

Interactive Journeys: making room to move in the cultural territories of interactivity. by Norie Neumark

What happens when a theorist /radio producer and a visual artist journey into the terrain of computer interactives? This is the story I want to tell in this paper, by beaming you up and morphing you over, by navigating you through some of these journeys with me. And, as we go, we'll map the ground for a criticism of computer imagery and techniques in both popular games and in those interactives which lie at the crossroads of art, science, and education practices and paradigms. Along the way we'll be venturing into the broader territory of tv and film computer graphics in order to excavate cultural meanings underlying the dominant aesthetics in these images and interactives and to ask what they do for their producers and users.

My interest in these cultural terrains lies at the intersection of a theoretical project on computer culture and a practical project of working with a visual artist on an informational computer interactive. My theoretical project concerns how computer aesthetics and techniques express and (re)produce subjectivity, in postmodern culture - how they texture the ways that technology operates as "fundamental constraint in the production of subjectivity". (1) The transition to this culture, in the postmechanical, information age, is characterised by a sort of cultural crisis and accompanying identity crisis or crisis in "identity" and identities. This crisis is experienced and produced at the subjective level, through everyday aesthetic experiences, representational practices, and techniques and accompanying changes in perception and practices.(2) My political concern is in the ground this opens up for different versions and subversions of computer culture, particularly across a spectrum of gender, age, ethnic and racial diversity.

At the practical level I have been working with a visual artist, Maria Miranda, in the context of an educational institution, to produce an informational interactive particularly for teenage girls from non-English speaking and Aboriginal backgrounds. The production process and the interaction with our target audience raised a number of issues around how to interact differently with young people whose diverse aesthetics, pleasures, consciousness, and bodies have been colonized, metallized, normalized by a narrow repetition of dominant computer images and practices. It also brought up questions of how to work within the educational paradigms which focus not on the pleasure and subjectivity of the student but on the end product of knowledge/data to be accessed. Working with science and engineering faculties as we did also brought us face to face with other sorts of institutional practices and knowledge paradigms similarly inclined to bypass the senses and pleasures and plug the 'brain' directly into data bases or texts.

My own journeys in all this have been circular or perhaps spiralling from the political problems of how to open up as much aesthetic space as possible in our interactive project to the general theoretical concerns about computer aesthetics and subjectivity. In some ways, the same journeys with different travelling companions and different baggage.

To traverse the cultural terrain of popular and informational interactives in this paper, I have chosen the metaphor of navigation, to resonate with and interrogate its ubiquity in interactive lingo. Like the use of metaphors in interactive practice itself, this is a risky move, as Brenda Laurel signals. (3) The metaphor risks waylaying the journey, as it develops a trajectory of its own. So I'll try to locate it on firm home ground and minimize its, and my urge, to stray.

It may have to do with living in Australia for 20 years, but when I try to envisage the terrain of interactivity, to map the journeys across it, I picture it like a big island continent, surrounded by water, a country defined as much by time as by space. The journeys across this timescape and landscape of computer imagery can be mapped in many different ways — each map in turn can be read in a number of ways, from different locations and with different perceptions. You are then in a position to navigate variously depending on how you drive - on your drives ; depending on your body and techniques, on how you move. Location is of course a crucial question here materially as well as metaphorically, since it always constrains your reading style of the maps. As Celeste Olalquiaga has pointed out, what's normal style in one neighborhood can be proactive in another.(4) The 'style' of navigation in Olalquiaga's sense, is not of course a matter of arbitrary or pure 'choice'. The question is, as always, strategic and practical - how to find spaces and ways to move on terrains where possibilities are open but not endless, always located within certain economic and historical boundaries.

Each of these navigations, then, maps the journey differently producing a different 'reality' and subjectivity. My method in this paper will be to trace some of these navigations across this landscape of subjectivities, by taking you on series of journeys into the interface, beyond and back again. The paper is in three parts. I want to begin by taking you *into the interface* of popular cultural computer graphics - on t.v., film, and interactive games. This first terrain is where popular aesthetics and techniques are largely molded, where computer cultural subjectivity is significantly shaped. This will be the longest and most (apparently) varied set of journeys. In the second and briefer part, I want to navigate you along some of the paths constructed by scientists and engineers and educators, located at data bases, built on functionality. Finally, briefer still, in the third part, I want to return you to what was my own starting point, with a revisit to the interface via the crossroads of popular culture, science/engineering, and education. To animate this intersection and enable a productive meeting rather than just passing along the way, we will take along the 'art factor'. I hope that this return will be not so much the end as another beginning, full of possibilities.

The first question, before setting out on your journeys into the interface of interactivity, will be what to wear. The wardrobe choices are neither infinite nor arbitrary and they must of course, more or less fit the constraints of your body - though there are always cosmetic surgical and body building techniques to alter your body to fit the outfit. But as you may know even with morphing your possibilities are formally constrained by compatibility of shape and size and of course the economic constraints of being able to buy the morph program.

