Technologies of Change: Body Coded in Motion

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Introduction

We live in an era where human motion becomes accelerated by technology and the points of stopping, looking and observing are rare commodities. Nowadays new technologies become extensions of the human body and as such influence its identity (Rokeby 1995, cited in Penny 1995, p.142). Human interaction with technology is an important area of study in the age of ubiquitous digital technology, for either new media studies and for performance studies. Interaction is crucial, although some perspectives diverge.

First of all, I want to explain how I arrived at this point and what motivated me to undertake this research. In 1999, I started to work as an educator in Macedonia, during the Kosovo crisis. The country was in economical and political crisis and the war in the region was deepening the already existing problems. Working in a team of educators which used different approaches on how to use art as a tool for social change, I was always questioning the existing methodologies. Especially, I was concerned with how technology was introduced as a transformation tool for children who are experiencing trauma. I was interested in the notion of the 'spect-actor' (Boal 2000), that draws upon Augusto Boal's politics as well as his knowledge of theatre and of what might now be called 'serious play'.

Boal's games for actors are developed from his brutal life experience. He develops his theory and method from his own experience and embodied knowledge. All of this is documented and

analysed in his work as a cultural activist as well as in his writings and professional practices demonstrated in the *Theatre of the Oppressed* (Boal 1979). But in *Games for Actors and Non-Actors* (2002), Boal went further to offer a way of seeing the spectator of a theatre performance as an engaged, embodied participant in a dynamic setting. This work has influenced the methods not only of theatre, but also of live art, and more recently, of media artist, whose work is deeply indebted to the role-play analyses of early theatre scholars (Goodman 2007, p.114). Technology must be engaged in artistic means if it is to help us realise new social-political configurations. Imagination and creativity are critical to social change. For my work on this project, in 2005, I received a Fellowship, to attend the IDEAS Institute at The MIT Media Lab, USA. The MIT Media Lab has initiated a new leadership program called the IDEAS (Innovative Design Experiences After-School) Institute. The Institute was for professionals working in after-school programs in low-income communities, who are dedicated to helping youth learn to express themselves creatively with new technology. The Institute aim was to nurture an international, collaborative network of after-school professionals, encourage community leadership, and inspire young people to learn new things in new ways. There, I was introduced to *Scratch*[1], which is a new programming environment that children can use to create their own animated stories, video games, and interactive art and share their creations with one another across the Internet. Also, I came across *Crickets*[2], devices that can help children create

[1] Scratch is a networked, media-rich programming environment designed at MIT Media Lab, by Lifelong kindergarten Group, to enhance the development of technological fluency at after-school centers in economically-disadvantaged communities. Scratch is based on a building-block metaphor, in which learners build scripts by snapping together graphical blocks much like pieces in a jigsaw puzzle. http://scratch.mit.edu/

[2] Crickets are adding to the Scratch integration with the physical world. Building on previous research on LEGO/Logo and programmable bricks, inputs from

musical sculptures, interactive jewellery, dancing creatures, and other artistic inventions and learn important math, science, and engineering ideas during the process. This experience had made me aware, both as an educator and an artist, of the importance of the concept of participation in the Human Computer Interaction. To foster change, these projects were developed with the explicit goal of helping people develop themselves as creative thinkers or, as stated by Resnick:

> designed to support what I call the 'creative thinking spiral.' In this process, people *imagine* what they want to do, *create* a project based on their ideas, *play* with their creations, *share* their ideas and creations with others, and *reflect* on their experiences—all of which leads them to *imagine* new ideas and new projects. (2007, p.18)

On the other hand, W. J. T. Mitchell suggests:

> Perhaps this moment of accelerated stasis in history, when we feel caught between the utopian fantasy of biocybernetics and the dystopian realities of biopolitics, between the rhetoric of the post-human and the real urgency of universal human rights, is a moment given to us for rethinking just what our lives, and our arts, are for. (2003, p.498)

The advent of new technologies has sparked much discussion in fields concerned not only with technological production, but in the arts where the implications for artistic production, political action, and performance ontology are debated. As Mitchell suggests, this debate occurs in a condition of heightened stasis, thus providing those of us fascinated by technology in/on performance, as well as with identity performance, with a unique opportunity to take

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physical sensors (such as switches, sliders, distance sensors, motion detectors, sound sensors) can be used to control the behavior of Scratch creations. For example, a child could connect an accelerometer to her arm and program an animated character to change its behaviour based on how she moves her arm, in the process gaining new insights into the concepts of acceleration, sensing, and feedback.

advantage of an extended moment. Interactivity and performativity are crucial elements of experiencing new technologies. I am interested in art works that are interactive in a really deep and gripping sense, 'a sense much deeper than that of picking from a menu and clicking on something' (Szpakowski 2009, in Stern, p.10). IDEAS' experience had led me to my current research, which is focused on exploring integration of body-centred performance practices with motion tracking software. This paper explores the interdisciplinarity of technologically mediated motion engagement in the production of embodied being.

