Playing With Non-Humans: Digital Games as Techno-Cultural Form

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ABSTRACT

Game studies has yet to engage with a sustained debate on the implications of its fundamentally technologically based foundation – i.e. the 'digitality' of digital games. This essay calls for such a debate and offers some initial thoughts on issues and directions.

The humanities and social sciences are founded on the principle that historical and cultural agency reside solely in the human and the social. Drawing on Science and Technology Studies, Actor-Network Theory and cybercultural studies, this essay argues that a full understanding of both the playing of digital games, and the wider techno-cultural context of this play, is only possible through a recognition and theorisation of technological agency.

Taking the Gameboy Advance game *Advance Wars 2* as a case study, the essay explores the implications for game studies of attention to non-human agency – specifically the agency of simulation and artificial life software - in digital game play.

Keywords

Technoculture, game studies, technological agency, actor network theory, cyberculture, simulation, artificial intelligence, artificial life.

The relationship between the human and the technological has been a persistent concern in the dramas and images of digital games. Gameworlds are populated with mutants, cyborgs, robots and computer networks – avatars are augmented with headup displays, exoskeletons and impossible weaponry. Yet in significant ways digital games can be seen not only as representations of a putative future technoculture – as a technological imaginary of new media - but also as actual instances of a technoculture here and now. To play a digital game is to plug oneself into a cybernetic circuit. Any particular game-event is realised through feedback between computer components, human perception, imagination and motor skills, and software elements from virtual environments to intelligent agents.

This cybercultural language has been regarded with some suspicion within the humanities and social sciences. For intellectual traditions founded on social constructivism any sense of technological determinism is problematic – historical and cultural agency, it is presumed, resides solely in the human and the social. In this essay I will argue that a full understanding of both the

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playing of digital games, and the wider technocultural context of this play, is only possible through a recognition and theorisation of the reality of technological agency.

I will draw in particular on theoretical positions developed within the Sociology of Science and Technology and Actor-Network Theory (ANT) to explore how social constructivism might be challenged by the consideration of the agency of technologies, and will, through an analysis of *Advance Wars 2* (for GameBoy Advance, Nintendo 2003), suggest ways in which this argument might shed light on the distinctive nature of the digital game and its play.

THEORIES OF TECHNOCULTURE

Disciplines concerned with the relationships between technology, culture and society (sociology, cultural studies, media studies, etc.) tend to approach the analysis of the reception and uses of media technologies from the 'social shaping' model. A 'social shaping' approach to digital games (within Media Studies for example) would on the one hand see digital games and gameplay as broadly continuous with other forms of media technologies and their consumption in everyday life (the Walkman, television, etc.) and on the other would view the forms and practices of this consumption (and hence the uses to which media technologies are put) as shaped by social agency. At the point of manufacture this agency is primarily economic, at the point of consumption it is the users or consumers that negotiate the meanings and uses of these devices. Consumers – it is asserted – negotiate their desires and hopes for new devices with the preferred uses anticipated by manufacturers and advertisers in the context of the contingencies of their everyday life (can they afford the device? Can they use it? Do they have to share it with other members of the household? How do issues of gender and generation affect access to such devices?). This focus on the social shaping of media technology through consumption tends to militate against conceptions of technological determinism; it foregrounds the conflictual, social nature of meaning generation. Producers' attempts to build in meanings, and then articulate them through promotion and advertising, can never result in anything more than 'preferred readings' of their products. They may wish us to see the Betamax video format or laser discs as the future of home entertainment, but they cannot make them mean that. Early home computers in the 1980s were often sold as information technologies, but were widely consumed as games machines. All commodities and media then, are 'texts', 'encoded' products which may be 'decoded' in their consumption to reveal a quite different message (Mackay 1997: 10). So,

> the effects of a technology [...] are not determined by its production, its physical form or its capability. Rather than being built into the technology, these depend on how they are consumed. (Mackay 1997: 263).