Part One: Beam me up, morph me over - some journeys into the interface

These journeys are plotted through popular interactive domestic games and video arcades, films, advertisements, and t.v. computer graphics. Your first journey sees you wearing a rather popular outfit - it's the bright and shiny metallic look which is virtually de rigueur evening wear for the high end popular cultural interface. This look fits a number of different bodies and suits you up for certain generally costly navigational paths on the small screen of tv and the big screen at the cinema.

So, there you are at the interface, wearing your metal outfit, perhaps weighed down by cliché, perhaps smoothly ready for quick and strategic movement. As a landscape, the terrain of popular cultural computer imagery that you can survey and traverse in your metal outfit can be like a desert, not a very rich ground for new life to spring from. But like the desert, the Australian desert anyway, the metallic landscape can also be beautiful and alluring, more complex and rich in the flesh than in its arid metaphor.

Navigating timescapes in your metallic look, you may be reminded of another, past moment. You may experience today as what sci fi in the past told us today would look like. The metal look here risks being so overcoded as yesterday's future that it loses a fantasy edge. It 's as if computers are stuck in a timewarp where they have to look like what science fiction promised and where they are "destining their own future and past", according to Albert Liu. (5) He traces a consistent genealogy from the chrome of the 30s to Silver Surfer to high tech future of post-technological beings, following the tracks of the people who invented rendering and computer imaging, people who came out of the whole aesthetic of science fiction, and comics. These graphics producers' own SF aesthetic got embedded in the "possibilities of the programs". (6). What holds computer aesthetics in this timewarp is not only the aesthetics of their producers, shaped for both women and men in some measure by a certain male aesthetic, but also of course capitalism. The old tried and true is what is likely to sell (they imagine) and there is the economically irrational refusal to see how much of a market they lose by their limitations. For, although to some extent capitalism has fallen in love with difference (7), it's not a very attentive suitor.

The desert of metallic timewarp gains its SF reflective surface not just from SF and comics aesthetics but also from high design. William Gibson, for instance, is aware of this when he paints his SF desert with the dislocating colours of crystal and metal. (8) And chrome is particularly featured. Many of Gibson's metallic images in the book, Burning Chrome are chrome coloured and chrome is the name and quality of the badguy in the title story. This Chrome is a woman, an icemaiden, whose data bases the heroes invade and burn. It's a rather macho set of

sexual relations and desires, though the plot and imagery, as usual, repaints literary SF in computer culture imagery so exuberant and incisive it's hard to resist.

Chrome—a particular sort of metal which can colour the timescape as well as the landscape in this journey to the interface. Again the way Deco and SF imagery merge in Gibson's story is telling:

The Thirties had seen the first generation of American industrial designers; until the Thirties, all pencil sharpeners had looked like pencil sharpeners - your basic Victorian mechanism, perhaps with a curlicue of decorative trim. After the advent of the designers, some pencil sharpeners looked as though they'd been put together in wind tunnels. For the most part, the change was only skin-deep: under the streamlined chrome shell, you'd find the same Victorian mechanism. Which made a certain kind of sense, because the most successful American designers had been recruited from the ranks of Broadway theater designers. It was all a stage set, a series of elaborate props for playing at living in the future. (9)

If chrome reflects the future of the past (Deco) then perhaps when you wear it, the interface is coloured by a retro feeling of safe familiarity, at the same time as seducing with a promise of some fascinating future. And does this retro feeling, a typical postmodern perception and experience work like its referent -Deco- to override cultural differences to the point of loss of visibility? (10)

Chrome. A metal known for its covering of surfaces with its heyday in the era of industrial design when mechanical things became all surface and exterior. Hiding and suggesting. From the 30s modern culture hid the guts and intestines and smells and tastes and workings of things, paying attention to the surface and metaphorizing the insides - thus making/acknowledging them as both desirable and frightening and increasingly a creature of the imagination. Chrome reflects, so that you see everything except the thing itself. (11)

Chrome's reflective surface intensified and represented the modern move to the surface. Not surprising that one of the first animated shorts on a computer was "Chromosaurus". (12) Chrome metallic images in computer graphics continue this lineage of an aesthetics of surface and skin rather than the viscera. (13) Albert Liu has traced an etymological connection between chrome and skin. (14) When you wear your metal outfit, does it feel like a second skin? A skin that enables movement (of a particular sort) or a skin that inhibits breathing or? Are you perceiving a deadening reflection and repetition of metal images all around you and suffering sensory deprivation without other colours and textures? Or are you excited by the glitter and glitz?