Screen as site of change

> I see display screens everywhere, and I wonder whether they are happy. Happy? Well, maybe "happy" is not the right word. Instead, "Do they live meaningful lives?" may be the question to ask (Maeda 2004, p.8).

If we contemplate the fluidity and multiplicity of the screen as a medium, our most powerful relationship with certain sites is more often mediated by the screen. There are various ways in which screen configure, affect, mediate and/or embody social relations. Martin Heidegger, in his pivotal essay 'The Question Concerning Technology', describes technology as *bringing forth* or letting 'what is not yet present arrive into presence' (Heidegger 1954, p.318). He equates the process of *bringing forth* with revealing truth. In this sense, screen technology is also a vehicle for praxis. Reflecting and drawing on the work of Alan Kay, Myron Krueger, John Maeda, Ben Fry & Casey Reas this paper will try to demonstrate how an anthropocentric conception of the world is increasingly shaping and influencing the outcomes of the HCI (Human Computer Interaction). Special attention will be drawn on interdisciplinary art works that are using social-constructionist approach that centres on

human beings, who, 'in conjunction with technology, form a dynamic system with diverse feedback options' (Friedewald 2005, cited in Buurman, p.26). Historically the relationship between the arts and the sciences has been a stormy one, sometimes close and sometimes distinctly separated, but the last century has seen increasing levels of formal intersection as discrete yet complementary disciplines. Ascott (1999, p.2) argues that: 'art, technology and science are converging in important ways to produce new strategies, new theories and new forms of creativity, increasingly relying for their advance on a kind of trans-disciplinary consultation and collaboration'.

Following from art, science and technology intersection, it is important to demonstrate that discussions of aesthetics are still rare in this context. Artists and critics are often more concerned with the technological currency of works of art than with examining what makes them work (Cubbit 1998, p.23). Festivals of digital art emphasize exploration of new technologies, excluding and implicitly announcing the obsolescence of older technological forms. Maria Fernández suggests that progressive art practice is indirectly linked with new generations of technology (1999, p. 59). The role of the artist is to explore the technology before it is commercialized. Electronic art concurs with commerce, where products are ranked on the use of the latest technology. In electronic media art, the artist's concentration on technology frequently makes content irrelevant. As suggested by Simon Penny, there is a need for 'a paradigm shift to embodied, performative perspective […] in order to adequately address theoretical and design challenges of technology' (Penny 2009, p.2). The crafting of embodied, sensorial experience is the fundamental expertise of the arts, an expertise which is as old as human culture itself. This paper will further discuss specifically art

works, where the focus is shifted on the embodiment process.

The pioneer in the field of embodied aesthetics of new media, Myron Krueger believes that the computer is always a vehicle for exploring and expanding embodied (human) interaction with the world and with other human beings. In his most acclaimed piece 'Video Place', he locates human embodiment in a position 'to constrain the referencelessness of digital code, thereby installing it as the agent whose action actualizes the (abstract) potential of code' (Hansen 2006, p.35). In this way Krueger is introducing new approaches in which 'the computer system's role as interaction partner fades into the background, and it now makes itself available as an instrument for the visitor to use' (Dinkla 1998, cited in Hansen 2006, p.36). Myron Krueger's 'Video Place' system (1970) was the first computer-mediated responsive interface of its kind – it contained both reflexive and performative aspects. An individual's silhouette was projected onto a large video screen, into a virtual world. Based on real-time video tracking, the performer could use body movement and gestures to actuate his silhouette within the virtual world, interacting with its critters and floating across its horizon. Krueger noted the reflexive quality of his piece, remarking that performers felt as equally self-consciousness and private about their projected silhouettes as about their bodies. Performers identified with their virtual likeness to such an extent that some were telepathically creeped out when critters crawled over their silhouette. More than a mirror however, 'Video Place' has a strong performative quality because the mirrored image could also constitute a highly expressive artwork – that is to say, it could be regarded not only as a mean, but also as an aesthetic end suitable for audience (Liu & Davenport 2005, p.205). Krueger tackled the important issue on how human motion can be used as a signal for the computer to

produce output and how this process is transcribed onto the computer screen through the use of programming languages.