However, significant problems follow from the extension of this textual metaphor to the consumption of new media technologies. Put simply, this textual model (and by extension the 'social constructivist' paradigm from which it derives) limits any analysis of the *materiality* of media technologies, hence ruling any consideration of technologies as having 'agency' or 'effects' out of court. I would argue that the effects of a technology may not be *reducible* to its 'production', 'physical form', or 'capability', but it a nonsense to assert that these factors have *no* effect. There may be uses for a microwave other than cooking, but it can't be used to sharpen a pencil. There is a danger of throwing a material baby out with the technological determinist bathwater. As Mackenzie and Wacjman point out:

> It would be terribly mistaken, however, to jump from the conclusion that technology's effects are not simple to the conclusion that technology has no effects. (Mackenzie & Wajcman 1985: 7)

'Social constructivism' in general and models based on textuality and representation in particular emphasise the meanings, the symbolic circulation, of media technologies and in so doing elide their material existence as objects and devices, their uses constrained or facilitated by this material existence:

> What is being shaped in the social shaping of artifacts is no mere thought-stuff, but obdurate physical reality. Indeed, the very materiality of machines is crucial to their social role (Mackenzie and Wajcman 1999: 18).

This argument has significant implications for social constructivist theories of media and technology, and it also opens up new areas of enquiry. For if, on the one hand, the material world and the artifacts in it are 'obdurate' and 'physical' (as well as symbolic), and on the other (as we will see) society and the material world (technology, nature) can be seen as mutually constitutive, then it becomes difficult to maintain the assumption that humans are the only agents in the world, shaping and moulding artifacts, but never vice versa. It is clear that the implications of such questions pose fundamental challenges not only to the critique of technological determinism, but also to the theorisation of society and culture in general.

Actor-Network Theory

Mackenzie and Wajcman introduce Actor-Network Theory (ANT) as identifying 'the reciprocal relationship between artifacts and social groups' (Mackenzie and Wajcman 1999: 22). ANT is ambitious and the implications of its assertions far reaching.

> Both society and technology, actor-network theory proposes, are made out of the same 'stuff': networks linking human beings and non-human entities ('actors', or, in some versions, 'actants') (Mackenzie and Wajcman 1999: 24).

Bruno Latour for instance calls for enquiry into what he calls the 'missing masses', that the mass of non-human devices and objects that, he asserts, make up the 'dark matter' of society - unobservable using established sociological lenses, but theoretically necessary to the existence of human relationships and activities. He sometimes refers to these non-humans as lieutenants (from the French - holding the place of, or for, another):

> If in our societies, there are thousands of such lieutenants to which we have delegated competences, it means that what define our social relationships is, for the most part, silently prescribed back to us by non-humans. Knowledge, morality, craft, force, sociability, is not a property of humans but of humans accompanied by their retinue of delegated characters. Since each of these delegates ties together part of our social world, it means studying social relations without the non-humans is impossible. (Latour 1992)

He argues that the idea that society is made up only of human agents is as bizarre as the idea that technology is determined only by technological relations:

> Every time you want to know what a non-human does, simply imagine what other humans or other non-humans would have to do were this character not present. (Latour 1992)

He uses the example of doors and automatic door closers to illustrate these delegations. Asking us to imagine the effort it would take to get from one side of a wall to the other – entailing presumably the breaking of a large hole in the wall, and then bricking it up again afterwards. The simple technology of a hinged door is a delegate: it translates this hypothetic human effort into a much more efficient and convenient operation. The door-closer then acts as a delegate for, and translation of the effort of, the (unreliable) human user of the door. Different kinds of door-closer have delegated to them (or delegate to humans) different effects:

> The door-closer will attempt to close the door regardless of whether anyone is in the way or not. Door-users familiar with particular doors will be able to dodge or anticipate the closing door, whilst others may find the door slamming in their face. Thus, 'An unskilled non-human groom thus presupposes a skilled human user. It is always a trade-off. (Latour 1992)

Though there are significant overlaps in approach between ANT and social constructivism in that they both assert the fundamentally social nature of technology, the former would also argue that societies are fundamentally technological. The distinction between these two conceptual frameworks is also significant then: ANT claims both the agency of non-humans and, moreover, the *symmetry* of agency between humans and non-humans in any network.

> If human beings form a social network it is not because they interact with other human beings. It is because they interact with human beings and endless other materials too […] Machines, architectures, clothes, texts – all contribute to the patterning of the social. (Law 1992).

Indeed ANT claims that any firm conceptual distinction between the human and the non-human is untenable. Steve Woolgar, for example, critiques what he calls 'the object hypothesis' – that human and non-human entities are bounded and discrete from each other and from other entities and their environment (Woolgar 1991).