Does this metal outfit only shape your body in that streamlined modernist way where form hid function - or does it (also) change function - enabling certain new movements? Does the flat iconic surface of the various screens on which computer graphics occur produce a desire to create the illusion of depth? You'll find that in your metal outfit you're well suited for the gravityless 3d movement, so familiar in computer graphics on tv and film. Backwards and forwards through space, alongside those metallic rendered logos for tv stations. Movements with the potential to giddily float you free and disrupt your point of view, disturbing the staid position of classical perspective. But also perhaps a movement that can re-anchor you in a reality that has not changed - the reality of the corporations which bring you these as if/once dazzling ads — re-anchor you at the point of a "supernarrator" (the tv station, the advertising company, the film distributors), as Judith Barry and Margaret Morse trace:

'When logos appear mysteriously on the screen, they seem to pass through our bodies on their way to our field of vision; when they swoop or tumble across the screen in elaborate trajectories, their controlled movements suggest not objects given momentum by some other force, but subjects with their own motive power. In this sense a logo can be thought of not only as the proper name of a station, but as a supernarrator that conveys us through various modes of discourse'. (15)

Judith Barry, following the path of Margaret Morse, tracks these 3d computer graphics as they alter the place of the viewer and therefore subjectivity. She sees animated tv logos as "trace(s) of an absent subject...anthropomorphized like fantasy creatures in fairy tales". (16) While the

continuous movement of these (metalloid) figures locates the viewer deep inside space, in several place and planes at once, it is not only movement that gives them their meaning but also speed:

Speed causes us to lose control, we give ourselves over to its exhilarating (sic) effects. It seems as though we are participating...in this universe of motion control to look is to be caught, not by an image but by something more powerful which delivers you to where it wants you to go.(17)

The terrain you are pulled into here by speed and motion is one of a new sort of perspective, different from traditional cinematic space which was a "believable, inhabitable representation" centred on "monocularly-based systems of perspective" - a space with a centre at which you, the viewer was located and your subjectivity ordered. (18)

What drives the movement and the drunken ecstasy of speed, which allows you to leave your centred and controlled self behind - is it just the engine of capitalism and commodification? Perhaps it can be diverted if the outfit doesn't quite fit - because of sex or race say? Does it make a difference if females dress in metal? It depends on who you are, as well as (re)shaping who you are. You risk feeling like the robot Maria in Metropolis, a representation of both frightening, destructive machine culture and terrifying femininity. A machine age scenario perhaps outdated in our post machine information age? And in any case, an all too classic scenario that does nothing to alter the gender/sex mappings of the terrain.

An even less appealing navigation of that Metropolitan terrain, where frightening machines were coded as female, is the road to fascism. On the fascist road machines have a glamour and appeal, as the modern; and the frightening codes of outsiders were mapped instead onto Communists and messiness. This is a much more straight and narrow path, a regimented road and you play a more deadly game. Here you wear your metal suit to protect and armour your body - for those with a fascistic need for safe boundaries, afraid of losing control, needing to hold messy frightening insides in, as Klaus Theweleit has analysed. (19) Here, where your own hold on reality is slim, the metal outfit bears a fascistic glint, giving you that first hold, not so much an escape from reality as an escape from lack of reality, a grounding in a "reality". On this road the games of war and competition flow along tight lines, violently hewn out of the landscape. From inside this suit you read the metal rendered maps to suit your needs. But such journeys into the monumental/monometal scorched earth of fascism like those into the cultural desert of advertising and commercialism should not be confused with the more everyday journeys into the popular cultural interface. Which we're about to take, after a digression to the most high end articulation of the metal outfit and way to mix it out there with the metal boy pixels.

Here you are wearing a very different outfit than the armoured representations usually associated with metal beings. This one is modelled on the smooth metalloid body of the metalmorph. This metal is worn on the inside and can bring Terminator 1000 delusions or desires. According to Albert Liu, this new generation Terminator exhibits the ultimate phallic boneless rigidity, body without organs - perfectly suited to the flat surfaced computer graphic terrain.(20) And having no insides, being post-machine, it needs no immune system to be invulnerable, immune, which is not a bad quality in the era of AIDS.

The Metalmorph is a strange computer product that is "postcybernetic" - it is "morphogenetic ...rather than programmed", therefore unable to be deprogrammed or even turned off. It is an image in no way related to computers, according to Liu, and "almost as flexible and illusory as celluloid.... a representation of Filmic Intelligence over and above Artificial Intelligence".(21) It is also an unusual computer metal image because in this "figure of persecution" the material which once held a promising future has now become threatening.(22)

But the metalmorph is also particularly slippery, flexible, flowing and mobile - well suited for travelling . Not only a metal being, but also a liquid metal being, which navigates easily across the border from the continent to the sea, itself a border creature of liquid/solid form, like the pseudopod in The Abyss where its rendering program was first trialed. This program achieved a breakthrough in computer simulation , according to Liu:

Rendering...since it is capable of simulating a holographic realism unattainable in sculpture - by creating the *Metalmorph*, returns the human figure to a prototypical, subhuman facelessness, its unidealized anonymity reinforced by realism....T-1000's liquidity incarnates the anticlassical possibility of Dionysian sculpture. Accordingly, the *Metalmorph* marked a moment not in the plastic arts but in the plasmatic (as in *plasmaticos*, "molding") arts. (23)

It's interesting to note this renders a move not only from the classical but also the modern representation of sculpture, in its monumental form, which was so appropriate to the bourgeois ideal of solidity. This postmodern *metalmorph* is marked by its movement and speed as well as its form/lessness. And the *metalmorph* is not only a metallic being but also also a morphing being which not only changes form but changes shape and takes on, flows into, other shapes. And with a multibillion dollar film budget you can morph into a lot more exciting things than your more economical home version.

