest among young people was already low in 1994 and had fallen further by 1998. Over a third of young people aged 12 to 19 claimed to have no interest in politics at all in 1998, a rise of 7 percentage points since 1994. A further third had not very much interest in 1998, leaving only one in three teenagers who claimed to have an interest. Although there has also been a fall in interest among adults, they remain substantially more interested in politics than their younger counterparts.”


The Game of Life is a cellular automaton. It consists of a collection of cells, which, based on a set of mathematical rules, live, die or multiply. Depending on the initial conditions laid down by the user, the cells form various patterns throughout the course of the game. An online example can be found here: http://www.bitstorm.org/gameoflife/

Incidentally, this is where the UK’s first MA in Interaction Design started in 1989.

Gestalt psychology investigates into human perception of groups of objects and how we perceive parts of objects and form whole objects on the basis of these.

According to Gibson, direct perception follows three rules: the environment contains all of the sensory information needed to form an accurate perception; perception is immediate and spontaneous; and perception and action are inextricably linked.

Biographical notes
Michaela Reiser is a Senior Lecturer in Interactive Multimedia at the University of the West of England, UK. Her research interests include sound, performance and digital media, with a strong focus on new media performance. She is currently developing work called ‘Excitations’, which focuses on sonifying subtle physiological processes of a performer’s body. Using biofeedback sensors and electro-acoustic signal processing, she measures blood flow and stress levels and makes this audible. A playful dialogue emerges between performer and responsive system. New media performance is also the focus of Michaela’s theoretical research, and she presented related papers at a range of major conferences. She recently acted as a key organiser of ‘Mindplay’, a conference on digital media theory, culture, practice and play, held in January 2006 at London Metropolitan University (www.mindplay.org.uk), and as guest editor of a related issue of Digital Creativity Journal (Routledge, Vol 17 No 3).
**Dis/appear: a video installation exploring stillness and the thickness of time.**

**Margaret Seymour**

University of Sydney

This short paper describes my recent artist-led research project – a real-time video installation called *Dis/appear*. In this work, a live video image is processed in real time to incorporate a temporal delay. Moving objects and people disappear from the image, registering only as ghostly traces traversing the screen. Recreating one of the unintentional effects of early photography – the inability to depict moving subjects – *Dis/appear* explores the idea of stillness as creative repetition, a memory or echo of the past existing in the present. Memory opens us up to larger time frames gives us a sense of the thickness of time. Following Bergson, time is a constant melding of past, present and future.

Keywords: video art, installation art, time.

*Dis/appear* is a video installation that interrupts our ordinary sense of space and time. In this work, live video images captured in the exhibition space are processed in real-time to incorporate a temporal delay. Time appears to stretch. Moving objects and people ‘disappear’ - registering only as ghostly figures traversing the screen. Only those things that are stationary are brought sharply into focus.

The project began by thinking about space and time in the digital age. Connected to the internet, space is seemingly infinite but users still experience a temporal limit, are still prone to boredom, distraction, fantasy, day-dreaming and forgetting. Watching live webcam video on the internet I am always struck by the beauty of the grainy, low-resolution images and the poignant, halting motion caused by the low frame rate. Each frame of the streaming image seems to hesitate before appearing, and then disappears only to be replaced, in an equally tentative manner, by the next frame. What would normally be considered a deficiency, something that will improve with increased bandwidth, seems to give visible form to the phenomenon of human memory – to the simultaneous stillness and transience of the images we recall from the past.

The halting motion of webcam video reminds me of the difficulty early photographers had capturing motion in their images. Specifically, the work *Dis/appear* makes reference to a famous image titled *Paris Boulevarde*, captured by Louis Daguerre in 1839. This well-known picture shows a Paris street, however because of the long exposure time required, the only person appearing in the scene is a solitary man who stopped to have his shoes shined. All the other people and vehicles moving along the busy street were erased by a kind of selective amnesia inherent in the technology. *Dis/appear* recreates one of the limitations of early photography – its inability to depict moving subjects.

Work began on *Dis/appear* in 2005 during a creative residency at the Banff Art Centre in Alberta, Canada. I worked with a programmer to write a patch that would remove moving objects and people from a live-feed video image. Video documentation of the work-in-progress shows fellow artists at the Banff Centre interacting with *Dis/appear*. A CCTV camera mounted in the ceiling of an ordinary corridor in the studio building fed live images to a computer in an adjoining room. The computer was programmed to add a delay to the live images – each frame rendering to approximately 10% opacity. Image elements that remained unchanged over time appeared in sharp focus. Moving objects appeared blurred or disappeared entirely. Standing still at the doorway to the


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studio you could see your image on the computer monitor – that is until you moved and your image evaporated before your eyes.

Figure 1: Dis/appear - Margaret Seymour, 2005. Still from video documentation of work-in-progress. Copyright: image appears courtesy of the artist.

There are two levels at which the work Dis/appear engages with the theme of ‘stillness’. Firstly, the video acts as a distorting mirror, reflecting as well warping reality by editing out moving objects and people. Initially I hoped it would be possible to edit out motion completely. What I ended up with however is an image that seems more fluid than frozen – figures slipping and morphing from one position to another as if they were memories coming into and fading from consciousness.

Secondly, by deliberately referring to early photography’s inability to depict moving subjects, Dis/appear incorporates a creative repetition – echo of the past within the present. While Dis/appear uses currently available technology – a surveillance camera and realtime computer processing – it also remembers an earlier period of change and technological innovation. Memory seems to slow time down, making us aware of larger time frames outside of our immediate present. It causes us to stop and reflect. Memory allows us to escape the force of habit, to learn from past mistakes, to step away from perceiving the world as governed by cause and effect and to embrace the unforeseeable. For Henri Bergson (1859 – 1941) scientific models of a universe governed by cause and effect have no time. Human beings “introduce a gap into the universal interplay of mechanical causes and effects, a delay in reaction and frequently a shift in direction”. (Bogue 2003, 30) Time is this delay. Time is a vehicle of creation and choice.

While it is often argued that in today’s world we are increasing having to accommodate ourselves to rapidly shrinking time scales, that the world is becoming smaller and the pace of life faster, our understanding of time is not solely determined by technology. We live simultaneously in electronic
and real spaces, and in the space of memory and imagination. Each of these spaces has its own temporal characteristics - some looking to the future, others to the past, some characterised by speed and others, in contrast, seem increasingly slow. Our technologies do not determine our understanding of time but suggest new temporal frameworks that are added to those with which we are already familiar.

As part of my research I have been searching out artists who incorporate multiple time frames in their work. I am particularly interested in a work Bruce Nauman proposed in 1969 but deemed too complex to realise at the time. In this work, *Untitled* (1969), Nauman describes a person entering and living in a room for a long time – “a period of years or a lifetime.” One wall of this room is a video projection that mirrors the real room but from the opposite side so that there appears to be a parallel room existing alongside the first one. When the viewer stands facing the image, they see themselves from behind, standing facing a wall. Nauman explains that after a period of time, “the time in the mirror room begins to fall behind the real time – until after a number of years …(the person living in the room) … would no longer recognise his relationship to his mirrored image.” (Nauman quoted in Kraynak 2003, 55)

Naumans’s *Untitled* (1969) seems to encapsulate the idea of existing in two spaces simultaneously, electronic and real, each with their own distinct time frames. In Nauman’s ‘mirror room’ time slows down, the virtual lagging behind the real until the viewer gradually becoming estranged from their own image.

Two works by contemporary artist John Gerrard *One Thousand Year Dawn (Marcel)*, 2005, and *Portrait to Smile Once a Year (Mary)*, 2006, also demonstrate the paradox of living simultaneously within multiple time frames. Both works are realtime 3D animations - a medium most commonly associated with computer gaming where images are rendered in real time to give the user a sense of instantaneous control over a character or avatar. Gerrard’s largely static works however counter the usual emphasis on action and user control in computer games. In both these works Gerrard incorporates extended time frames – prompting the viewer to contemplate a future they may never behold. His *Portrait to Smile Once a Year (Mary)* shows a photo-realistic 3D computer model of a young woman standing still. The portrait will smile once in a year at a time of her own choosing, thereby denying the viewer control over the work.

*One Thousand Year Dawn (Marcel)* invokes an even longer time frame. A solitary figure stands on a beach looking out at the horizon. A faint glow illuminates the sky. We watch the figure as he waits for the sun to rise. As the title suggests, dawn will take a thousand years to arrive. We will never see this dawn break across the ocean.
The images of time in Nauman’s Untitled (1969) and Gerrard’s One Thousand Year Dawn (Marcel) give us a sense of the ‘thickness’ of time. In Nauman’s work the past co-exists with the present, while Gerrard focuses our attention on an imagined future. Time is not simply composed of a succession of instants but, following Bergson, is a melding of past, present and future. The past persists in the present as memory and the future also exists in the present as anticipation.

While Bergson’s own images of time – the dancer and musical melody – are characterised by movement, the images of stillness in Dis/appear, Untitled (1969) and One Thousand Year Dawn (Marcel) each ask the viewer to contemplate their own existence within a larger time frame. In doing so, they echo Bergson’s idea of time as real duration.

In today’s digital and networked environment we experience simultaneous and contradictory facets of time. Our technologies are designed for instantaneous communication and yet our experience of electronic space is often characterised by stillness and waiting.