It is one of the strengths of ANT that it has proved to be productive across a wide range of social enquiry and in application to a wide range of objects of study: from weapons systems to the Paris metro, from scallop fishing to allergies. There is a challenge here then: how to draw on these theoretical resources to address the specificity of media technologies in general and of digital game play in particular?

DIGITAL GAMES & NON-HUMAN AGENCY

Cyborgs or circuits?

It has been argued that digital game play – given its centrality to the development and dissemination of popular computer hardware, software and cultural practices - is a privileged, even paradigmatic, instance of a popular, digital, technoculture (Turkle 1984, Lister et al 2003). In these terms digital game play is a vivid instantiation of Donna Haraway's figurative cyborg: an ambiguous and monstrous intimacy between the human and organic and the technological and inorganic (Haraway 1990). Digital games aestheticise this cyborg world, but they also *realise* it: this is an aesthetics of control and agency (or the loss of these) through immersive, embodied pleasures and anxieties; rather than (just) of dramatic scenarios and screen-presented action (Friedman 1999, Lahti 2003). The common experience of digital game play as characterised by moments of loss of distinction between game, software, machine and player, resonates with the ANT critique of the object hypothesis. Of the boundaries under threat, perhaps the most significant is that between subject and object – precisely the boundary that digital game play transgresses.

Yet this figurative cyborg is perhaps not the most productive model for understanding digital game play in technocultural terms. The cyborg tends to be figured as an augmented body, extended, armoured, with implants, etc. but still fundamentally a body – the 'object hypothesis' barely troubled. Focussing on the game player we might see some mileage in this – the bodily systems of nerves, senses and motor action extended into the prosthetic devices and environments of controllers, dancemats and virtual worlds. Yet if we look at the event of gameplay itself we might rethink the human – nonhuman relationship as one not of an extended cyborg body but of a cybernetic circuit: a flow of information between organic and inorganic nodes, the initiation of which cannot be identified in either the player or the machine:

> By definition, a circuit consists in a constancy of action and reaction. In gaming, for example, not only is there the photon-neurone-electron circuit […] there are also macroscopically physical components of that circuit, such as the motions of finger, mouse or stick. […] Through the tactile and visual interface with the machine, the entire body is determined to move by *being part of the circuit of the game*, being, as it were *in the loop*. (Lister et al 2003: 370)

There are resonances here with the actor-network and its rejection of the object-hypothesis in that it "shifts attention from the interactions between two discreet entities towards the cybernetic processes that, as it were, edit parts from each to create an indissociable circuit of informational-energetic exchange". (Lister et al 2003: 370)

Whilst this conceptualisation of gameplay is compelling and suggests new avenues of enquiry into the distinctive nature of 'immersive' play, it says little about the digital game as a game, as a new media form. I now want to shift the emphasis from the relationship between human and nonhuman to think through some ways in which digital games as software can themselves be seen as actors.

Emergence and intentionality

Some commentators have identified the sheer complexity of the operations of computer software as threatening to established notions of human agency. As Espen Aarseth points out:

> When a system is sufficiently complex, it will, by intention, fault, or coincidence, inevitably produce results that could not be predicted even by the system designer. (Aarseth 1997: 27).

His examples include computer viruses and the complexity of global trade networks. These cybernetic phenomena are, he argues, genuinely autonomous. The global financial market is autonomous

> since is cannot be controlled, shut down, or restructured by a single organization or even a country. Its machine-human borders are also unclear, since the interface could hide a human trader, a machine, or a cyborg, a combination of both. Such a system, even if it consisted purely of autonomous agents, is not a model or a representation of something else; it is itself, a cybernetic entity that communicates with all and answers to none. (Aarseth 1997: 28).

The notion of emergence has been addressed in game studies in the study of relatively 'open' games the complexity of which facilitates actions and play strategies not anticipated by the game's designers (Juul 2002, Giddings 2003). The concept will be returned to in this essay.

For now I want to address Aarseth's third example of cybernetic automata: the chess programme that beats its programmer. This device is central to an influential essay of 1971 in which Daniel Dennett explored philosophical issues arising from research into artificial intelligence. The essay makes important points both about machines as actors, and about a relationship between a human player and a digital game that is addressed neither by ANT or cybernetic models. Moreover it is telling that Dennett's example is a computer game.