Morphing - this suggests a movement and technique possible at any point on the navigational path, more than a departure point. Morphing - is it a body technique to evade(explore) the identity crisis precipitated by awareness of cultural difference in the postmodern west? It's interesting to track the major territorial invasions of morphing to try to excavate its meanings. It is a currently and increasingly popular technique in film and music videos, and particularly in advertising. Frequently its beginning and endpoints play around with racial, gender, even species difference. You may want to read this play as erasing or highlighting differences, homogenizing or exposing the tenuousness of a type of identity which made sense in/of the mechanical age of modern capitalism but no longer does in the post modern age of information. Is it a technique driven by the desire to be other, not just travel to other worlds? Is this a fantastic disruption of 'reality' (that leaves you with the abject queasiness) or an erasure of the significance of difference by tampering with the signs of difference?

It depends in part on your location, in time, space, place, discourse, as the producer or reader of the morph. Morphing could be read in the way similar to that in which Margery Garber reads cross dressing, as the creation of a 'third sex' and as a sign of the 'anxieties of binarity', the 'constructedness' of gender, and the crisis of cultural categories.(24) To Olalquiaga, morphing can be similar to cross dressing when it is about camouflage, which plays a large part of contemporary culture. Both allow the taking on of different personas, presenting yourself as a spectacle, transforming yourself, being multimorphous, not bound by notions of the essential. Both allow for lots of mobility, irrespective of certain codes of your race or gender. Morphing and cross dressing make sense in this postmodern culture, according to Olalquiaga, because it is so visual and icon oriented and there is the desire to look like the icons we see around us.(25)

Computer imagery lends itself to these iconic presentations which are very surface, lacking depth, and also very mobile and able to traverse a lot of boundaries. Olalquiaga traces the ways that both computer imagery and morphing and crossdressing construct/reflect postmodern sensibilities and subjectivity. However, both crossdressing and morphing can also fail as playful interceptions of the mainstream. In particular, playing round the boundaries of gender is more difficult for women to benefit from than men, according to Olalquiaga.(26) You can see if you look at Lucas Films' multiple users' game *Habitat*, for instance, that at one level the crossdressing and morphing possibilities are wide open - body parts are interchangeable, you can re-spray your colour, you can change your sex. And you'll find lots of men crossdressing as women. (27) But at the level of the graphics, the imagery and the bodies' design are not particularly transgressive or diverse - they remain classically Anglo, cute and 'shapely'.

You might produce other readings and episodes of morphing techniques - as a computer culture version of cosmetic surgery or body building perhaps, as something which fails to disrupt or to dissolve structures? (28) I wonder about the way some of the most stunning versions of morphing involve two of popular culture's most famous examples of body building and cosmetic surgery - Arnold Schwarzeneger and Michael Jackson. Arnold, who built his own body, was fabulously well paid to be seen travelling round the interface with a morph, even apparently known to try it himself, changing race in a magazine image. Michael Jackson who's turned sort of white in real life through pigmentation alteration and cosmetic surgery had what I remember as some of the earliest examples of morphing across race and species in his music videos.

All this raises the political challenge facing you at each moment at the interface, to analyse what's going on culturally and politically with morphing. A strange dislocation occurred at a Seminar on Computer Graphics and Cultural Diveristy around TISEA 93 when Rejane Spitz showed some Brazilian ads with women morphing into big cats. Some feminists were worried by what they saw as the exploitation of women's naked bodies for advertising. Others, including myself, were excited by this example of cultural difference in reading computer graphics and stunned by an image whose meaning was at the same time overcoded and yet available to be disruptive in certain cultural contexts. This was also the beginning of my secret desire to be morphed into my cat Nellie.

Beam me up, morph me over —now that your identity is so disrupted with all this high flying and morphing activity around you, let's go back to the wardrobe, where, like Albert Liu, you might choose scuba gear for the journey into the interface. He sees this as a very appropriate wardrobe choice for crossing mediums, which is how he imagines a journey into the interface: a "submerging of the human body in another medium... a way to gain access to another ...unnatural, inhuman experience...a human/inhuman fusion". (29)

Or, along with Celeste Olalquiaga in New York City, a city where urban movement is a crucial concern outside the interface and fuels a desire to journey inside it, you could journey into the interface dressed in lycra, gliding on rollerblades. Lycra to cover your whole body because you are submerging into another reality and your body needs to be free to traverse whatever obstacles it finds. She identifies the roller-bladed styles on the streets, a look, which is protective, fluid and robotic, as reflecting the look on video games monitors. It's a look appropriate to speed and violence. A look that lets you glide in and out of the streets and the interface and realities - in a merging or surfing-like manner.(30) Which recalls again the Silver Surfer, a metallic comic character, and the resonance of computer games with comics in their look and significance to urban youth styles.