References

Biographical Notes

Margaret Seymour is an artist and academic at Sydney College of the Arts, University of Sydney. Her research incorporates a diverse range of media including sculpture, installation, computer graphics, video and sound. Her works often combine new media with older lens based technologies now considered ‘defunct’. For example, *The Mirrored Room* is an installation incorporating a live 3D stereoscopic projection. Viewers are invited to don a pair of anaglyph glasses (the type used in 3D movies) and to interact with an image of themselves that at times floats in front of the screen, at other times sinks back behind the screen. Combining aspects of stereoscopic cinema and modern video surveillance systems, the work explores ideas of fear and uncertainty in a world that today seems both familiar and irrevocably changed.

Margaret’s recent work has been seen in galleries and public spaces in Sydney and interstate. In 2005 she was awarded the Australia Council International Residency - Banff, Canada.
Stillness between the Nodes of the Networked Classroom

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Abstract
The Network Society, as described by Castells (1994), entwines nearly every aspect of lived existence for increasing numbers the world over. Students learn to quickly adapt to change, typically faster than their teachers. In fact, it is the youth who thrive within contemporary hypermediated social networks, and are often much better equipped to use not only the hardware, but understand the cultural implications that they represent.

Educators, though slow to adapt to these changes, are beginning to adapt. Distance Education at the university level is beginning to reflect some of these changes, while still tied to outdated notions. This paper presents an overview of an undergraduate general education course titled Introduction to Art, offered in a Distance Education format at Indiana University of Pennsylvania (US). Understanding the possibilities for creative expression and critique in the art classroom, including modes of resistance informed by the work of Deleuze and Guattari (1984) will be crucial for pedagogical tactics that make use of the moments when informational exchange threatens to become noise, or when stillness is just as disruptive.

Keywords
Art Education, Distance Education, Network Society, Rhizome, Society of Control

Online Flatline
When I was offered the opportunity, in the Spring of 2004, to develop a distance education version of the Liberal Studies course ARHI 101: Introduction to Art at Indiana University of Pennsylvania, I agreed without hesitation, based on my prior experiences with both the course and the technologies involved. As all of my lectures were already posted to the WebCT server, the transition to a relevant distance education format was simple. What was not simple was incorporating in-class activities including studio experiences, museum visits, and campus walking tours that had always been my favorite part of the course.

This first summer of teaching online went by like a blur, primarily due to the short, five week semester, but also due to another, unanticipated feature of the course. Students completed activities based on course readings, posted lectures, and questions generated from the discussion boards – our primary means of interaction. My general response was positive: I had not planned for an experience close to that of the traditional classroom, and, having taught using the technologies previously, my adaptation rate was quick. However, one aspect seemed troubling. The responses of the students seemed unremarkable. Their thoughts and reactions to the artworks and theories studied, usually spanning from dull to brilliant, from inspired to insulting in the traditional classroom, were flattened into a homogenous mass. A stillness. An online flatline.

There was no confrontation in the discussion boards. The charged ideas and ideologies presented
were responded to with little to no energy. There was also a noticeable lack of awkward silence that
might follow a particularly confusing topic, or simply any topic presented at eight AM. This
flattening could have been the result of any number of factors: the semester during which the course
was offered, the particular group of students participating, the responses that were requested from
the students. Out of these, I have to think that the course delivery – the distance at which we held
not only the ideas discussed, but each other’s comments – resulted in exchanges that were very
similar to the next.

Were the patterns of communication tied to the technologies used? The history of the Internet is
coupled with notions of technological utopianism, leading to theories that online communication
allows for multiple identities to develop, freed from the constraints of the ‘real world’ (Turkle,
1995). Why was there seemingly less freedom in these responses? Does it have to do with the
expectations of the institution, based in centralized forms of control and rigid disciplinary
segmentation?

Or, do these responses relate to the everyday use of the technologies? Email is used primarily for
short conversations, while Instant Messenger communication is typically composed of dense chunks
of information, and is quickly becoming the preferred mode of digital communication for U.S.
teenagers (Lenhart, et al, 2005). Does the use of the discussion board, inasmuch as it resembles
e-mail exchange, represent an outmoded form of communication for students? Or, was this my
problem? Was I reading student responses when they were presented to be heard, nomadically
maneuvering through the territory between written and spoken text that seems to relate to
networked digital communication? Finally, could it be that the answer was to be found in the
network itself, one that is decidedly decentralized?

**Education in the Network Society**

While wishing to avoid technological determinism, I do feel that my responses to the previous
questions are based in the nature of education in what Castells (1996) calls the ‘Network Society.’
In his writings, he suggests that contemporary sociocultural and technological networks have
shifted almost every aspect of contemporary life the world over. In regards to education, he states
that such systems are the most resistant to change; particularly, the entrenched hierarchies of higher
education. With the recent growth of universities that are primarily online, such as the University of
Phoenix, many in higher education are debating the future of networked forms of education, while
others rush to develop online course content without considering long-term consequences or
appropriate pedagogical adaptations (Trend, 1999).

Much of the resistance to online education comes from the lack of physical meetings with students,
both from faculty and students alike. In 2002 only six percent of college students in the US enrolled
in an online course, and 56% stated that it was a worthwhile experience (Jones, 2002). However,
this resistance seems to be based upon a romanticized view of traditional schooling, where students
are attentive, engaged, and eager to interact with teacher and student alike. Anyone who has spent
time in a classroom recently knows that this is typically far from the case. Many students are eager
to interact with each other, possibly not in the manner anticipated by the teacher. The passing of
notes is a prime example of a form of communication taking place outside of official lines of
communication, a precursor to ‘Instant Messenger’ and the multilevel channels of classroom
communication simultaneously in operation.

Classrooms were hypertexual long before the term existed, each gesture or word opening up to a
range of potential responses. Students learn to negotiate these spaces early on, as school is, for
many, the first regulated space for social interaction outside of the home. As soon as they learn the
rules of these spaces, they learn how to use the rules, following them to the letter, or bending them to their will. They eagerly interact, or resist the responses that the teacher anticipates; possibly combining the two, double-coding them using the language of teen sarcasm.

Educators interested in exploring the possibilities for distance education, particularly within the arts, should consider the distance that exists in the traditional classroom, spaces that are already infused with digital technologies, and, perhaps more importantly, the sociological residue of such forms of communication. The notion of screening as discussed by Baudrillard (2002) plays an important role in the distances created and maintained within the traditional classroom space. As technologies continue to miniaturize and wireless connections expand, the ability for students to occupy themselves with their own screens increases, multiplying not only the amount of information available, but also the possibilities for connection as well as disconnection. Text messaging via cellphones, as one example, is a common activity in my physical classroom space. While I do not usually appreciate this, is next to impossible to eliminate this from the educational environment. Perhaps it is a matter of having them integrate the screen with the course information. As I have experienced, utilizing networked technologies in the traditional classroom can create situations where discussions extend beyond the physical space, where students discuss works of art with distant friends, or test out theories of commerce in real time, disrupting stillness in productive ways.

When education takes place via distance learning, the screen becomes centralized as the main conduit for learning. One possibility for unsettling the ‘online flatline’ is to acknowledge the multitasking that is part of computer use. The contemporary computer screen is the space for multitasking, where IM conversations share mental and visual space with gameplay, research, and any other combination of audiovisual information. Expecting students to respond in what might be thought of as a coherent, logical manner might be antithetical to the rhizomatic lines of flight encouraged by the CRT.

Wasp/Orchid
Deleuze and Guattari’s (1984) discussion of the rhizome adds to the discussion of the homogeneity of interaction in distance education. In particular, their description of the ‘unnatural couplings’ of the wasp and the orchid points towards an acknowledgement of the notion of purity upon which much of the critique of distance education rests.¹

The wasp and the orchid exist in a symbiotic relationship. However, Deleuze and Guattari suggest that their exchanges extend beyond pollination; their interactions are social, visual, and sexual. As these couplings are essential for each species, they cannot adequately be considered in isolation. The networks that they form leads to the creation of a third entity, a wasp/orchid, which questions the taxonomic divisions that separate not only species, but forms of life, or even life and lack thereof.

In a similar manner, we might consider the traditional classroom space as a hybrid of the analog and the digital, of centralized control and decentralized interaction. The spaces of distance education are also the spaces of hybridity, of centralization and decentralization, which, if they are to maintain a level of flux, must remain as such. However, as Deleuze (1993) suggests, the tendency of the digital is to reduce information to code that can be more easily catalogued and controlled. In his response to Foucault’s (1972) notion of the disciplinary society, Deleuze theorizes that the contemporary subject can no longer be adequately understood as an ‘individual.’ As disciplinary societies shift to ‘societies of control,’ the modern subject that Foucault builds much of his ideas upon starts to erode: the individual becomes divided, becomes a dividual, the Panopticon is replaced by digital gatekeepers, and visual surveillance shifts to dataveillance. This shift to dataveillance, what Lyon

¹ Deleuze and Guattari, 1984.
calls ‘The Electronic Eye,’ is often voluntary, such as the sharing of personal information with telemarketers or businesses on the Internet. The vast networks of communication and control that collect personal data and catalog behavior result in the fragmentation of the individual into at least two bodies: physical body and databody.

It is the notion of the *dividual* that I find important to acknowledge when discussing distance education; and, in particular, the interactions described previously as an ‘online flatline.’ Each student contributed responses to the discussion board, based on interpretations of the course readings and reflections upon personal experience. As these responses were catalogued, they built up to form a representation of each person. This body of data, understood as a databody, is a type of auxiliary personality, standing in for the student in the online forum.

The flattening of these responses seems directly tied to the distance of the databody. Each student was free to respond to the course questions, and to each other, but within a highly monitored space. The disruptions and silences associated with traditional instruction, in the discussion board, become catalogued, recorded, easily returned to the discussion with a few clicks of the mouse. Within this monitored space, the responses form a common denominator. In this manner, the identity of the individual student becomes, to a certain extent, a facet of a composite ‘student body.’ Each allowing her/himself to respond within tightly controlled boundaries.