His argument runs as follows: the strategies of a sophisticated chess computer are so complex that they cannot be predicted by a human player. Hence it is only possible to play chess with a chess computer by ascribing intentionality to the computer, by reacting to it as if it were an intelligent player:

> when one can no longer hope to beat the machine by utilizing one's knowledge of physics or programming to anticipate its responses, one may still be able to avoid defeat by treating the machine rather like an intelligent human opponent (Dennett 1971: 89).

This is the 'intentional stance', and Dennett distinguishes it from the 'design stance' in which a detailed knowledge of how the computer or program is designed would allow the designer (or user or player) to predict the system's response to any input or operation. In the case of chess, the design stance would entail the player knowing enough about the instructions coded into the game-as-program to definitively predict every move the computer would make (Dennett 1971: 87-8). Yet,

> on occasion a purely physical system can be so complex, and yet so organized, that we find it convenient, explanatory, pragmatically necessary for prediction, to treat it as if it had beliefs and desires and was rational (Dennett 1971: 91-2).

Dennett offers this concept as a practical, *pragmatic* way of understanding the operations and agency of complex systems that at once acknowledges the very palpable (and perhaps unavoidable) sense of engaging with a system as if it had desires and intentions, whilst rejecting idealist versions of anthropomorphism:

> The concept of an Intentional system is a relatively uncluttered and unmetaphysical notion, abstracted as it is from questions of the composition, constitution, consciousness, morality, or divinity of the entities falling under it. Thus, for example, it is much easier to decide whether a machine can be an Intentional system than it is to decide whether a machine can *really* think, or be conscious, or morally responsible (Dennett 1971: 100).

So this intentionality does not assume that complex systems have beliefs and desires in the way humans do, but that their behaviour can, indeed often must, be understood *as if* they did. Or perhaps, and Dennett hints at this, their 'beliefs' and 'desires' are not so much metaphorical as analogical.

This 'unmetaphysical' notion of the intentional system both resonates with Latour's nonhuman delegations and suggests ways in which we might theorise our material *and conceptual* engagement with complex computer-based media, sidestepping a whole range of largely unhelpful speculations on imminent realisation of actual machine consciousness. It suggests that the experience of playing with these game/machines be theorised as one of engagement with artificial intelligence without slipping into naive anthropomorphism or frenzied futurology.

I will now apply the issues raised so far to an analysis of the Nintendo GameBoy Advance game *Advance Wars 2* (2003). The game will be studied as a technological artefact, software constituted by various forms of agency.

ADVANCE WARS 2 AS SIMULATION AND ARTIFICIAL LIFE

Artificial Death: simulation in Wars World

Day by day the antagonists launch missile strikes, generate new troops, weaponry and vehicles from factories, sieze cities, calculate risks and trade insults. And yet it would be hard to generate a moral panic over the violence in this war simulation-game. The warfare itself is tactical in play and on defeat the units do not explode in the gibs of a fragged FPS avatar, but are rendered in generic animated sequences - gracefully sliding from the screen. The warriors are the Commanding Officers (COs): cartoon characters, a number of them apparently teen-aged, each with a set of characteristics, interests and moods familiar from the economical sketchings of personality traits of their television animation forebears.

The popularity and success of this game, *Advance Wars 2*, is due to the sophistication of its tactical and puzzle-based gameplay rather than the immersive cinematographic verisimilitude of other recent popular games. This is largely due to it being a GameBoy Advance game – it makes the most of the 2D graphics and the portability of this handheld console.

The basic dynamic of the gameplay is quite simple. The player commands an army against a computer-controlled enemy army on a battlefield – one of many maps in the game's presentation of itself as 'Wars World'. The armies are constituted by various units: infantry, artillery, different kinds of tanks, planes and ships. Most battles require the defence of a base and the capture of the enemy base and most have a particular puzzle-like element that must be solved for victory. It may take a number of attempts at a battle for example to realise that an airport must be seized and held for victory to be possible. Play proceeds on a turn-by-turn basis. This fundamental temporal structure defines this game genre: it is a turn-based strategy game (TBS) rather than the now more popular real-time strategy game (RTS). The RTS was made possible by increased computer processing power and developments in game software design, however the *Advance Wars* series exploits the more stylised pleasures of the more ‘primitive’ genre.