Or, back in the wardrobe, on the other side of your continent, along with Katherine Hayles you could wear a colourful iridescent body suit, for gliding through the interface. For her, living in L.A., hypersensitive to the pervasive traffic, the journey to the interface is driven by an impatience with materiality and the desire to achieve infinite mobility and the exhilaration of speed. Navigating the journey in this outfit, in this way, shortcircuits the cognitive machinery and appeals more to a kinaesthetic sense. (31) Being held up by traffic is certainly something you escape in the cars at the video arcades. There you drive a car as fast as you want, crashing painlessly. Sometimes you find the crashing as exhilarating as the speed as a moment of release and joy. (32) For the more adept, or those who get their thrills without spills, you strive to improve your technique and move ever faster in pursuit of your goals. And with the perfected techniques of computer games and video arcades your sensory channels are reconfigured.(33) According to Klaus Theweleit, you develop a whole new set of perceptions as you play video games -and generations of youth follow generations of computers, differing in the way they perceive and react to/interact with images, movements and depth. In the timescape and landscape of computer games, the kinaesthetic sense of your phenomenal body keeps up with that of the computer and the younger you are, the faster you see and move.(34)

It is culturally significant that you choose to experience these other realities via a machine, rather than say, through drugs, meditation, reading or any of the other many possible ways in. That is not to ignore that they too are technological but here technology takes a particular form, includes particular techniques and aesthetics and shapes your visit to this landscape of other realities in particular ways. And it is part of the technological drive to produce a machine to extend human capabilities, to gain access to to other sorts of experiences (35)

As you drive into the interface you may find yourself navigating a fine line along a very repetitive road. On the one hand, repetitive image can be important and play the soothing function of giving you something to hold onto in postmodern culture where things disappear so quickly that they leave a gaping emptiness. Too much speed can leave you breathless. This breathless emptiness can be balanced with repetition, according to Olalquiaga. (36) For Hayles, the speed with which the new becomes banal means we have to move even faster to escape the banal which is pursuing us ever more closely.(37) It is no surprise perhaps then that these games in which speed is a crucial part are also incredibly repetitive in their narratives and imagery.

All of which takes us deeper into the question of driving. Depending on how you are driving or how you are driven, you can navigate the journeys into the popular cultural interface in a variety of different ways and directions. So what drives you to set out on these journeys into the interface? Sometimes it is the desire to enter another reality or extend your reality or lose your reality; perhaps even to have a radical experience - to test the limits of experience and the limits of desire. This can be the desire to be in another time or space, or place or medium, as we've seen. It can offer an opportunity to lose your particular perspective in time and space. This happens "when things exist in informational form" at the interface, "where doors open that never could open in material form". (38) Is this what makes doors so popular an image on the interactive interface? For Katherine Hayles, the move into the interface "is a movement from materiality into information" so that "sensory data ... impact on us". As you move from your world into the screen you become fluid and immaterial and therefore not bound by the rules of your world - a movement different from that of film which comes out into your world. (39)

Via the machine you are incredibly absorbed, more so, according to Albert Liu, than with reading where some kind of symbolic faculty is being used. At the interface, you can supercede your symbolic faculties - your senses are stimulated in ways that confuse or obviate the brain. The whole design of computer games... "is to assume a purely passive or automatic position with respect to technology, to allow it to access the senses without symbolic mediation, without going through the sign systems which have governed the production of meaning in our culture, namely language.... You enter [the interface] willessly, involuntarily, inconspicuously". (40) How this operates for the interactive interface of Sega computer/video games was perceptively described by one 14 year old girl as an escape from boredom, your mother, using your brain:

"it takes over your mind and you just get hooked on it til you've finished it...It's an imaginary place where you can just relax and your mind goes free... Your mind gets loose and stuff". (41)

So what happens when you mix it with the tough boy chrome pixels in the old games of violence and competition. Are these games 'fantasies' in the subversive way that Rosemary Jackson discusses?

A fantastic text tells of an indomitable desire, a longing for that which does not yet exist, or which has not been allowed to exist, the unheard of, the unseen, the imaginary, as opposed to what already exists and is permitted as 'really' visible. (42)

They are certainly fun, an escape, addictive even, but whether they are fantasy or not depends in part on who plays and how, as well as what they play. However, their violence should not necessarily be seen as a signal of 'realism' or recuperation. Violent computer games can enable a violation and subversion of norms which are particularly restrictive for kids under the institutions of family and school. That Danielle, like many (?) girls is not violent but likes violent games because they're the ones 'you can get into', are more 'exciting', you get 'glued to', could make sense in terms of what Rosemary Jackson elaborates in her study of fantasy literature:

As a literature of 'unreality' fantasy has altered in character over the years in accordance with changing notions of what exactly constitutes 'reality'...From about 1800 onwards, those fantasies produced within a capitalist economy express some of the debilitating psychological effects of inhabiting a materialistic culture. They are peculiarly violent and horrific. (43)

This can be a sort of using the very codes that bind in order to free those binds. (44) As Bataille noted, "Those arts which sustain anguish and the recovery from anguish within us, are the heirs of religion. (45) How apt that the ultimate scientific rational machine enables such fantasy encounters - science yet again doing the work of religion?