The limitations of online exchange should be addressed, particularly by proponents of distance education who invest heavily in the benefits of ‘interactivity’ and ‘online community.’ Educators should resist placing limitations on technologies that have contributed to flexible technocultural forms represented by recent social media sites such as Facebook, YouTube, MySpace, and Flickr. Acknowledging moments of rupture, similar to those described earlier, and incorporating opportunities for multiple forms of interaction will hopefully allow for this flexibility to be maintained, so that online instruction is not used to reproduce the mechanisms of the societies of control.

**Networked Classroom**

The educational structures developed during the Industrial Revolution should be reconsidered in the Network Society. Distance education has the opportunity to respond to developing media forms, and introduce related forms of pedagogy, if the hybrid nature of education is acknowledged. Social media offers educators in both traditional and distance education the opportunity to acknowledge multiple forms of self-representation, for new forms of interaction and engagement to fuse with those practices that are time-tested and effective.

These issues are important for art educational practice in particular, as artists, art historians, theorists, and viewers become accustomed to practices that blur the lines between the analog and the digital, between information and identity. Art educators should make certain that the visual qualities of distance education technologies are continually critiqued, and that democratic pedagogical strategies are not lost in the adoption of new techniques and technologies. As McClaren (1991) writes:

> A critical pedagogy must grapple with the ways in which youth resist the dominant culture *at the level of their bodies* because in doing so the utopian moments to which such resistance points can be transformed pedagogically into strategies of empowerment.

The complexities of distance education in the network society can be addressed through active
responses to the forms of identity created in online instruction: the databodies that accumulate on discussion boards and in chat rooms, along with the hybrid bodies formed through social media. These are forms of networked identity that might allow for the reconsideration of the individual as a form of decentralized empowerment that disrupt the centralization of the panoptic pedagogue, unsettling the stillness of the online flatline.

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2 WebCT documents all posts, allowing for threaded and unthreaded views. Also, each student is monitored according to number of posts read, responded to, including the last date and time that they accessed the message board.

Biographical Notes
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In The Eye of the Storm: An unexpected calm may be discovered in the crafting of virtual worlds

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Abstract
3D software provides for an animation industry in which computer-generated action and special effects are the order of the day. The end results may be cartoonish or they may be intended to replace actual footage of actors – they are seldom quiet or still. A curious effect becomes evident to the independent image-maker, however, when using the same technology, an effect that may be likened to being at the calm eye of the technological storm.

Typically, these software packages allow for modelling and surfacing (emulating a workshop), arranging and lighting (emulating a studio) and photorealistic rendering (emulating the shooting of the image). The combination of these functions makes for a very different psychological effect, however, to that of photography where the sense of ‘capturing’ – is the dominant feeling.

For the independent artist, the many different activities associated with creating the image in virtual 3D must be undertaken alone and with expert knowledge extending from materials science to anatomy, from optics to computer algorithms. The slow creation of the scene, and the infinite variety and number of decisions between conception and final render, ensures a level of intimacy with the creation that is usually not associated with digital production.

Using these tools the creative process is deliberate and considered. This paper considers whether there is a relationship between stillness and craftsmanship and argues that craftsmanship lies at the heart of using 3D imaging software.

Keywords
Digital, craft, virtual, photorealistic, stillness.

At the SIGGRAPH conference in New Orleans in 2000, the futurist, Ray Kurzweil made the following claim:

We will make 100 years of progress at today’s rate in 25 years. The next 10 years will be like 20, the following 10 like 40. The 21st Century will therefore be like 20,000 years, as far as the rate of progress based on the current rate. (Kurzweil, 2000)

If Kurzweil has his maths right then he says that in the course of this century mankind will make the same amount of technological progress that it has made, to date, since just this side of the Stone Age. Humankind has never experienced change at that rate and history suggests that we are not emotionally, physically or psychologically equipped to do so. Nor has Kutzweil allowed for human resistance to being replaced by “immortal software-based humans”. (Kurzweil, 2000) His enthusiasm and its material manifestations, however, may help to account for the reaction inherent in such movements as “slow food”, “slow reading” and indeed for the purpose of this conference. Whether such interests and movements turn out to be merely a brief respite, a moment for humanity to catch its collective breath, before the great push towards warp speed progress – remains to be seen. What is certainly the case is that the computer has responded very effectively to the “need for speed” that may be inherent in the human psyche. As a result, computer-generated or computer-mediated art has tended to suffer from the popular belief that great work may be accomplished in no time.
Leaving aside the issues of content, function, meaning – which are irrefutably important, the belief that the computer and adjunct hardware like the digital camera, scanner or video camera, can produce master works automatically or within minutes of commencing work militates powerfully against the discipline associated with craftsmanship. If craftsmanship can be described as the willingness to take pains, to provide for exactitude, to serve art, to prepare well, to polish, refine, redo and, ultimately, to produce work that looks well-crafted and unique – then a great deal that comes from the computer manifests high levels of craftsmanship.

In 3D modelling and rendering, the disjunction between the reality - that is, what is required to make good images using 3D modelling and rendering - and the public perception of those requirements is considerable. The gap between the two is made greater by virtue of the fact that so many tools of new media are readily available with the purchase of the latest computer or by piracy. As a consequence, well-crafted, if meaningless, results frequently do reward relatively minimal effort – whether the medium is Photoshop or iMovie.

Indeed, many schools of new media now implicitly rely upon incoming students having already mastered at least the basics of the more popular mediating software and increasingly concentrate their efforts in teaching theory and driving the issue of high-value content. This is appropriate enough when it comes to most media but not so appropriate with 3D modelling and imaging, the requirements for mastery of which are considerable – as noted already. Perhaps because of the technical demands, interest in craftsmanship in 3D modelling and imaging has mostly emanated from schools of computer science and often at the expense of content, which is frequently – though not by any means always – depressingly predictable.

In teaching students how to draw, paint or photograph, art schools have not assumed that students have an innate understanding of the “how to” issues. Poor drawing skills have been improved in the studio by practice, ditto paint management or lighting techniques. When a student of 3D modelling and imaging sits in class for the first time to be told that they cannot make a model successfully unless they can draw it – a ripple of outrage runs through the digital studio as palpable as if the students have discovered that they must master Mandarin before they commence work. The perception that drawing is tedious and hugely difficult and that the computer will eliminate the necessity for such tedium originates, perhaps, in the marketing of computers but is not overcome in secondary education either.

The apparent, current human need for speed may result from any number of modern ills and anxieties that are not the focus of this work. Immediacy, however, is very much a concern of new media theorists, academics and practitioners and immediacy is undoubtedly a close associate of speediness. And, while the blazing immediacy of such works as Velázquez’ Las Meninas clearly illustrate that our liking for it is far from new it also seems to be evident that we have drained whatever satisfaction there was from its speedy cousins, fast food, adrenaline-driven working lives, caffeine-fueled leisure and so on.

Immediacy – that “lack of an intervening or mediating agency” (the Free Dictionary) is well provided for, in audience terms, by those technologies associated with the computer. Meanwhile, producers of digital new media works enjoy turnaround times unimaginable to artists and designers of even the recent past. It seems that everything that comes from the computer – from production of works to the computer-based reception of them tends towards speediness.

Meanwhile, in The Language of New Media, Lev Manovich argues that “the achievement of photorealism is the main goal of research in the field of computer graphics” (Manovich 2000, p. 199) 3D modelling and imaging software results from that research and, by its very nature, appeals
to the most independent and determined auteurs – those who would control the entire creation process. To understand why computer graphics research has aimed so consistently at such a goal and to understand the appeal of the medium, we need to look closely at photography itself and the causes of its popularity.

The advent of the camera provided for a long-standing human desire to capture important moments of time, briefly to “stop” time by recording a recognizable slice of it. For the first time in history reality was recorded faithfully if imperfectly and, in particular, the human face was translated from its actuality to the mantelpiece so convincingly that the photograph came to be the benchmark for the concept of “likeness”. For painters the effect was especially dramatic in terms of calling into question the ultimate purpose of portraiture or landscape painting or recording generally.

Photorealism, the bastard child of photography, inherits some but not all of its characteristics and twists them into a new and unique shape of its own. “Evidence” is loaded with irony as photorealism challenges us to question our senses or our sense of humour. Photography’s intrinsic effect of memorializing is mocked by photorealism as photorealism’s own “intrinsic effects” (McLuhan et al 1964, p. 8) deliver its unique message, for nothing but the imagination of the artist is “captured” by image-making in virtual 3D even as the artist feigns “evidence” by virtue of the blood relationship with photography.

The “ability to fake visual reality” (Manovich 2000, p. 200) naturally endears the tools to games-makers although “what is faked is, of course, not reality but photographic reality, reality as seen by the camera lens” (Manovich 2000, p. 200) and in the hands of games-makers a games aesthetic has come to be expected of the tools. 3D modelling and animation software makes for greater immediacy because it emulates the faux-evidentiality of photography and what usually results is a variation on the Cottingly Fairies. Photorealism and 21st Century “fairies” have come to be seen as the aesthetic of the tools.

Many new users find the allure of the software, in terms of directorial and creative control and photorealism, irresistible but the delight is quickly checked by the discovery of the level of knowledge necessary to use the tools successfully.

