Soft Worlds: AI in play

(extracts from Seth Giddings 2014, *Gameworlds: virtual media and children's everyday play*, New York: Bloomsbury)

'I like my screwdrivers like I like my hedgehogs: sonic' (computer-generated joke)[i].

Alex watching Jo play the last boss battle in *Lego Star Wars* (21st May 2005):

> A: It's not fair… the computer never falls off does it?
>
> J: Of course not – it's the computer.
>
> A: The computer knows where it's going!

Videogames and virtual media are fully part of a popular children's media culture generated by commercial and public sector broadcasters and producers. They have found a place within domestic ecologies of media use, both displacing and merging with entertainment and communication media from television to telephony through mobile devices and Internet channels. They resonate with, and amplify, previously peripheral media modes and genres: from board games to game shows, from playground jokes and games to collecting and swapping cards and toys, from the topographies and quests of children's books to reality television. Imaginative and pleasurable engagement with characters, environments, stories, powers and abilities, conflicts and quests flows between the everyday consumption of books, television, films, children's play and toys, and videogames. These flows are now solicited in the transmedial circuits laid down by popular media and toy producers and commercial playful media universes are generated from them.

But they are also quite different. This [extract] will concentrate on another tangled line of descent, that of computer technology and media. The analysis of the videogame as a computer-based medium demands the description of a distinctly new set of domains and agents. The focus will be on the *computer* in computer games, on the nature and behaviors of software, on real-time procedural operation, on simulation, interactivity, and virtual environments. Games scholars have argued that videogames are characterized by an ‘aesthetics of control’ (Murray 1997, Klevjer 2001). Evidently videogames are “interactive” media objects and as such their players exercise some level of agency in the on-screen events. However the software that constitutes videogames needs its its own animate operations to be acknowledged in the dynamics of gameplay. Children and adults play with non-player characters (NPCs), artificial intelligence (AI), virtual physics and architecture, rules – but these artificial entities and processes are at play too. They respond but they also initiate, they have their own coded and autonomous behaviours. To understand the gameworlds of videogame play we need an ethology of artificial as well as human players.

Play with technology

The history of children’s play with technology is inseparable from both the emergence of a commercial children’s culture […]. In the nineteenth century both everyday and exciting new machines were scaled down to fit children’s hands: toys cars and guns, mechanical dolls, and the domestic fittings and architecture of dolls house. Educational toys and devices were popular, particularly those of scientific wonder and experimentation (optical toys such as zoetropes and kaleidoscopes) and engineering and construction. Some of these were intended for educational use, some purely for pleasure and entertainment, others, like the home computers that would eventually follow, were used for both. The early twentieth century saw the first fantastical and futuristic machines of spacecraft and future weaponry - particularly for boys (Chudacoff 2011).

This overlapping of the functional and the symbolic, the mundane and fantastical, the entertaining and the educational continues with everyday computer technology today, not least of course in the sophisticated toys that are the videogame console and software. Younger children in particular are targetted by the manufacturers of computerized toys and devices, some like simple laptops aim to educate, others like the simple responsive robots Furby and Tamagotchi of the mid to late 1990s take more traditional toys and add mechanical life to that imbued by the child. Smart phones and tablets may also be given to small children, and there is a growing market for visual and tactile apps for a pre-school market[ii].

The line between (hard) toy and (soft) digital game / character is not a clear one. The nurturing of a Tamagotchi was an ambiguous activity - was the egg-shaped object itself the toy creature, or did the creature live inside it, looking out from its screen? There have been many videogames since that used a similar game mechanic of attentive and repetitive feeding, exercising, etc., for instance *Pokémon*, *Nintendogs*, and *Moshi Monsters*. Interestingly, the human characters in *The Sims* are as much creatures to be nurtured in this regard as the cats and dogs of *The Sims Pets* expansion packs.

To date, a few particularly intense crazes notwithstanding, the virtual toys of videogames have proved more successful than their actual, physical cousins. A Furby was sold on its responsive AI, its ability to learn from and communicate with its owner, yet it and “smart” toys like it were often played with as more traditional inanimate cuddly toys - switched off and incorporated into free play (Goldstein 2011: 325). The semi-autonomous nature of NPCs in many games, and the bots (software robots) of massively multiplayer online games (MMOs) such as *World of Warcraft*[iii], is often at least as sophisticated as that of smart toys. Unlike smart toys whose behaviours and intelligence must stand up in comparison to the physical and social worlds in which they are situated, software characters often suggest a dynamic complexity beyond their often simple AI and repetitive algorithmic actions. As artificial agents in the artificial and ludic environments of a videogame world, they are fully at home and set the terms of the interaction, the rules of the game.

So, the functioning of videogames is at once symbolic and technical. On the one hand, videogames are toys, popular media, performative events, animated with characters and scenarios derived from established popular screen media. On the other, the analysis of videogames as a computer-based medium demands the description of a special category of nonhumans, software entities and agents depicted as individual characters, as collectives, or as aspects of the virtual environment itself, but all acting with a certain degree of autonomy. For instance, to play a videogame is to play with, or against, artificial intelligence in the form of non-player characters and responsive simulated environments.