Casey Reas and Ben Fry, the creators of Processing[3], take this idea further. They are working from the premises that 'a computer machine and a computer program can be whatever a programmer wants it to be' (Simon 2004, cited in Maeda 2004, p.48) and for that reason 'possibility exists to create new paradigm of computer programming that build on humankind's inherent visual and bodily perception skills.' (Reas 2004, cited in Maeda 2004, p.44). Processing is an open source software[4] and environment designed to bridge the gap between programming and art, empowering anyone to create digital work by using mathematical patterns. Processing is a contemporary of an early alternative programming language concept Logo, developed for children, by Seymour Papert in the late 1960s. Initially, it was developed to support Papert's version of the turtle robot, a simple robot controlled from the user's workstation that is designed to carry out the drawing functions assigned to it using a small retractable pen set into or attached to the robot's body. But, also Logo made it possible for the first time for children to program different media. Logo opened up possibilities for new generation of programming tools and activities to be developed (Processing, Scratch, Crickets, among many), which can help making computer programming more accessible to everyone. According to Fry and

[3] Processing is programming language and integrated development environment built for the electronic arts and visual design communities with the purpose of teaching the basics of computer programming in a visual context, and to serve as the foundation for electronic sketchbooks. More on Processing: http://processing.org/

[4] Open source software (OSS) is computer software for which the source code and certain other rights normally reserved for copyright holders are provided under a software license that meets the Open Source Definition or that is in the public domain. This permits users to use, change, and improve the software, and to redistribute it in modified or unmodified forms. It is very often developed in a public, collaborative manner.

Reas, 'Processing relates software concepts to principles of visual form, motion and interaction' (2007, p.1) and with that, opens up endless possibilities for creation of hybrid media projects that expand our corporeal approaches to computational systems and environments. In a historical sense, Alan Kay, a pioneer at Xerox PARC, explains how important software literacy is:

> The ability to 'read' a medium means you can access materials and tools created by others. The ability to 'write' in a medium means you can generate materials and tools for other. You must have both to be literate. In print writing, the tools you generate are rhetorical; they demonstrate and convince. In computer writing, the tools you generate are processes; they stimulate and decide. (Kay1990, cited in Laurel 1990, p.138)

In a different context, the Desperate Optimists (DO), a performance duo from UK, find that using media technology is a perfect way to include more performers and audiences in their work. They state, "perhaps by foregrounding the digital aspects of our work we've invariably found ourselves hanging out where the more interesting and current cultural and social debates are happening" (Slater 2005, p.3). The issues they historically have been interested in are poverty, urban space, survival strategies and coping mechanisms as they affect and are used by citizens of the UK. Their work, however, accessible via the Internet, is applicable to other Western societies. This accessibility is paramount in their desire to work with cameras and computers rather than through touring live performances. Marcyrose Chvasta argues that sharing your work online does not afford a good sense of the location of the viewer. However, viewers have the ability to respond to the work via email and engaged in dialogue with the artists over an extended period of time (2005, p.162).

In conclusion, the screen becomes a site for multiple interactive activities: programmable manipulation of different media

(images, animation, movies, etc. – a technological component), shareability (social component) and finally, integration with the physical world (performative component). The role of performance-based techniques and scenarios in participatory media (Muller 2002) and in design of interactive systems (Iacucci, Iacucci & Kuutti 2002) has been examined. Whilst endorsing these studies, I am looking for a deeper understanding of the value of creating change through performative utilization of technology. Focusing on motion, in the next section, I will try to tease out some of the complexities and the possibilities of how interdisciplinary research of screen technologies might create change.

Body, screen, motion

> The new interactive media, however, require acts of performance. We must physically interface with them in order to activate them, in order to get them to respond. (Guertin 2007, p.3)

The contemporary focus on motion in a range of technologies and applications has not increased the importance of sensory engagement so much as made it more apparent. The relationship between the performance and technology is often framed as oppositional; performance engages the body, while technology supersedes it, each being defined and positioned in relation to the human physical body. Although they are commonly placed in opposition to one another, both performance and technology explore the interaction between the body (the person) and the environment by challenging the parameters of what the body can do and experience (human potential). Moreover, both operate within constantly shifting contexts, which assume that embodied experience is itself constantly shifting and cannot be frozen. It is the task of scholars, as much as of artists, to understand the nature and significance (individual, cultural,

social, political) of this experience.