3D, modelling, imaging and animation software and its users are undoubtedly responsible for both aesthetic and content clichés in games design. For example, there are few games that do not rely on speed in one form or another to generate popularity in the largely young audience to which it is
appealing. Speed may manifest in many ways, reaction time being one such example but also the ability to port to different locations or the speed of service of the system in terms of having additional facilities assigned to a player and so on.

Many games hark back to a time (or propose future worlds) where acute senses and a good turn of speed make the difference between “life” and “death”. Speed provides an adrenaline rush in societies that are far safer, better designed and more durable than ever before.

It has been noted that adrenaline can be addictive (Hart. A. 1995) which may, in itself, help to explain why electronic games are so popular. (Some research also suggests that an addiction to adrenaline may cause aversion to exercise, since exercise burns off excess adrenaline. Conversely it may be argued, aversion to exercise may create the craving for adrenaline.) By observation the “need for speed” goes hand in hand with the desire for immediacy, which helps to explain why 3D imaging programs are popular tools for making games. It seems also that the software and those who use it to make games are stuck with protocols and algorithms that favour a particular aesthetic. So ubiquitous is the aesthetic that more adventurous games makers are turning away from virtual 3D in an effort to generate new concepts both in terms of aesthetics and content – form and function being as closely linked in this issue as in any other. Certainly games do not preclude aesthetic variety. And, while many artworks produced with 3D imaging tools do appropriate the games aesthetic (cf. Stephen Haley. Datascape: Peak, et al) such an outcome is not a foregone conclusion (cf. Callum Morton. Tomorrowland, et al)

Academic games courses or programs are largely, though not exclusively, populated by those who like to play and, by definition, those who enjoy the challenges posed by electronic games including, as noted above, those who are addicted to adrenaline. Imagine their distress when they discover, as they inevitably must, that there is no “make” key for the immediate creation of what they have in mind and that, in fact, in making 3D virtual words they have entered a creative environment that has far more in common with the craftsmanship of fabrication than the craft of war or Formula One.

Much has been written about the velocity and magnitude of change brought about by the Industrial Revolution. The effects may seem puny from this distance in time especially as we try to come to terms ourselves with the current Technology Revolution. But the effects, both good (steam power, cheap textiles, steel ships etc) and bad (the enslavement of many millions in inhumane working conditions from which some, even in this generation, have yet to escape) were great and long-lasting.

The Arts and Crafts movement was a reaction to and relief from the supremacy of the machine and an attempt to reverse human subjection to it and, simultaneously, a reaction to the meaningless revival of past decorative styles – revived for no better reason than that the technology made it possible to revive them cheaply. It may be argued that some products of new communication technology exist also merely because the technology makes it possible. The Arts and Crafts movement was not merely reactionary, however - many leading lights were prepared to create designs for machine manufacture providing such manufacture did not separate the craftsman from the satisfaction of his or her craft by means of the division of labour.

John Ruskin, the philosopher-champion of the movement equated national good health with the health of the nation’s craftsmanship and provided the intellectual arguments for the work of such designers, artists and craftsmen as William Morris, Charles Rennie Macintosh, C.R. Ashbee and The Pre-Raphaelites. The movement paved the way for Art Nouveau, De Stijl and Bauhaus and its effects can be seen in the work of Clarice Cliff, Frank Lloyd Wright, Walter Burley-Griffin and many other exponents of Art Deco. It was through the efforts of the Arts and Crafts movement that
the concept of satisfying design was extended from the public sphere to that of personal property and we see echoes of it in every iPod. It is difficult now to imagine a time when craftsmanship was so widely celebrated and intellectualized as an antidote to banality and the loss of meaningfulness in daily life. It is pertinent too to note the value that is still accorded to the artifacts that resulted directly or indirectly from the movement.

As Callum Morton, Stephen Haley and others testify, a few contemporary artists have embraced digital media just as some in Arts and Crafts embraced industrial production methods. In his book - Painting The Digital River (Walker, 2006), James Faure-Walker attempts to express the excitement and frustration of the traditional artist getting to grips with digital tools. Unlike most other traditionally-trained painters, Faure-Walker who is also a critic, academic and member of the London Group, has persisted with his research and, like Morton and Haley, always manages to honour Clement Greenberg’s dictum to respect the essence of the medium. But Faure-Walker largely uses Photoshop and Painter, both 2D applications.

Respect for the medium is a more problematic issue using 3D software because so much is “ready made” and tantalisingly available courtesy of the software designers. The issue of what or how much pre-made material to use is compounded both by the huge amount of work involved in the creation of a single scene and by the increasing generosity associated with the Creative Commons which makes the models and surfaces of others available in the public domain. Through Creative Commons a kind of 21st Century division of labour is occurring which militates against complete authorial resonance and artistic veracity.

At the very heart of games-making activity is a slow, deliberate craft that needs support and encouragement at a moment when publishers await faster bandwidth to pour out more of the same but at lightning speed. Meanwhile, here in Australia, we have been determined to favour content above craftsmanship in our teaching practices in art, design and new media schools. Ironically we have allowed computer science and IT specialists the high ground of programme craft while leaving young artists and designers to the tender mercies of the Creative Commons and a diminution of visual art and craftsmanship as sure as that brought about by the division of labour in the 19th Century. The idiosyncrasies that mark the work of the individual artist will disappear if his or her own craftsmanship is not nurtured or valued and materials made available under the auspices of the Creative Commons are more readily accepted.

Traditionally, craftsmanship in any area has been the prerogative of technical rather than higher education because it has been regarded as a non-intellectual activity. To understand the functioning of high-end 3D applications, however, and the associated peripheral knowledge requirements, is an activity as intellectual as architecture, bridge design, painting or music composition and should be taken as seriously.

New users of 3D imaging software, whether artists or designers, often approach the business with a degree of “speediness” associated with games aesthetic. The same is true of fledgling new media artists and designers generally and certainly within the ranks of critics of digital art and design there is a sometimes justifiable view that the computer provides too easily for artistic slickness, for facile rendering or assembling that results in equally facile works. As commitment by individual artists to the medium of 3D modelling and imaging develops, however, as intellect, hand and eye are engaged and work commences, a reiterative rhythm of thought and activity is generated that demands concentration of a high order. In due course and under the right circumstances the concentration becomes contemplation as the true nature of the work is revealed. For in due course it becomes clear to those who devote their patience and energy to it that, at the very heart of a
medium apparently dedicated to emulating the speedy “click” of the camera shutter, is the still
centre of a slowly realized creation.

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Biographical Notes
Gaye Swinn joined RMIT in 1995; she is a senior lecturer in the School of Creative Media and a
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Materiality and Immateriality

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Abstract

In this paper I will examine materiality and immateriality in the expanding area of research within art as creative practice. Emerging technologies have created new materials and processes that construct different social realities. These materials and processes are being compressed into many art school agendas under historical materially constituted areas of study, predefining areas of exploration for artists and students. The role of art, based on a dominant hierarchical material base has controlled emerging practices, collaborations and engagements. The contemporary technologically mediated art student is confronted with art practices from among other things: Biology, Microbiology, Animals and Plants, Ecology, and Medicine and the Body Physics, Nonlinear Systems, Nanotechnology, Materials Science, Geology, Astronomy, Space Science, Global Positioning System, and Cosmology, Algorithms, Mathematics, Fractals, Genetic Art, and Artificial Life. I will draw examples from contemporary art practice to explore ways in which art schools need to confront key issues that will define their future. These concepts involve new materials that question the presentation of art, initiating current debates such as the role of Bio art¹ and new media art practice² within the gallery context. I will also look at examples expressed by art students in connection to the making and researching of art.

Keywords
Nanotechnology, Materiality, Immateriality, Science, Collaborations.

In this paper I will examine materiality and immateriality in the expanding area of research within art as creative practice. Emerging technologies have created new materials and processes that construct different social realities. These materials and processes are being compressed into an art school agenda under historical materially constituted areas of study, predefining areas of exploration for artists and students. The role of art based on a dominant hierarchical material base has controlled emerging practices, collaborations and engagements. The contemporary technologically mediated art student is confronted with art practices from: Biology, Microbiology, Animals and Plants, Ecology, and Medicine and the Body Physics, Nonlinear Systems, Nanotechnology, Materials Science, Geology, Astronomy, Space Science, Global Positioning System, and Cosmology, Algorithms, Mathematics, Fractals, Genetic Art, and Artificial Life.

What must artists do differently than they always have done to prepare to participate in the world of research? They must broaden their definitions of art materials and contexts. They must become curious about scientific and technological research and acquire the skills and knowledge that will allow them to significantly participate in these worlds. (Wilson 2001, 39)

In 2002 Gerfried Stocker, the director of Ars Electronica presented ‘Takeover’ as the event’s artistic theme. This theme was in part a direct challenge to the institutions of art to define themselves in the face of emerging technologies.

The scene is defined by self-reinventors and spin-offs who have acquired their softskills in direct dealings with the material or as by-products of the media design institutes, most of which are not oriented on art but on the training of media workers. It is rife with the massed potential of pros proceeding with self-assurance and possessing all the prerequisites and skills...
to implement their own ideas and not just to provide content to fill the design vacuum of commercial software.³

In this context we become aware that in the face of a shift towards a self taught technologically mediated culture we need to work out the relevance of what is delivered. The ‘institutional art’ has been attempting to hang on to its traditional ground by the promotion of a skills base ideology. The art institutions have developed new inclusive systems of delivery and forms of training but they are still predicated on tradition. We must not see art school as the funnel of art related activities but introduce critical thinking and practice in investigating from a mediated cultural perspective.