Each day / turn the player moves or refuels his or her units (according to their range of movement and the kinds of terrain they can traverse), generates new ones (funds and possession of factories permitting), and launches attacks on enemy units. Once all movement and attacks have been completed, the enemy (computer-controlled) CO takes its turn. At the end of this turn, the game-day ends and the cycle begins again. Game-battles can be over in four or five game-days, or can rage for game-months. Moreover, given the infinite iterability of both games (digital or otherwise) and software, any battle can be refought as often as desired. Or, given the progressive structure of the game, refought until victory finally allows the player to move on to the next battlefield and the next battle.

Though it may initially look on screen like animated cinematic or televisual representations of war, Wars World may be more productively conceptualised (along with many other computer applications) as ‘code’ rather than ‘text’; or more specifically as ‘simulation’ rather than ‘representation’.

Simulation, AI and automata

There are two very broad ways in which the term simulation is put to use in the analysis of new media. One is Jean Baudrillard’s identification of simulation as hyperreality (Baudrillard 1994). According to Baudrillard, simulacra are signs that can no longer be exchanged with ‘real’ elements, but only with other signs within a system. For Baudrillard reality under the conditions of post-modernism has become hyperreality, disappearing into a network of simulation. In postmodernist debates over the past few decades the nature of simulation over representation has been posited as of fundamental importance for questions of the future of human political and cultural agency.

The second is a more specific concern with simulation as a particular form of computer media (Woolley 1992, Lister et al 2003, Frasca 2001, Prensky 2004). The two concepts overlap however. Baudrillard’s simulation, though formulated before the rise of computer media to their current predominance and predicated on – crudely speaking – the electronic media and consumer culture, is now widely applied to the Internet, Virtual Reality and other new media forms. Discussions of the nature of computer simulations often also entail a consideration of the relationships (or lack of) between the computer simulation and the real world. Both make a distinction between ‘simulation’ (where a ‘reality’ is experienced that does not correspond to any actually existing thing), and ‘representation’ (or ‘mimesis’, the attempt at an accurate imitation or representation of some real thing that lies outside of the image or picture) – though often with very different implications and intentions. A simulation can be experienced as if it were real, even when no corresponding thing exists outside of the simulation itself. (Lister et al 2003: 390-1).

There is another facet of simulation of direct relevance to the study of technological agency. One root of the terms simulation and simulacra that is rarely picked up on in theories of media, games and cyberculture is the automaton. Automata in general then are ‘self-moving things’ (and historically this category has included animals and humans). Lister et al trace the concepts back to the classical differentiation (in the *Iliad*) within automata between the simulacrum and the automaton. Automata are devices that move by themselves, with simulacra as a subclass of self-moving devices that simulate other things (humans, ducks, etc.) (Lister et al 2003).

For the purposes of this paper I want to concentrate on simulation as software, with particular emphasis on software as, or mobilising, self-moving agents or automata. Artificial Intelligence (AI) is perhaps the most commonly understood instance of simulation as autonomous agent in digital games. In a game AI generally refers to the components of the program that respond most sensitively to the actions of the player. The term covers both the coding of the behaviour and responses of NPCs and the overall sense of the gameworld as a system that is responding convincingly to the player's engagement with it. In this sense the playing of such a game involves Dennett's intentional stance: the player ascribes intentionality ('intelligence') to the game and its entities. Michael Mateas (a theorist and a game-designer) has outlined the key aspects of what he calls 'expressive AI'. On the one hand firmly rooted in the discourses and technologies of computer science research, but on the other hand looking at the use of AI for non-scientific purposes, for interactive entertainment: 'expressive AI' in games 'covers a diverse collection of programming and design practices including pathfinding, neural-networks, models of emotion and social situations, finite-state machines, rule systems, decision-tree learning, and many other techniques' (Mateas 2003).

The enemy units in *Advance Wars 2* are artificially intelligent. For each map they have both an 'unintelligent' strategy (for example move towards the player's base to seize it, or to capture cities). Their tactics are artificially intelligent though: within the context of their overall motive, they will stop or divert to engage with the player's units. Importantly they respond to the contingencies of the player's units' positions and movements. The unerring mathematical basis of the enemy agents' AI facilitates *Intentionally* fiendish tactics: hanging back just out of the player's units' range so that they can move forward to make the first attack, calculating all the options and risks and bringing them all to play in a manner beyond most the capabilities of many human brains.