Just as with fantasy literature, computer games' subversive function resides perhaps in their structure rather than (only) their themes. (46) Computer games play with fantasy is determined at the graphic and technique level more than/as much as the narrative. When its narratives stray from the more fantasy lineage into more 'normally' violent, romantic or realist territories, it is perhaps only their disorienting speed and their low res graphics which save them from performing a normalizing cultural function.

The genres may vary but the narratives of these games can be so familiar that you can follow them with a bit map - and you're still drawn in, despite the low level graphics. Perhaps even these low level bitmapped graphics provide some allure - some room for the imaginations in these well worn narrative and aesthetic grooves. The less intelligible it is, the more we can project fantasies and desire onto it. As David Humphrey suggests:

A low-resolution image like a badly taken photograph, or an image produced after many generations of cheap copying, has the capacity to solicit the viewer's participation in a production of its sense. That degree of filling-in-the details required to 'recognize' or 'define' the low-resolution image draws the viewer closer to the realm of memory and association...these vague images create an increased susceptibility to the unintended or subjective, exercised by the peculiarities of the maker and viewer. (47)

So with or without the bit map as a sop to your drive for imaginary space or space for the imagination, you are drawn into the interface.

The crucial question, at each interface moment, is whether the sexist, racist and overly repetitive content locks you too closely to the codes of reality. At those times it may be role playing games that offer some deeper fantasy involvement. Or perhaps the appeal of role playing games is to kids in (sub)cultures where they've already passed some speed threshold and need the complication of role playing's involvement. (48) According to Alberti Liu, role playing games seduce by producing the sense of yourself being somewhere (else). They produce a sense of subjectivity and selfhood not by a stable fixed point of view or point of reference but precisely by the instability and fluctuating commotion we now perceive as real life or real sensation. (49)

Even in these role playing games, neither the narrative content, nor the movement are necessarily fantastically disturbing of the reality you've escaped from and will return to. As Olalquiaga notes, they co-opt 'styles' with a lot of speed in order to become readily marketable but through the narratives infuse the new modes of reality with traditional values, because of who's producing them - their male point of view. Yet this is not a totally bleak journey because it can be redirected back to the streets where people take on this computer game look as 'style' and, in making it their own, offscreen, they find room to move where capitalism and masculinity have blocked or monopolized the way on screen. 'Style' allows people to play with codes and transform them, alter them, be creative and active in their response. (50)

This is all very tricky territory you've been on - particularly when you try to work out what's going on with those young girls at the interface. You can try asking them but they speak a different language to describe the visual landscape. And more than that. As the generation which has grown up in the information age, you can find their perception of time, the techniques with which they operate at the interface very different from your own. They move differently and at a different pace. Speed of play and updateness of the game (signified by music and graphics) draw them in and move them around. All of this is not to say that the graphics don't have an effect in (re)shaping their aesthetic sense, even if this is not conscious. But this seems not to be a question that concerns the market forces operating at this interface. Nor, unfortunately does it figure much as you journey past the interface, as we're about to do in Part 2.

Part 2: Journeys past the interface: Plotting navigations to the heart of the machine: scientists, engineers, and educators rule okay

In these journeys you aim for the dead centre of reality, bypassing the imagination as much as possible. A movement directed by symbolic urges, which sometimes got detoured as you played around at the interface. There's a high res. road which can take you straight there though there are low res. access roads. And the eye you keep on the road is that of scientific vision in this landscape where engineers rule okay. (51)

No time for cross dressing or other playing in the wardrobe for this journey - What You See Is What You Get. Scientists and engineers are more interested in playing around under the hood of the vehicle than giving it a respray, new chrome finishing. Their relation to the machine's insides follows the paradigm of science - constructing it as something to be conquered, controlled, to exercise power over, to find out its secrets; to have their own power and subjectivity expressed in these 'useful' actions. (52) Any style on the outside will do, indeed to the engineer's eye attention to the graphic look can be 'a waste of time', a 'superficial' and 'insubstantial' activity because it is not 'analytical'. To that eye there is no difference between the active, creative transformation of style and the passive consumption of fashion. Although the cleaner and simpler the interface looks, the better, because its less likely to bedazzle the user away from their main aim of following the well laid navigational paths as quickly and efficiently as possible. The high res. road holds the greatest promise here as the path of smooth, clean functionality - far more appealing to the tech's eye than the dirty, abject low res. approach which appears as a dysfunctional roadblock to their vision. It could distort or disturb the drive around their hierarchically organized space in which immediate and fast navigation between levels is the top priority, paramount to who or what is on those levels and what it feels like.