Sally Jane Norman states, in reference to the changing aspects of discipline areas, that;

Efforts to mitigate what may be construed as repressive connotations of this term – discipline having to do with establishing authority – have spawned much productive inter-, pluri-/ multi-, and trans-disciplinary discourse and/or practice. In creative arts institutions in particular, where challenging disciplinary confines is an essential part of learning processes, terms like “nomadology” may be favoured for their resonance with contemporary cultural theory and attitudes.⁴

The experiment here seems to be attempting to solve a problem that might need a totally new strategy to ‘privilege mobility and mutual enrichment of disparate mindsets’.⁵

What is the future for traditional art school disciplines?

In the face of the dominant research culture within many Universities what is the core essential aspect of art that should not be lost in the convergence of old world disciplines? Can art alone deal with cost and re-identification of emergent areas of practice/research? Can you imagine electives in Chem-Art, Bio-Art, Nano-Art, Health Science-Art Cosmology-Art?

The significant attitude shift in recent years between artists, sociologists, philosophers and scientists sees each discipline reaching out beyond their own ‘traditional’ domains. This comes at a time when global economics, fuelled by new developments in science and digital technology, provides increasing opportunities for artistic and technological interactivity.³ Artists have not always been among the first to critique technological advances through their practice. The use of electronic and digital technologies for visualising and expressing ideas is becoming commonplace in the scientific arena. The mutual interest in shared electronic and digital tools is fostering a common language between artists and scientists.

This interest in a common language needs to become part of the fabric of the art school. The Internet and network communications further enable artists and scientists renewed access to a hybrid space of ideas and projects. Consequently, there exists an exciting opportunity for art schools within universities to develop collaborative partnerships between disciplines whereby the artist, sociologist, philosopher and scientist work together to explore creative interchange. The emerging technologies focus on social interaction and communication, which has always been a traditional role of the arts in society. These collaborative partnerships are ways of expanding the students’ ability to access new materials, concepts and equipment beyond the economic means of the art school.
With the evident convergence of interests, and ever increasing levels of computer literacy developing through school systems, interdisciplinary collaborations or partnerships should be both a natural consequence and desirable element in higher education institutions.

The conceptual ephemerallity of new technologies has demonstrated that there is a need for a different approach to the concepts of materiality and immateriality. The purpose is not to create a blended homogenised convergence, but to move towards the creation of a neutral environment. This environment would allow for the remix of culture and the reshaping of potential for convergence.

The evolution within art schools from multi-disciplinary to inter-disciplinary to trans-disciplinary practices has only allowed for repetition of an emerging matrix of already existing possibilities. Other forms of hybridity and convergence have also maintained a strong linear developmental but based around pre existent material processes.

I want to introduce two third year students’ statements to reference the changing context to what is happening to materiality from a student perspective.

The idea that the inherent meanings in objects can never be avoided or fully understood becomes too much. It therefore makes it difficult to produce anything about anything and it becomes frustrating to do anything. The work is always going to be a failure. The production of work and the dialogue of opposites in the work, its makeshift theatricality as well as the surface quality and visual impact of the work act in a way to create a distraction from this always failure nature of the work. They act in a way to imitate other art forms to convince the viewer of the works importance and in some way legitimise the work. The mass of stuff tries to compensate for this overwhelming sensation of doubt but inturn creates more doubt in the hope that something of value will happen, even though not much is going on or nothing is specified to be going on.7

In another example the students develop the concept of the project.

When we began work this semester we started with the half-joke ‘it’s going to be about love’. And in a way, it is. It’s about absence, fragmentation, change and the failure to find meaning in something we once thought we cared about. It’s about the moment after passion ends and interest wanes, and the moment after that when things continue just the same as before, an affront to meaning itself. It’s been said that the underlying cause of the decline of art is the artist’s lack of passion about the subject. We present works which are concerned with this and the nature of amateurism, indifference, and apathy, and employ a ‘near enough is good enough’ aesthetic to discuss this. As videos remain the popular response to boredom and apathy, we have focused on the medium. We eulogise the end of art, the end of our collective moment, and the end of belief in progression and decisive change. We pre-enact the end, and the anticlimactic persistence of the moment after.8

What these student statements are suggesting, is a shift towards questioning the role of materiality in the art school. The statements challenge the art school in the face of new world orders by asking the institution to develop a critical stance towards the statements. The statements test the inherent philosophical attitudes of the project constructed around the views of the staff.

The statements reflect a saturation point where the students themselves are faced with an ever-increasing deluge of media, not allowing time for critical reflection and discernment. This
saturation does not lead to an exclusion of materials but rather a revaluation of material relevance and signification. What Nicholas Tresilian calls ‘immatereal’.

Tresilian suggest that the two cultural phenotypes (innovative and iterative culture) differ most overtly in their relationship to the magical/immaterial aspects of meaning – ‘which I shall conflate here, […] into the single term the *immatereal*’. 9

Tresilian goes on to say

By the *immatereal* I refer to the use of semantic attractors which systematically reverse the Aristotelian principle of contradictions – the rule that nowhere in the real (= rational) world can an object both have and not have the same properties: black cannot be white, positive cannot be negative, and so forth. In the domain of the *immatereal*, positives and negatives, black and white, coexist simultaneously in the same semantic entity, which to be perceived must have a material existence, but which embodies a meaning which is not the rational/Aristotelian sense ‘real’.10

What is being proposed here is a need for a thorough reappraisal of the position of art schools in relation to current social, scientific, and philosophical awareness of materiality. We are at the point in time when the art school has to define itself in the face of institutionally determined categories of research, new science and technologically mediated culture.

I am suggesting that there is a shift from the position that art has held in defending its raison d'être. It no longer needs to bend and reshape itself to reflect every funding cutback or twist so it can fit itself around urban transport planning if there is the scent of funds. Art is in a position to respond to evolving social change and propose new directions in comprehending scientific and technological advancement. The flexibility of non specific outcomes gives the art school potential to create their own relevance based immateriality/materiality that expresses a humanistic view towards new technologies and new sciences. We have the potential to utilise and develop the universities’ struggle for creativity and innovation from within.

Science is presenting us with new understandings and different approaches to concepts of *materiality and immateriality*. The role of the art school as a unique entity incorporated in universities is needed to create a blended homogenised convergence of disciplines. This could be achieved by a move towards the creation of neutral hybrid research environments between different discipline clusters. This environment would allow for a remix culture and reshaping the creative potential of convergence.

I would like to use the example of SymbioticA (initiated in 1996) as an on-going research centre investigating the use of tissue technologies as a medium for artistic expression.

SymbioticA - The Art & Science Collaborative Research Laboratory in the Department of Anatomy & Human Biology, University of Western Australia - is an unusual artist-run research laboratory dedicated to the exploration of scientific knowledge in general and biological technologies in particular from an artistic perspective. SymbioticA will be awarded the Prixars, Golden Nica at Ars Electronica in September 2007 for their work in this area. Their exhibition at will focus on a number of artist’s projects that have been assisted by SymbioticA residencies. Recently SymbioticA have developed a Master of Bio Art a unique postgraduate science degree offered through the Faculty of Life and Physical Science, University of Western Australia. It enables students to undertake a Masters of Science in Bio Art to engage in wet biology practices in a biological science department, and in the process, return to the visceral state of the body.
The visions of the future presented by artist such as those who work at SymbioticA have us confronting new materials and ideologies. The Master of Bio Art within the faculty of life and physical science challenges the art school as the sole arbiter of art with in the institutions. The art students confronted by this vision are trying to define their artistic intention and must be able to refer to potential new materials and ideas.

I would like to give brief example from my own practice, to explore the nexus of art and science in the area of Nano-Art by looking at the Midas project. The Midas project started at the nano level investigating the space where skin meets gold.

Midas examined what is transferred when touching the material of gold. The project uses an Atomic Force Microscope (AFM) that has a cantilever recording the surface by touch, instead of the traditional optical microscope to create an image. A skin cell was scanned by the (AFM) in contact mode using a gold coated cantilever. The cantilever is lowered on the surface of the skin cell to reveal the topographies by gathering deflection data that is translated to produce a visual image.

The space between skin and gold was captured initially by comparing data under different experimental conditions. The Midas project when presented as an installation with the use of sub sonic speakers makes the infinitely small audible and palpable. The installation presents the vibration of atoms at the point of transition where the skin meets gold. Kevin Raxworthy a Master of Electronic Art student from the Studio of Electronic Art at Curtin University of Technology collaborated with me to analyse the data from the AFM in force spectroscopy mode. The various sets of data were processed translating the relevant information into sound files.

What Nanotechnologies are determining in relation to matter and materiality is confronting the arts. This confrontation with emerging technologies can construct reactive desire in the arts to return to traditional material qualitative values. Neal Sephenson’s in his science fiction book Diamond Age reveals through the use of the Victorian attitudes and settings a binary contrast with the world of nanotechnology. (Stephenson 1995) Nanotechnologies and Nano-art throw into question the possibility of materiality by interrogating what constitutes the worlds ‘immaterial substrates’ the building blocks of materiality.