If we focus our attention toward interactivity, the only way the 'audiences might start caring for (new media) art […] is when they're given reason to. Seeing their own images, their own realities, lives and experiences is, perhaps, one key element in helping people care about art in the information age' (Wilson 2008, p.4). Immediate interplay between performer and culture-as-audience is body movement and physical gesture. Using real-time video tracking, the location and distance of the performer from the display can be sensed. Ingrid Richardson (2005) suggests that both tool and body are covalent participants – and coalesce as various technosoma – in the making of meaning and environment. The seamless integration that Richardson describes demonstrates a maturity that allows the performance to focus on aesthetic rather than functional aspects, hence the apparent transparency of the technology. As argued by Janez Strehovec:

> Today we come across new media art projects as post-industrial art services that occur at the intersection of contemporary art, new economy, post-political politics (activism, hacktivism), technosciences and techno lifestyles. The artwork is not a stable object anymore, it is a process, an artistic software, an experience, a service devoted to solving a particular (cultural and non-cultural) problem, a research, an interface which demands from its user also the ability for associative selection, algorithmic (logical) thinking and for procedures pertaining to DJ and VJ culture, such as mixing, cutting, sampling and recombination. (2009, p.233)

In the last couple of years there has been a flurry of new publications that address, from a range of perspectives, the interface between live performance and digital technologies. These publications, such as Broadhurst (2006), Popat (2006), and Dixon (2007) are timely and demonstrate the plethora of recent professional arts and academic research practice that investigates what has been variously termed

'digital performance', 'mediated performance' or 'performance and new technology'. On the other hand, in the wide terrain of multimedia performance work, which can be defined as performance that creatively utilises media technologies as an integral component, mixed-reality works that are incorporating the human body lie somewhere in between the domain of virtual theatre and post-dramatic theatre as identified by Hans Thies Lehmann. This includes performances where media technologies are brought into the theatrical frame as a feature of the mise-en-scène (Klich 2007, p.1).

In the piece *trajets*, Susan Kozel and Gretchen Schiller are looking at the physical bodies of the audience as they wander through a forest of screens as well as the bodies of dancers as these are dissolved and re-corporealised through video capture, editing, and projection techniques. Visitor location causes the video projections to respond, effectively creating visual-physical choreography across people, screens and images. The screens in *trajets* do not separate the subject of the visitor's movement experience from its representation, but instead, seek to develop a participatory dynamic which continuously maps and renders present movement perception between the participant and the given feedback experience. As described by Kozel:

> The locus of the performance in *trajets* is shifted from the specific bodies of the performer (dancer, actor, musician) to the distributed bodies of the screens, image-bodies and public (2008, p.178).

The piece *trajets* reduces the gap between action and representation. The screen is not only a projection surface, but also a dynamic participant in the performance. This notion expands the fact that 'new technologies call us out of ourselves and our moments of being in shared timespace with others, and beckon us through the screen to other places, sometimes but not always coincident with our social,

educational and cultural needs' (Goodman 2007, p.104). *trajets* strives to conceptually get at the interdisciplinarity that blends theory with practice, to link theory and practice, not as distinct and divergent domains, but as epistemologically interdependent in the emergent field of digital performance studies. Lizbeth Goodman describes this process of performing self beyond the body:

> Given the speed of technological change combined with the shifting relationships that we all have to the notion of 'present time' in the age of telematics, it seems less important to label and tie down any concept or mode of communication or performance, and more important to capture instead a sense of the multiple streams of embodiment, and connection, that develop between bodies and minds in performances, staged and screenic. (2007, p.104)

Digital media, now applied in the contexts of performance art, may be said to represent a break with the respective traditions, production practice and theoretical frameworks, e.g. liveness vs. mediatised performance. Within recent theoretical discourse on technology and performance, the meaning of the term 'presence', has been redefined to include ideas of telematic or online presence, relating to the concept of the agency of the participant rather than simply the efficacy of the spectatorial position. To adapt knowledge and methods of diverse fields such as, science, media studies and performing arts becomes a question of not only merged conceptual frameworks, but merged methods and aims, in this instance, of theoretical reflection. But, do the performing element always suffers in its relationships with science and/or new technologies? Support for this gloomy hypothesis can be found in Peter Hall's statement that 'advances in technology have allowed for greater scope, potential and excitement but have also created potential problems in the cohesiveness of making theatre' (Hall 1998, in Popat and Palmer, 2005, p.48). Technology is seen by some as anti-artistic, and those

who use it can appear more concerned with the mechanics than its creative contribution to performance. As a performing-arts academic engaged in collaborative research with digital technologists, the search for common ground was a key issue for my work *Display movement*.