Their drive is to detour any possibilities to engage visual pleasures, to bypass the senses and plug the 'brain' directly into data bases or texts. In the engineering faculty at UTS, they took the Mac users off the network because the Macs 'caused trouble' for their IBM traffic - too many pretty or different pixels interfering with the march of the repetitive parade of interactive bodies? Functionality is the go on this journey, navigational dexterity is where it's at. Relating is as superfluous as visual pleasure. No need to relate to the user, just track their movements through the visual desert where your data base is right at home.

If an educator guides you on these journeys, your path can often be pretty much the same as if you go with a scientist or engineer. The difference is that as travelling companions, they're generally more interested in what you have in your suitcases and your final destination than in how the path takes you there. So long as they can track your movement and you reach the proper destination, they're happy. And what does tracking as a technique of relating to the user do to the producer and the user? This question doesn't seem to delay many engineers and educators - and it's certainly not protocol to let the users know. Tracking could look to you very much like the commercial and government surveillance uses of computer - though dressed up for this journey in the educational guise of 'for your own good'.

Of course the navigation of the journey will differ depending on which scientist, engineer or educator you travel with - where they've come from, how they like to travel and where they want to get to. There are engineers and scientists whose perceptions exceed the boundaries of the knowledge system they work within, enabling them to see the significance of the graphic imagery interface rather than rush straight through the tunnel vision to the 'heart' of the machine function. And educators sometimes get derouted from their institutionally driven goal-orientation - they can stop and recognize the practice and pleasures of the user. Still, this is not normal practice and many of the educational and informational interactive interfaces reveal the low level of awareness of the significance of aesthetics and show the limitations of the institutionalised nature of their knowledge.

The effects of the engineer's eye and the educator's ear are very evident at the interface even if not consciously. Lack of concern with the graphics, music, and speed factors tell teenage users that they're there for an educational rather than entertaining ride. Which brings me to the end of this section and back to my beginning - with the question of how differently to travel to an interface where diverse young people can operate differently than in the usual educational or popular cultural mode, though with some of the pleasures and benefits of both.

A Return to the Interface - a journey at the crossroads of art, science and education.

As we return to the interface after that brief visit to the heart of the machine, a number of questions remain unresolved from our first series of journeys through it. Can there only be tough chrome boy pixels and fluffy pretty girl pixels, marching in the repetitive parade of interactive bodies? 'Are all the pixels white'? Can art be available to new bodies/subjects and new bodies/subjects available to art through images resonating with cultural and aesthetic diversity? To examine these and other questions, it's useful for this revisit to the interface to take an artist along and introduce the 'art factor'.

Art Factor is one of those travelling companions I never like to quiz too much about who they are for fear of scaring them off. Art has her own constraints on her own turf, where historical, market and institutional forces constrain her movements. On this territory here, though, she may be a bit freer of those constraints and able to add both a critical edge to the technique as well as an aesthetically pleasurable dimension to the landscape. Art Factor enters the terrain of educational and informational interactivity to make reality strange. With her paintbrush and technique, scientists, engineers and educators can loosen the deadlock grip of "reality" on imagination and the imaginary. In the process, 'reality' itself can be disturbed and experienced differently.

So Art Factor makes room for possibilities to engage visual and aural pleasures at the educational/informational interface. How to do this is tricky because the techniques are not necessarily the same as those she likes when she's on her own turf. There, one of the popular strategies is to take the low res. road to the interface to challenge the tying down of meaning. What David Humphrey says about the value of the abject quality of low resolution in art in general can also apply to computer art specifically:

Low resolution...translates as languid irresolution. The dumb simplicity of the dissolving gestures registers a low-intensity resolve to simply mark the surface without the burden of representation. (53)

Other computer artists working on their own turf take the high res road. For instance, they see possibilities to disrupt meaning and "implant the visceral in the technological" with more high res techniques, though they are constrained by the economic possibilities of going as far along the high res. road as they'd like to do. (54)

While there's a far greater diversity to approaches by Art Factor on her own turf that I can track here, as I come to the end of my story, I'll just note that these questions of high and low res. roads, and cultural diversity, articulate differently when you stand at the crossroad of art, science, and education. My own ongoing project, with artist Maria Miranda, at that crossroads, has been to create a 'real' world familiar/strange enough to excite curiosity, pleasure, and engagement. We constructed paths which suited our target audiences' desire for the 'game' factor, for surprise and challenge. The data came last, not first; it was audience - driven not menu driven. The information was designed to fit the aesthetically pleasurable interface. The look was painterly, a lush, non-'realist' world inhabited by culturally diverse bodies. A real' world (domestic and exterior) was animated expressively and fancifully; and an informational territory was infiltrated with the critical, 'inconsistent' edge of the 'art factor'. When your funding is limited and you have engineers, scientists and educators to keep happy, then to transgress 'reality' and 'realism' and speak to the aesthetic sensibilities of a culturally diverse audience of 15 year old girls, is a happy end, and beginning, to the story of these interactive journeys.