The 2002 National Science and Technology Council report to the United States Congress entitled ‘Nanotechnology : Shaping the world atom by atom’ encapsulate in its mission a disregard for the integrity of materiality. It goes on to state in its introduction that ‘the emerging fields of nanoscience and nanoengineering are leading to unprecedented understandings and control over the fundamental building blocks of all physical things’. (Amato 2002)

In addressing the relationship of nanotechnology to materiality we could draw the comparison between binary code and atomic particles. The machine trans-codes and re-codes binary data to interpret immaterial representation, not unlike self replicating nanobots that can reengineer objects. The atomic particles swarm together to represent a reconstruction of the material object. Colin Milburn refers to science fiction writers whose nano-technological musings have informed science and entered our conscious understandings of what constitutes matter. Milburn uses references from science fiction writers who explore apocalyptic nano-threats to territory of the body leading to the de-territorialising and re-territorialising of a post-biological body. (Milburn 2005)

What Roy Ascott suggests is to explore the concept of Nanotechnologies as
tearing the fabric of the physical world to expose the instability of its immaterial substrate. Whilst providing the basic elements for its material reconstruction. Nano offers the means of reality checking and reality building a super imposition that finds its continuum in the field of consciousness. (Ascott 2005)

BC. Crandall suggests that Nanotechnology is “simply a descriptive term for a particular state of our species’ control of materiality,” a step in our species-destining towards “absolute control”. (Crandall 1992 viii) This absolute control has the human pursuit of controlling material in making art, questioning the underpinning reality of arts material intentionality.

I have presented a number of points that need to be contextualised and drawn together to create a current understanding of developing an inter-faciality with matter. On one hand, we have art students being offered new understandings of materials through the ever-expanding advances in science and technology. Students are confronted by the collapse of space and time through a deluge ubiquitous information technologies creating a techno-mediated understanding of art. What is dealt with in Tresilian’s concept of immatereal is relatively mirroring current thinking in Nanotechnology.

The materiality that Nanotechnology reveals is posing more questions relating to the material world and our consciousness. The topics that could be of interest to today’s students are investigating what constitutes the boundaries of materials, materially and the body.

Statements about Nanotechnologies and their abilities to rebuild and re-engineer nature atom by atom, via semi autonomous nanobots will reconfigure our understandings of being human. (Amato 2000) This nanologic will continue reforming our understanding of living, of embodiment and what constitutes life at an atomic level.

If art schools are to progress towards a hybrid approach then these questions that confront the fundamental material basis for art schools must be seen as a point for convergence.

Footnotes


5. Ibid.

7. Claire Peake, extract from review statement (3rd year, Curtin University of Technology, 2006)

8. Sophie Hamilton, Sarah Salvidge and Virginia Withers, extract from review statement (3rd year, Curtin University of Technology, 2006)


10. Ibid

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**Biographical Notes**

Dr Paul Thomas, is the coordinator of the Studio Electronic Arts (SEA) and the Master of Electronic Art at Curtin University of Technology. In 2000 Paul instigated and was the founding Director of the Biennale of Electronic Arts Perth 2002, 2004. Paul has been working in the area of electronic arts since 1981 when he co-founded the group Media-Space, which was part of the first global link up with artists connected to ARTEX. Paul’s own current practice led research is in collaboration with the Nano Research Institute, Curtin University and Symbiotica, University of Western Australia. Paul is currently working on a commissioned public art work for the Curtin Mineral and Chemistry Research Precinct in collaboration with Woods Bagot Architects. Paul is on the program committee for the re:place Media Art Histories conference in Berlin 2007.

http://www.visiblespace.com
Stillness: Articulating Space Within The Still Image: Positioning Photography Now That It Is “Dead”

Tim Thomas; School of Creative Communication, University of Canberra

Abstract
Have the rumours about the death of Photography been greatly exaggerated? The 1996 “Photography is Dead Long Live Photography” exhibition at the MCA, re-stated photography as a fine art practice apart, and distinct, from whatever role it was playing in the then ‘new’ media. Increasing access to new technologies for image capture, manipulation, distribution and viewing mean that photography is more pervasive than ever.

Yet the job of representation is moving from the world of the photographic to the data set environment of 3D modelling. This move serves to highlight the failings of the photographic image.

What is the position of photography now that the ‘burden of representation’ is being lifted (Tagg 1998)? Are there parallels between the intersection of painting and photography, and the collision of photography and ‘new’ media? How good is photography at rendering the world and subsequently how strong is the indexical link that was supposed to make photography real?

Drawing on Barthes, Maynard, Krause, Merleau-Ponty and Deutsch this paper will use space to test the photographic representation of the world. Further it will argue that the articulation of space is a subject for further photographic investigation, and that space without time is stillness.

3D computer modelling is doing to photography what the introduction of photography did to painting. The exploration of picture space without reference to time is one possible response. This paper will argue that space without time is stillness.

This paper will start from an assumption that, just as there are many spaces, there are many times that correspond to those spaces. If I look at a picture I can see and share the space that picture is in, and experience the time that the picture is in that space. If I consider what the picture is of, especially if it is a photograph, I can imagine the time when the picture was made and a time when I might have been associated with the subject of the picture. This is an imagined time and space that is nested within the time that I look at the picture. A third time corresponds to picture space, the space that the picture depicts. It is this third time, picture time, that is the subject of this paper.

I find myself looking at an on-line forum dedicated to 3D computer modelling and as I look at the renders, 3D models of rooms, cars, beauty queens and orcs, I am conscious of their status as objects in the world (CGSociety 2002-2006). This is an awkward moment since I know that on one level these things are not real. They are just code; they aren’t an indexical link to a referent about which I can say with Barthesian confidence “this was” (Barthes 1984). And yet in the forum the creators of these and similar objects measure their successes by how closely the rendering of the object approaches a photographic reality.

The object is a data set. The data set can be interpreted in ways that correspond to a handling of the object. It can also be handled more directly through a haptic interface. The object occupies space in cyberspace and can be rendered into real space using rapid prototyping processes. The rendered prototype is an object in itself as well as a render of the data set object.
The modelling process can be divided into two parts. The first is the model itself. The model is built as a series of points joined by triangular patches which together form polygons that describe the topography/shape of the object. The wire frame model is the data set that makes the object. We can rotate the object and move sub objects in relation to one another. The object can be posed or placed into a setting that might itself be a model, an illustration or a photograph. At this stage the object has form but is not visible except as polygons. The second part of the process is the rendering and it is here that we find the greatest overlap with the photographic. To render the object the modeller has to describe not just the object but its illumination. It is as if the object is to be photographed. To photograph, for example a tea cup, the photographer needs to decide on the quality of the light source. Is the light soft or hard? Is it light from a window on an overcast day? Is there more than one light source? What is the spectral energy output of the light source?

Light has direction and a position in space, so with the introduction of lighting, there is automatically a space as bounded by the object, the light source/s and the position or point of view of the camera. This enables decisions about the relationship, in space, between the object, the light source and the observer. Where is the light in relation to the object and the viewer of the object?

In making the tea cup photograph these lighting decisions will be dependent in part on the desired effect and in part on the qualities that are attached to the surface of the object. In a 3D model of a tea cup it is at the rendering stage that the surface qualities of the model are defined. Texture, reflectance, colour, sub surface light scattering, all need to be addressed.

If the process of rendering a 3D model of a tea cup deals with the same problems as the process of photographing a tea cup we shouldn’t be surprised since both tea cups are objects and the images that are produced are traces of the objects. The modeller/photographer sets up lights and the camera/computer records the effect of those lights on the object and the point of view.

Suppose that we were to make a 3D model of Roland Barthes’ mother’s imaginary childhood friend, Steve. We could render Steve using the same lights as those that illuminate Barthes’ mother. We can model a garden and put Steve in it. We could show the print of that render to Roland. In one hand he has a picture of his mother as a child in a winter garden, in the other a picture of Steve, also in a winter garden. There is no question of authenticity since we know that Steve is imaginary, and Roland will authenticate his mother’s photograph based on resemblance and providence. We know what Roland Barthes makes of his mother’s picture: it is a sign without a code that says “this was”, but what of Steve’s picture?

The moment that is recorded in the mother photograph can never be revisited except as an act of imagination prompted by that recording. The mother gets older, she changes, hence the past tense.
Whilst it is conceivable to apply an ageing algorithm to the model Steve, unless we make a new model, the original Steve will be the original object. That is the object to which the ageing algorithm has been applied. We can't say that Steve “was”. Instead we can say Steve “is”. The render is an instance of the object, not the object. The render is a picture of Steve, not Steve, just as the picture of Barthes’ mother is not Barthes’ mother. We can use it in the same way we use a photograph. It can remind us of the object or when we were last in the presence of the object. It can be used as an illustration of the object or to illustrate another concept that is not about Steve but that Steve may represent (Maynard 1997). The picture of Steve could well provoke the same sense of mortality. We will age and die but Steve won’t. This might be the same for all fictional characters (e.g. Pooh doesn’t age but Christopher Robin does; he grows up and goes to school and stops coming to the Hundred Acre Wood (Milne 1928)), but Steve is an object, not a character.

The render of the object is for all intents and purposes a photograph of the object, Steve. We can photograph Steve from a number of points of view including those that contain a view of the position from which we make the first render. This is different to the photograph of Barthes’ mother. There is an “aura” to that photo; it is a link to a moment that is gone (Benjamin c1968.). It isn’t so much a single moment that the photograph refers to; it is an indication of a series of moments. That moment was one of many. The mother didn’t pop in and out of existence just for that photograph. The photograph is a record of not so much a moment as a continuum. Furthermore not only does the photograph say that Barthes’ mother and the garden were, but also that the photographer was. It is an index to a series of events each one of them as important as any other in the chain of events that result in the creation of the object that is the photograph. Barthes could just as easily have felt an overwhelming sense of dismay that the chemical fixer that fixed the plate and the paper was poured into a drain (as it most likely was), from where it travelled to a water way and killed things. A photograph is not just a record of the subject; it is a record of photography itself.