Display movement: methodology and theoretical framework

Since 2005 I have been researching how motion can be used as a signal for the computer to produce output. In my early work on this topic, inspired by the Muybridge[5] research in capturing frame-by-frame human motion, I developed the project 'Display movement'. My aesthetic guidance was the photographical work of Edward Muybridge (particularly his motion studies of the 1880s) who believed in the special power of photographs to convince viewers of counterfeit motion. Muybridge used fast-shutter speeds to break action into moment-by-moment increments, rendering movement stationary. For animators and other artists, the images he captured in the numerous sessions remain a standard reference, a dictionary of movement. In *The Philosophy of Photography*, Vilem Flusser outlines how the technical images are products of machines that are themselves the product of texts, e.g. research, engineering and others (Flusser 2000, p.17). This indeed articulates how we understand the body in western and globalized cultures, as compelled and defined through the technology of the lens and the camera. While in performance studies, the dual subject seems to enforce a simple distinction between the live and mediated bodies, Steve Dixon, performance artist and academic, argues that the media enables his

[5] Edward J. Muybridge (1830-1904) was an English photographer, known primarily for his important pioneering work, with use of multiple cameras to capture motion.

performers to point toward a more complex perception of space and time, and hence, the body. For Dixon, there is no power differential between the live and the mediated body—both are equally forceful embodiments of human experience. Furthermore, he argues:

> In contemporary cultural and cybercultural theories, the body has been increasingly conceptualised as an object divorced from the mind, and emerging discourses on the virtual body and "disembodiment" reinforce and extend the Cartesian split. The bifurcatory division between body and mind has lead to an objectified redefinition of the human subject—the "person"—into an abstracted, depersonalised and increasingly dehumanised physical object. (Dixon, cited in Chvasta 2005, p.163)

The theoretical point of interest, was the divide between the live and the virtual in the performance discourse. This was a topic for a debate concerning live theatre and mediatised performance, initiated by the differing perspectives of Peggy Phelan (1993, cited in Klich 2007, p.1) and Phillip Auslander (1999, cited in Klich 2007, p.1). While Phelan asserts the authenticity of live performance, arguing that performance is non-reproducible, Auslander critiques the concept of liveness arguing that it exists as a result of mediation. This ongoing dialogue has established an assumed opposition of the live and virtual within performance studies (Klich 2007, p.3). In performance where 'liveness' and physicality are frequently focal elements, it is difficult to ignore technological influences. This rather condescending view devalues the digital, rather than appreciating it as another facet of performance possibilities. Chvasta explain that live and technologically mediated bodies tend to be perceived in opposition to each other within performance discourse (2005, p.156). In addition to this, Fenske makes a compelling argument that performance theorists need to move beyond the perceptual habit of placing corporeality and virtuality in a hierarchical binary and instead work from a Bakhtinian aesthetic that values 'the dialogic and

discontinuous connection between form and content, corporeality and virtuality' (2004, p.15). The focus of 'Display movement' is on the body as placed: the space it takes up in lived experience and within the alternative frame of screenic presence. The work revolves around the notion that each body and each body memory and gesture, deliberate and multiply framed staging of self in performance leads to another layering of communication as bodily inscription. 'Display movement' is not seeking a form of technology that can infiltrate performance invisibly, but instead searching for methods by which the technology can extend the possibilities of performance.

My experience of practice-based study of interdisciplinarity between digital media and performance derives from 'Display movement', a collaborative multimedia performance piece that I did with my students at The School of the Art Institute of Chicago. The project captures the speed and glimpses of the performers' movement in the era of fast communication and technology. For this work I took sequences of isolated moments and by unfreezing time I combine them in a single image. The methodology was bridging my practical and theoretical work and analyzing the link between technological performance and the performative embodiment in new media through the use of motion capture devices and the programming language 'Processing'. The performers are seeing representation of themselves on the screen. This representation follows the movements of the performer like a mirror image or shadow, transformed by the potentials of the space. These transformations were realized by software running on a computer. In this piece of work, 'the content is contained in this difference between the gesture and its transformed or recontextualized reflection' (Rokeby 1995, cited in Penny 1995, p.145). 'Display movement' explores the experimental, process oriented practice-

based inquiry into digital media involving performance contexts. While exploring the integrations of body-centred performance practices with motion tracking software, I was also exploring the features of digital media as performance. Motion tracking involves real-time sensing and analysis of location, speed, duration and various other characteristics of movement. The results of this analysis were fed to a computer system that generated video and audio in response to the movement. But the outputs are always incomplete and approximate, or as argued by del Val:

> When a motion analysis system is developed it is important to consider that what is being analyzed is not the moving body: it may be a threshold of light in case of the camera, and the parameters we extract have little to do with our own perception and understanding of moving and dancing bodies. It is thus important to know that we are dealing with discrete representations of the moving body, and not with moving bodies themselves, and that these representations carry along a large amount of assumptions about what the body is, of how we identify, understand and dissect movement and so on: in that respect any representation of a movement will always be arbitrary and discrete, embedded and contingent. (2006, p.197)

This is partially why the work developed beyond realism to explore notions of non-linear association, embodiment and reflexivity by creating motion graphic visualisation. This somehow resonates with Grotowsky and his idea of how to allow the body to be free, or as he described, to give body;

> […] freedom from the time-lapse between inner impulse and outer reaction in such a way that the impulse is already an outer reaction. Impulse and action are concurrent: the body vanishes, burns, and the spectator sees only a series of visible impulses. Ours then is a via negativa – not a collection of skills but an eradication of blocks. (Grotowsky 1968, in Schechner & Wolford 1997, p.57).

Or as argued by Goodman:

> Grotowski's principles of 'poor theatre' with no sets, no props, no make-up or stage lighting are typical of mass produced digital performances, but also quite distinct from the higher tech mediated performance technology showcases that still challenge a performance paradigm, and that Grotowski did not code in his juxtaposition of "poor", "rich" and "total" theatres. (2007, p.110)

New production designs and new theoretical frameworks are crucial to get at novel digital media forms. The interplay of, for instance, digital media and live performance may be fruitfully achieved only through interdisciplinary practice-based research. Technology, by complicating our experience of self might also encourage a similarly heightened, even somatic, awareness. Technologist Sherry Turkle calls for personal transformation:

> If we cultivate our awareness of what stands behind our screen personae, we are more likely to succeed in using virtual experience for personal transformation [...] Our need for a practical philosophy of self-knowledge has never been greater as we struggle to make meaning from our lives on the screen (1995, p.269).

Focusing on motion, 'Display movement' tried to tease out some of the complexities and the possibilities of sensory engagement, locating it in relation to the negotiation of embodied subjectivity, in which we are all, as embodied subjects, involved.

Conclusion

There is an urge to develop new guides to conduct and new ways to tackle interdisciplinary research in art, raised by breakthroughs in science and technology. Moreover, as argued by the Goat Island performer and writer Matthew Goulish:

> The human produces the transparent entity of the technology, and in return, the technology offers to retransparentize the human. Moreover, we must ask ourselves not only how we will USE technology, but

> also whether we will BECOME technology. (2000, p.38)

Kolcio takes this even further when she argues that:

> In reconfiguring basic parameters of perception, communication and expression, technology asks 'What can we become?' In doing so it asserts the potential for human transformation. Dance and technology share this implicit commitment to the possibility of human transformation. Both operate on the premise of putting theories and ideas into practice. Both ask 'What can we become?' through (embodied and disembodied) praxis (2005, p.107).

Practice as research is still an evolving form, and although many examinations of embodied experience of performing through the technology focus on interactivity within the framework of technology and technological innovation, there is a great deal more to do in researching performativity as a way to approach technology. Creativity in an arts project is centred on finding solutions to non-functional problems, problems associated with aesthetic outcomes. But these solutions are seed of change, or as Resnick, director of the Lifelong Media Group, explains:

> New technologies play a dual role in the Creative Society. On one hand, the proliferation of new technologies is quickening the pace of change, accentuating the need for creative thinking in all aspects of people's lives. On the other hand, new technologies have the potential, if properly designed and used, to help people develop as creative thinkers, so that they are better prepared for life in the Creative Society (2007, p.18).

The point of the practice based enquiry and research is surely about keeping this dialogue alive, keeping thoughts relevant. This paper is part of a process of re-engagement, re-interpretation and re-examination pf the process of interaction between new media and performance studies, body and technology. The only way these ideas

evolve is when others interact with them. Or as summarised by Goodman:

> What we do, how we choose to act and interact and "spect-act", perform and play and replay, will differ for each of us, at each moment, and for many political and personal reasons. One thing only is certain: we will be faced with such choices in real life and in any number of digital or virtual performative spaces as well – even in our own imaginations and dreams: in the spaces of our own desires. (2007, p.118)

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