Footnotes

1. Leola Jacobs, "Technological Dreaming: Language, poetics, subjects", paper delivered at Sex/Gender in Techno-Science Worlds, University of Melbourne, 29 June, 1993.
2. Celeste Olalquiaga's work, particularly Megalopolis is a valuable exploration of this cultural and political moment. Celeste Olalquiaga, Megalopolis: contemporary cultural sensibilities; Minneapolis: University of Minnesota Press,, 1992.
3. Brenda Laurel, Computers as Theatre, New York: Addison-Wesley Publishing Company, 1991 *passim*, esp 7, 127-132.
4. Celeste Olalquiaga, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
5. Albert Liu, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
6. *Ibid.*

7. Adele Clarke, "Modernity, Postmodernity and Reproductive Processes c. 1890-990 or "Mommy, where do cyborgs come from anyway?", paper delivered at Sex/Gender in Techno-Science Worlds, University of Melbourne, 28 June, 1993.
8. William Gibson, "The Gernsback Continuum", Burning Chrome, London: Grafton, 1988, pp. 45-46.
9. *Ibid.*, p. 39.
10. Penny Sparke, Felice Hodges, Emma Dent Coad, Anne Stone, Hugh Aldersey-Williams, The New Source Book, London: Little, Brown and Company, 1986, p. 100.
11. Sandy Stone, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
12. Albert Liu, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
13. Francesca da Rimini, conversation about VNS Matrix's interactive "All New Gen", September 27, 1993.
14. Albert Liu, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
15. Margaret Morse, cited in Judith Barry "Eyestrain", Public Fantasy: an anthology of critical essays, fictions and project descriptions by Judith Barry, (ed. Iwona Blazwick) London: ICA, 1991, p. 111.
16. *Ibid.*, pp. 111-112.
17. *Ibid.*, p. 112.
18. *Ibid.*, p. 114-5.
19. Klaus Theweleit, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
20. Albert Liu, "Metalmorph", The Abject, America, Lusitania, Volume 1 Number 4, p. 131; and Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
21. Albert Liu, "Metalmorph", The Abject, America, Lusitania, Volume 1 Number 4 p. 138-9; and Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
22. Albert Liu, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
23. Albert Liu, "Metalmorph", Abject, America, Lusitania, Volume 1 Number 4, p. 138, see also pp. 136-138.
24. Margery Garber, "Introduction", Vested Interests: cross-dressing and cultural anxiety, New York: HarperPerennial, 1993, *passim*.
25. Celeste Olalquiaga, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
26. *Ibid.*

27. Alluquere Rosanne Stone, "The Anthropologist as vampire: Transsubjectivity and Transgender", paper delivered at Sex/Gender in Techno-Science Worlds, University of Melbourne, 27 June, 1993.
28. *Ibid.*, For a discussion of fantasy as disruptive of structures, see Rosemary Jackson, Fantasy: the literature of subversion, Methuen: London and New York, 1981, pp.72-3; 77-8, 174-80.
29. Albert Liu, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
30. Celeste Olalquiaga, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
31. Katherine Hayles, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
32. Alluquere Rosanne Stone, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
33. Katherine Hayles, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
34. Klau Theweleit, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
35. Albert Liu, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
36. Celeste Olalquiaga, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
37. Katherine Hayles, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
38. *Ibid.*
39. *Ibid.*
40. Albert Liu, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
41. Danielle Tuwai, conversation, September 25, 1993, Sydney.
42. Rosemary Jackson, Fantasy: the literature of subversion, Methuen: London and New York, 1981, p.91.
43. *Ibid.*, p.4.
44. Celeste Olalquiaga, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
45. cited in Rosemary Jackson, Fantasy: the literature of subversion, Methuen: London and New York, 1981, p.18.
46. *Ibid.*, p. 175

47. David Humphrey, "The Abject Romance of Low Resolution", The Abject America, Lusitania, Volume 1 Number 4, p. 155. A similar point is discussed by Alluquere Rosanne Stone, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
48. James O. Jackson. "Vidkids everywhere", Time Australia, September 27, 1993.
49. Albert Liu, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994. See also Rosemary Jackson, Fantasy: the literature of subversion, Methuen: London and New York, 1981, p.35, where she notes: "Subverting unitary vision, the fantastic introduces confusion and alternatives".
50. Celeste Olalquiaga, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
51. Scientific vision is something Donna Haraway investigates most usefully in her Primate Visions: Gender, Race and Nature in the World of Modern Science, New York: Routledge, 1989, see especially chapters 1 and 9.
52. Leola Jacobs, "Technological Dreaming: Language, poetics, subjects", paper delivered at Sex/Gender in Techno-Science Worlds, University of Melbourne, 29 June, 1993; and Alluquere Rosanne Stone, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
53. David Humphrey, "The Abject Romance of Low Resolution", The Abject America, Lusitania, Volume 1 Number 4, p. 155. A similar point is discussed by Alluquere Rosanne Stone, Radio interview for "Journeying into the Interface", the listening room, ABC FM, in production, for broadcast January, 1994.
54. Francesca da Rimini, conversation about VNS Matrix's interactive "All New Gen", September 27, 1993.