The 3D computer model is an object and the render is a photograph of the object. It is a record of a series of decisions and printing processes that lead to the material picture. I don’t have to print the rendered object. I can leave it in virtual space, and it is here that the computer model represents reality better than the photograph. A photograph is very good at recording tones and textures but is poor at showing space. Space for the photographic image is an abstraction. Three dimensions are mapped onto a flat two dimensional surface. We don’t perceive the world that way (Barry 1977).

A photograph as made by a camera is not an analogue of perception; rather it is a map of the retinal image. The perception is what happens next. We perceive the world over time, from moment to moment and from a series of viewpoints. A camera records an abstraction of reality that is mapped onto a flat surface from a single viewpoint at a single moment (ABC Radio National 2000). Looking at the world through photography is like looking with one eye shut and the other eye blinking.

A 3D model is open to investigation of space in a way that approximates our experience more closely than does a photograph with its single point of view. Barthes is free to examine Steve in a way that more closely approximates examining the real world. He can, using the metaphor of the picture frame as window, walk up to the window, open it and step into the picture space.

However Steve is a data set whereas Barthes’ mother was a real person. When we make the imaginary Steve, we aren’t making a representation of the world. Steve is a fiction. In order for the 3D model to equal the photograph in terms of its ability to represent reality there must be a reality that includes Steve as more than a fiction. If we can model Steve we can model a real person.

This is in fact what happens. Almost any object you care to mention has been modelled. There
aren’t nearly as many models as there are photographs. Models take a long time to make, but there is an increasing number of subjects both imaginary and real. The fascination with 3D modelling seems to lie in the details; it isn’t about broad strokes but careful observation. Modellers like texture, light and shade, reflectance, form... just like photographers.

Since The Pencil Of Nature (Talbot 1844 and 1846) the link between the photographed world and the photograph has been assumed, nature has drawn itself, and the photograph has been able to say that this was. The camera and the photographic process have been the primary means of representing the world. In representation there has been an emphasis on resemblance at the expense of experience. This has been the thrust of the European process of picture making from the first experiments in optical perspective up until the initial stirrings of modernism and the impressionist experiments. I don’t think that it is a coincidence that, just as machines and processes were developed that enabled nature and everything else to “draw itself”, the subject of European painting changed from that which is seen, to the experience of seeing. The notion of authenticity that is attached to photographs continues to be used in the rendered 3D model. The rendered image of the 3D model is a trace of the model which is, in the case of a model that replicates reality, itself a trace.

So if modellers are starting to represent the world as an extended form of photography, what about photography? The last time that it was declared dead it obviously wasn’t. There is no question that people will keep taking snaps and that there will remain a place for the skills and processes of photography, wet and digital. If anyone is uncertain then consider printmaking, where processes that have been industrially obsolete for hundreds of years are still practised and held in high esteem. The language of photography continues to be used in the rendered 3D model. This again shouldn’t come as a surprise. The render is a print of a data set that is analogous to the data set contained within a photographic negative. Photography is modelling, modelling is photography.

Painting when faced with the same issue embraced modernism and adopted different ways of seeing. The resemblance to the subject became less important, the act of viewing/experiencing the subject became primary. A series of experiments, the isms and schisms of modernism, led to a shift in the field/figure dichotomy in favour of the field (Krauss 1993).

So what of photography, especially fine art photography? The subject of photography has for a long time been photography itself. The questions of what a photograph should look like and its status as an art object have fuelled debates amongst photographers. Pictorialism vs. f64 is an ongoing debate, the split seeming to fall along commercial vs. fine art lines. Digital photography enables the original data set to be manipulated, both as interpretations and fabrications that question photography’s claim to authenticity. One possible answer lies in the photographic response to space.

Photographically, depth in space is dealt with as an abstraction. The optical perspective provides depth cues. Convergence, overlapping comparative size, atmospheric, distortions of known shapes such as wheels, are all depth cues, or clues, that enable us to perform an act of imagination in which we visualise the imagery in the photograph as if we were to move our view through ninety degrees and so see the depicted depth as width or height (Merleau_Ponty 1945).

We move through space and time, photographing an imagined reality of space. What if that were different? Suppose I was to photograph reality as space without time? Space without time doesn’t admit the possibility of movement. There is no reference to a just before or just after. This is stillness. This isn’t stillness as a lack of movement or of a frozen moment. A water droplet photographically frozen, just as it separates from a tap, is not stillness. It is sampled movement or
fragmented movement (Nagel 2001). If the fragments are reassembled the movement is also reassembled, just like a motion picture. Space without time is the objects that define space all at once without reference to their temporal relationships. Stillness is space without time. Time without space is not still; the arrow of time still applies even in a zero plus one dimensional construct. Objects age whether they move or not (Prigogine 1996).

If I was to photograph space, what precisely would I photograph? Space is real; we experience it. Space follows predictable rules (Deutsch 1997). We use space to organise and separate perceptual events that occupy the same time. The inverse of this is also true in that we use time to separate perceptual events that occupy the same space. Yet space is not thing. It is a not object. We can talk about objects in terms of their attributes. We can describe objects according to their behaviours and their effects on other objects. We can’t talk about space in that way. Space is defined by the perceptual events or objects in it. Without objects we can’t reference space’. A single shutter release is not going to photograph space without time. It may, if it is short, freeze movement. A long shutter time will record the passage of time through movement. Neither are stillness. A photograph without time will paradoxically take more time to make. I won’t take the photograph; I will make it. I will revisit the photographic canvas over time and arrange photographic objects on that canvas. The photograph will be a trace of the time I spend making the photograph. The objects will be a trace of the objects that delineate a space. The photograph, by abandoning optical perspective will more closely match our non visual experience of space. The temporally de-contextualised objects will be stillness.

The previous two paragraphs are a plan for making a photograph that approximates the experience of being in the world. The process and procedures, particularly the canvas being a trace of the time spent making the photograph feel un-photographic. Moving pixels around in a digital image editing application, feels more like drawing or painting than photography. There is an instant feedback and opportunity to edit what was done earlier, whilst retaining latter stages, that is absent in traditional photographic practice. There is still a direct link to the referent and the process, and that is photographic.

When old technologies are replaced they have the opportunity to pursue other interests. By
acknowledging that 3D modelling, in treating space in depth as more than an abstraction, provides a more complete representation of the world, we can reconfigure the photographic process to render not the representation of space but an experience of space. Removing time is one way to do this. By removing time we approach the truly still image.

References


Biographical Notes

Tim Thomas teaches Media Production in the School of Creative Communication at the University of Canberra and is a PhD candidate at the School of Art, at the Australian National University. He has worked extensively within the Film and Television industry undergoing on the job training as he worked his way through the camera department hierarchy.
His research interests revolve around representations of space and objects.
Perceived usability: How Computer Interaction Design is Informing Product Design

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Abstract
Computing is providing a great deal of information in regards to interaction design and in particular the connection between emotion and perceived usability.

In 1995, Masaaki Kurosu and Kaori Kashimura gave a short paper at the Conference on Human Factors in Computing Systems, documenting research that strongly indicated the positive effects of aesthetics on apparent usability, after studying different layout controls for ATMs. These findings were repeated, and with more profound results by a doubting Israeli scientist Noam Tractinsky (1997) who felt that the original research may have suffered from a cultural bias. Designer and psychologist Donald Norman in 2004 devoted a chapter, entitled ‘Attractive Things Work Better’ in his book ‘Emotional Design: Why we love or hate everyday things’ (2004) where he contends that positive emotions aid in the decision making process that are critical to learning, curiosity and creative thought.

This paper will provide a critical review of human factors research and practice into computer interaction design. In particular it will focus on the user’s emotional state and perceived usability and how it can inform product design. The links between: pleasure and happiness; aesthetics (style, beauty, attractiveness); self confidence in the user and usability will be discussed.

Introduction
As a product designer I am forever on the lookout for the key to the understanding of how and why the user reacts to what we design. Our knowledge and the understanding of usability in product design is quite sophisticated, as it is in Human Computer Interaction design. A look through a well worn addition of the ‘Human Factors Design Handbook’, (Woodson, W. E., Tillman, B., Tillman, P., 1992,) the Bible (or the Koran) of ergonomics, will attest to this. However, the influence of emotion on usability, is not mentioned. It is only alluded to in the context something that might influence the potential buyer after the real decision has been made about its functionality.

Donald Norman (2004) and Patrick Jordan (1998 & 1999) provide the product design profession with the best information on the role of user emotion and its affect on usability but they seem to be the very few authors discussing this in the context of product design. The need to fill this void is highlighted by Norman’s (2004) assertion that the emotional element of design may be more critical to a product's success than its practical elements, due to the part played by the brains visceral processing level, which he feels that is given little importance. He says,

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\text{Visceral design is about the initial impact of a product, about its appearance, touch and feel.}
\]

I have had many conversations with my fellow Multimedia colleges in our Design Department that alert me to the fact that usability is a major issue in the digital world as it is for product design. If you were to make a quick search on usability, results would support this notion, and in particular the connection between emotion & perceived usability by computer interaction designers. More research is needed to evaluate the emotional dependent aspects of human nature that influence usability such as pleasure and happiness; the benefits of creating a challenge and having fun; aesthetics (style, beauty, attractiveness); and self confidence in the user. It is the intention of this paper to form an overview of the emotional issues that should be of interest to product designers in
regards to their influence on usability. I am constantly impressed by the flow of research that emanates from the field of Human-Computer Interaction and I believe are worthy of further investigation by product designers.