ALife and agency in digital games

Computer simulations based on Artificial Life (ALife) principles and algorithms have been widely used in computer-generated imagery in popular cinema. The Disney films *The Lion King* (1994) and *Mulan* (1998) both use 'flocking' routines in the generation of scenes containing a large number of moving characters; a stampede of wildebeest and the charge of an army respectively. Flocking programmes instruct each individual entity (originally 'boids', simulated birds in flight) to move autonomously, but only in relation to the general trajectory and proximity of neighbouring entities. Thus very simple instructions to move at random but without bumping into a neighbour result in highly complex yet patterned movement analagous to the actual flocking of birds.

Whilst these instances of ALife, once recorded and processed (hence artificially 'killed') as animated sequences, are presented as a flow of images like all cinema, new media such as digital games maintain these entities' animate existence. Disney harness complexity and emergence for the economics of spectacle, whereas games exploit them for what Aarseth calls 'unintentional sign behaviour':

> the possibility of unintentional sign behaviour makes cybernetic media creatively emergent and, therefore, not subsumable by the traditional communication theories (Aarseth 1997: 124).

Another example of the application to digital entertainment of the generation of complex systems, 'bottom up', from a simple set of rules (of particular relevance to *Advance Wars 2*) is that of cellular automata. This is most clearly illustrated in the famous *Game of Life* (John Conway 1970). The simple algorithms of this mathematical game - the simulation of cellular colonies (animated clusters of 0's on a monochrome screen), through generations of life and death according to the relationships between any particular 'cell' and its neighbours - spawned entrancing patterns of emergent order and entropy. This simulation of cell colony growth obeys a very simple set of algorithms:

> **For a space that is 'populated':**
> Each cell with one or no neighbors dies, as if by loneliness.
> Each cell with four or more neighbors dies, as if by overpopulation.
> Each cell with two or three neighbors survives.
>
> **For a space that is 'empty' or 'unpopulated'**
> Each cell with three neighbors becomes populated.

From these simple rules highly complex patterns can emerge. Some of which are of interest to the science of ALife, some are sought for in a more exploratory, non-instrumental, even ludic spirit. *Advance Wars 2* has a more complex set of rules, and its units are constituted by their own capabilities for movement and firepower, its grid squares are differentiated into simulations of various terrains. Its complexities emerge not only through the blind iterations of automatic cell generations but also through the actions of the human player guided, configured, by the demands of the game design as well as the simulacra. Yet as virtual worlds there are important similarities between *Advance Wars 2* and *Game of Life*. The battlefields of Wars World have the stylised flatness and iconicity of a board game, the 'units' (ambiguous hybrids of personnel and technology) are cellular in appearance and in their uniform scale. Whilst the automata of *Game of Life* are strictly binary (each square is only ever 'on' or 'off'), those of *Advance Wars 2* are constituted by a scale of aliveness (or health) depending on their initial strength and the ravages of battle. Both *Game of Life* cell and *Advance Wars 2* unit however are always entirely coexistent with the square of the grid-terrain on which they rest. Neither have even the flexibility of Snakes and Ladders counters, for instance, to share a square. Through 'movement' and proximity *Game of Life* cell cultures nurture new cells into life or abandon them to die; factory units in Wars World generate new units, existing units supply friendly units and destroy enemy units. Whatever agency these simulacra exert, it is unguided by any moral or epistemological purpose. Cellular automata don't care whether they facilitate scientific research or play.

The game is profoundly pragmatic about the nature of its automatic denizens, the 'cells' in game of life are the product (one of a multitude of possible representations) of an algorithmic process. If there is 'life' here it is to be found in the process and its emergent complexity, not in the blinking patterns on the screen. In *Advance Wars 2* we battle against not armies or an opposing general but against an intentional system that mobilises itself through a variety of soft actors – units, COs and artificially intelligent tactics. ALife in *Advance Wars 2*, then, can be regarded in a pragmatic manner similar to that with which Dennett regards 'consciousness' in the chess programme.

The technological agency exercised through digital gameplay here is literal and unmetaphysical, everyday and playful. Yet this very mundanity and ubiquity may suggest a technoculture more far-reaching and significant than that once promised by enthusiasts for the exclusive experiences of Virtual Reality and 'cyborg' prostheses.