**Pleasure and happiness**

Human Factors specialist, Patrick Jordan, (1999), has discussed form and aesthetics in terms of the component of a design that can provide pleasure\(^1\) or produce a special bond with the user. Products such as the Volkswagen ‘Beetle’ and the Harley Davidson motorcycle are such examples that provide more than just their overt task of being a mode of transport. Is this due to their uniqueness? The pleasure component can be a powerful contributor to the bond that is created between the artefact and the user. Product designers captured this uniqueness in the new Mini, a sales success, a design that that Donald Norman (2004, p6) says, *It is fair to say that no other new vehicle in recent memory has provoked more smiles*, furthermore the new (2007) Mini barely looks any different from the previous ‘new’ Mini. It is a case of if you get the aesthetics right, it makes you smile and feel happy, don’t change it!

Another psychologist Alice Isen (1993) has shown that happy people benefit from thought processes that foster creative thinking, curiosity and learning. The stimulus for this could also be relatively small, just a very small gift, a bag of sweets or even watching a few minutes of a comedy. Feeling good resulted in improved brainstorming and the ability to examine multiple alternatives as opposed to concentrating directly on a single option (narrowing the thought processes) which is generally useful for situations, such as escaping danger. The emotional component can be so strong that it might cause us to overlook an artefact’s poor usability. To complicate the issues of usability even further you might want to consider the challenge of mastering a difficult instrument such as a violin or a guitar. Satisfaction results from producing entertaining music after persistent practice. Another example of this is computer games.

Appealing aesthetics helps provide confidence and creatively thinking which lead to a better interaction on the part of the user.

**Aesthetics (style, beauty and attractiveness)**

Product design has a habit of separating usability and aesthetics during the concept development process. Aesthetics being described as appearance, style, attractiveness or beauty and that which can attract the potential purchasers eye. The understanding of the emotional impact that aesthetics has on the interaction of the user with the artefact seems to be only a little better than complete ignorance. Perhaps this should be of no surprise when if you were to take a quick overview of product design courses, there is little evidence of curriculum that makes the connection between aesthetics and functionality. What there is only discusses it in terms of the balance rather than how it can positively influence usability and why. Other discussion is in terms of semiotics where no connection is made with usability or functionality. This at best provides an interpretation of the meaning conveyed by an artefacts visual elements, but it sidesteps the user interaction at a cognitive level (the understanding of the stages that are required to affect a result). Furthermore it avoids any understanding of the complete interaction that includes perceptual motor and emotional skills (Overbeeke, et al, 2003, p8).

In 1995, Masaaki Kurosu and Kaori Kashimura gave a short paper at the Conference on Human Factors in Computing Systems, documenting research that strongly indicated the positive effects of aesthetics on apparent usability, after studying different layout controls for ATMs (electronic teller machine). Interestingly their motivation for their study, at the time, seemed more to do with

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1The four pleasures he describes are: physio-pleasure, socio-pleasure, psycho pleasure, and ideo-pleasure.
increasing the market appeal of ATMs rather than attempting to improve usability of the interface. The rational being that if users weren’t attracted to the ATMs GUI in the first place then it really didn’t matter how good it was because no one would want to use it. The experiment used computers to emulate ATMs. Those who took part in the research were: three secretaries, nine GUI designers, eight engineers, and six industrial designers.

For product designers the results of this research has obvious application in the development of controls and feedback for products from DVDs, electric irons to mobile phones. They all require input from the user to set them up correctly for a particular task and the user needs to be periodically updated on the status of these actions.

Some of the results from this experiment documents cognitive efficiencies strategies, such as:

**Glance sequence:** the main display should be placed at the upper left corner, because the user may start to look at the screen from there, then may go down right. Because the main displays are showing information that is necessary for the subsequent operations, it should be seen by the user first in the total operation sequence.

For product designers this seems to fit with research that the power ‘on’ button for an electronic product should be optimally placed in the top left corner. This also relates to the best sequence of operations.

**Familiarity** (over efficiency): The layout of the numeric keys (referring in this case to those on the ATM), that were found to have the highest usability were those like a calculator, i.e. 1, 2, 3 top row line, as opposed to the standard calculator or computer keyboard, i.e. 7, 8, 9 top row. This mirrors the product designer’s experience of typewriter letter key layout (which carried through to computer keyboards) of the preference for the ‘qwerty’ layout as opposed to the ‘Dvorak’ key layout.

**Grouping:** Keys should be grouped according to their functions.

To product designers and ergonomists this is referred to as modularity.

In some respects, while the researchers have put the improvement of usability down to aesthetics they may also be due to good organisation and modularisation of the controls and feedback. More conclusions were made but the above illustrates the bodies of knowledge on usability that are key to both areas of design.

These findings were repeated, and with more profound results by a doubting Israeli scientist, Noam Tractinsky (1997) who felt that the original research may have suffered from a cultural bias, that being Japanese. His experiment was conducted to test the relationship between the users perception of a computer system’s (as he called it) beauty and usability. Again the system used computers to emulate ATMs. The analysis showed that while the systems aesthetics affected perceptions of good usability, the degree of actual usability was not affected, pointing to the probability of an emotional component affecting usability. The finding once again points to the importance of aesthetics in the GUI and human-computer interface (HCI) design. The product design’s equivalent is the human-machine interaction or controls and feedback.

Tractinsky (2004) says

> For me, the inquiry into the role of aesthetics in HCI has been—how symbolic—a struggle between logic and intuition. The logic of the HCI field (with very few exceptions), has marginalized aesthetics, often viewing it as standing in usability’s way. Intuition, however, based on my own experience and informal observations, had suggested otherwise.

Before this he had already coined the phrase ‘beautiful is usable’ (Tractinsky, et al, 2000), however he clarifies this on reflection saying that they were actually aiming to disprove such an equation. They found that the unavoidable conclusion was that something was going on between user’s
perceptions of the systems beauty and their perceptions of other system attributes. He came to the opinion that this is where logic and intuition have started to converge.


> Emotions, we know change the way the human mind solves problems – the emotional system changes how the cognitive system operates. So, if aesthetics would change our emotional state, that would explain the mystery.

Other researchers such as Hassenzahl, (2004) however, claim that perceived usability should be regarded as a bundle of low-level product attributes (p. 323). He goes on to claim that ordinary users cannot integrate specific usability elements into holistic judgement

**Self confidence**

This brings in another interesting area of research conducted a the University of Zaragoza in Spain (Flavián, et al, 2006), that investigated the influence that perceived usability had on the users loyalty to the websites that they visit. This team found a further benefit, that is the addition of self confidence and with it, customer loyalty:

> Usability is related to consumer ability to know where he or she is at any time and what can be done. Self-confidence may be defined as a consumer feeling of security and ability about his or her decisions and behaviours (Bearden, Hardesty and Rose, 2001) thus we may establish a clear relationship between usability and self-confidence. Greater usability offers more security to website users. In addition, greater self-confidence might improve consumer trust in the website.

Further insights on usability are emanation from web design. Author Steve Krug (2000), a usability consultant for companies such as Apple and Netscape dispense with the ‘academic speak’ and provided a strait to the point helpful hints on usability design born out of many years of personal experience. He provides a refreshing body of knowledge in the area of HCI that can be applied to product design.

> When we’re creating sites, we act as though people are going to pore over each page, reading our finely crafted text, figuring out how we’ve orgainsed things, and weighing their options before deciding what to click.

> What they actually do most of the time (if we’re lucky) is glance at each page, scan some of the text, and click on the first link that catches their interest or vaguely resembles the thing they’re looking for. There are usually large parts of the page that they don’t even look at. (Krug, 2000)

This experience of user interaction mirrors that of product (appliance) design. Unfortunately product designers foolishly also gravitate towards a multitude of actions and distracts for the user to wade through, called ‘featurism’, by Donald Norman (2000), which was mentioned previously in reference to over-featurism. Product designers also believe that the user is prepared to methodically work their way though a user manual!

Steve Krug suggests three simple facts to take when designing web pages:
• Users scan & tend to use as little time as possible, looking for words or phases that catch their eye.
• Users don’t make optimal choices, they satisfice, that is they choose the first reasonable option.
• Users aren’t necessarily intent on finding how things work, and again we are reminded that they don’t read instructions, they will just muddle their way through.

I would like to conclude with a quote from Noam Tractinsky

The unavoidable conclusion was that at least something is going on between user’s perception of the system’s beauty and their perceptions of other system attributes. This where logic and intuition have started to converge.

(2004, p351)

Product design needs to take the point that something more is happening between logic and intuition if it is develop further the issues of improving the usability in their domain. Computer interaction designers are already highlighting many issues that product design needs to follow up with specific research to find out what is really going on.

**Conclusion**

Product designers are creating an overwhelming diversity of appliances and electronics products that are supposed to save time and produce better outcome but wether they are designed to improve the experience of the interaction with the user is an issue of concern. At this point in time there does not seem to be a consistent acknowledgement in the literature reviewed for this paper that perceived useability can influence an interaction. There are many examples of research concerning this issues that emanate from Human -Computer Interaction design. Including issues that impact on the perception of usability such as: pleasure and happiness; the benefits of creating a challenge and having fun; aesthetics (style, beauty, attractiveness); and self confidence in the user. This research can be used to inform product designers in their pursuit of improving useability however more domain specific work needs to be done.

**References**


**Biographical Notes**

Martin is an academic at the Department of Design, Curtin University of Technology where he has lectured predominantly in Product Design and been a past Course Coordinator. However he has also been a past Course Coordinator for the Human Environment Design, Fashion and Textile Design and co-written new teaching developments for these and the Jewellery Design programs. Martin was instrumental in introducing new curriculum and creating a focus for the Product Design program in the areas of computer modelling, human factors and user-centred design.

His current teaching and research interest is in the area of human factors and in particular how it relates to the design of products and optimising the user relationship.