CONCLUSION

Game studies has rightly devoted a great deal of attention to the specificity of the game as a cultural form. However the conceptualisation of digital games *as* digital, as simulations, as software and as technologies has been less consistently pursued. In this essay I have argued that games studies can learn from a range of existing theoretical frameworks and that digital games and gameplay are paradigmatic instances of an everyday, actual technoculture. Attention to the technological nature of digital games – and in particular the distributions and delegations of agency between technologies and players in the act of playing – at once offers new frameworks for the analysis of digital games and play and suggests broader questions for the study of the relationships between technologies, culture and humans.

REFERENCES

Aarseth, E. *Cybertext: perspectives on ergodic literature*, Baltimore: Johns Hopkins University Press, 1997

Akrich, Madeleine "Technology, theory and method: the de-scription of technological objects" in Bijker, W & Law J (eds) *Shaping Technology / Building Society: studies in sociotechnical change,* Boston Mass.: MIT Press, 1992

Baudrillard, J. *Simulation and Simulacra*, Michigan: University of Michigan Press, 1994

Dennett, D.C. "Intentional systems" *The Journal of Philosophy*, vol.68, no.4, (February 1971), 87-106

Du Gay et al. *Doing Cultural Studies: the story of the Sony Walkman*, London: Sage, 1997

Giddings, S. "Circuits: a video essay on virtual and actual play", *Level Up Digital Games Research Conference proceedings CDROM*, Utrecht: Faculty of Arts, Utrecht University, 2003

Frasca, G. "Simulation versus narrative: introduction to ludology", in Wolf & Perron (eds) *The Video Game Theory Reader*, London: Routledge, 2003

Friedman, Ted (1999) "Civilisation and its Discontents: Simulation, Subjectivity, and Space.", in G. Smith (ed.) *On a Silver Platter: CD-ROMs and the Promises of a New Technology,.* New York: New York University Press, 1999, pp.132-150

Giddings, S & Kennedy, H. "Digital Games as New Media", in Rutter & Bryce (eds) *Understanding Digital Games*, London: Sage, forthcoming

Haraway, D. "A Manifesto for Cyborgs: Science, Technology, and Socialist Feminism in the 1980s", in Linda J. Nicholson (ed.) *Feminism / Postmodernism*, London: Routledge, 1999

Juul, J. (2002) "The Open and the Closed: games of emergence and games of progression", in Frans Mäyrä (ed.): *Computer Game and Digital Cultures Conference Proceedings*. Tampere: Tampere University Press 2002. pp.323-329. Online at: http://www.jesperjuul.dk/text/openandtheclosed.html Accessed 15 April 2005

Kember, S. *Cyberfeminism and Artificial Life*, London: Routledge, 2003

Lahti, M. "As we become machines: corporealized pleasures in video games", in Wolf & Perron (eds) *The Video Game Theory Reader*, London: Routledge, 2003, pp.157-170

Latour, B. "Where are the missing masses? the sociology of a door", online at: http://www.ensmp.fr/~latour/articles/article/050.html , 1992. Accessed 14 March 2004

Law, J. (1992)"Notes on the Theory of the Actor-Network: ordering, strategy and heterogeneity", Centre for Science Studies and the Dept of Sociology, Lancaster. Online at: http://www.comp.lancaster.ac.uk/sociology/soc054jl.html accessed June 2002

Lister et al *New Media: a critical introduction*, London: Routledge, 2003

Mackay, H. *Consumption and Everyday Life*, London: Sage 1997

Mackenzie & Wajcman (eds) *The Social Shaping of Technology*, second edition, London: Open University Press, 1999
Mateas, M. “Expressive AI: games and artificial intelligence”, *Level Up Digital Games Research Conference* proceedings & CDROM, Utrecht: Faculty of Arts, Utrecht University, 1993
Prensky, M. *Digital Game-Based Learning*, McGraw-Hill, 2004
Turkle, S. *The Second Self: computers and the human spirit*, London: Granada, 1984
Woolgar, S. “Configuring the user: the case of usability trials”, in Law (ed.) *A Sociology of Monsters: essays on power and technology and domination*, London: Routledge, 1991, pp. 58-99
Woolley, B. *Virtual Worlds- a journey in hype and hyperreality*, Oxford: Blackwell, 1992