[…]

lively worlds

The computer-generated environment of a videogame in its entirety is an animated virtual playworld. By concentrating on the avatar we might miss too the active, agential nature of the gameworld, all generated by the same software engines, rendered with the same polygons and texture maps, ascribed behaviors and affordances. Players can manipulate a game's topography (*Super Monkey Ball*), or construct it (*The Sims*, *Little Big Planet*, *Minecraft*). In more abstract games there is no clear symbolic distinction between environment and characters (*Tetris*, *Minesweeper*). We have already explored something of the world of Sandy Bay, its ludically motivated landscape and physics. [T]o play a videogame is often to play with the whole gameworld as a system.

Gameworlds are virtual polities as well as virtual geographies: as Rachel and Katarina implicitly recognized, they simulate social and economic systems (Stevens et al 2008). The society and economy might be explicitly figured as a gameplay motive – in *The Sims*, *Zoo Tycoon*, *Animal Crossing*, or they may be similarly integral to the game mechanic but adopt a different frame of reference. To play any game that involves the accumulation of points, coins, rings and their expenditure for survival, items, power-ups and so on is to to be subject to a virtual economy in all but name.

Perhaps the most significant – but rarely studied – feature of videogame worlds as virtual media is the strange socialities they generate between players and artificial intelligence (AI) and non-player characters (NPCs). 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.

Generations of children have grown up playing with automata, software robots, whose behaviors are driven by the application of AI to entertainment. This "expressive AI" is about

> creating a sense of aliveness, the sense that there is an entity living within the computer that has its own life independently of the player and cares about how the player's actions impact this life (Mateas 2003).

In some applications of AI to playful media, such as smart toys or chatbots, the artifice is unavoidable and prompts ontological reflection on the nature of life and reality. Sherry Turkle's research with computer toys from the late 1970s illustrates this: she found that children playing with computers and interactive toys were also playing with their understanding of machines' agency and intentionality. An interactive toy that seemed to anticipate the child's moves or strategy would be angrily accused of cheating for instance. A nine year old girl with some experience of programming compared the vitalism of television and computers:

> 'The television set isn't alive. It doesn't make up its picture. It only passes it on.' A person, she explains, might have to tell a computer how to make a picture, but the picture doesn't exist in the world before the machine gets involved: 'The computer has to know how to do it. To make it up.' This reasoning leads her to a special kind of verdict for the computer: 'It's sort of alive.' (Turkle 1984, 41).

This *sort-of* life resonates with all the *sort-of* realities of play, games, and the virtual: in her instrumental engagement with heterogeneous entities in her world she has established a practical variegation of agency and autonomy, rather than the binary opposition of human subject and nonhuman objects (nature, technologies) that has structured Western thought since the Enlightenment (see Lister et al 2009, 277-280). The sense of aliveness or intelligence (or at least the sense of plausible behaviour and responses) of NPCs seems to require a much lower degree of sophistication or realism than that expected of chatbots, smart toys, and other more serious AI applications.

Within the stylized gameworld, and when put to playful ends, automata can seem perfectly acceptable in their animated artifice. An influential essay by the philosopher Daniel Dennett offers productive ways of thinking about the imaginative / pragmatic relationships between human and nonhuman players. Taking a chess computer as his example, his argument runs as follows: the strategies of a sophisticated chess machine are so complex that they cannot be predicted by a human player. Even the programmer couldn't say what sequences of moves it would make in a particular game. Hence it is only possible to play chess with a chess computer by ascribing *intentionality* to it, 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, 87-88). 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, 91-92).

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 naïve or 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. The intentional stance usefully sidesteps the speculative cul-de-sacs of arguments over machine consciousness and allows a concentration on what complex systems, in this case software, actually do: what behaviours they exhibit, what effects they have.

This 'unmetaphysical' notion of the intentional system both resonates with Latour's nonhuman delegations and suggests ways in which we might theorize our material *and conceptual* engagement with complex computer-based media. It might suggest why children interacting daily with artificial intelligences and autonomous agents in videogames do not seem to reflect so deeply on the ontology of their playmates as did the players with early computational toys observed by Sherry Turkle.

To give a simple example from a more recent computer game form, the player of a first-person shooter (FPS) such as the Call of Duty series, must respond to the behaviour of the enemy NPCs as intentional. These automata "want" to kill the player's avatar and avoid being killed themselves. Metaphysical reflections on the nature of machine intelligence are neither here nor there: in the gameplay moment the enemies move, target or evade as intelligently as their limited but effective range of behaviours requires.

Mateas cites the behaviour of the ghosts in *Pac-Man* as a foundational moment in the development of expressive AI. The ghosts do not simply hunt down the avatar as quickly as possible, which would be easy to program but would result in a very limited game. Rather, each ghost has its own simple coded behaviour. One chases Pac-Man directly, one is directed to a point immediately in front of Pac-Man, and so on. In addition they attack in waves, gradually attacking more often. Individually none of them is a particular threat, but the combination of simple behaviours generates a nonlinear and dynamic ludic environment. The ghosts' AI must be both complex enough to deny the player a 'design stance' – the ability to predict their movement and so easily avoid them - yet controlled enough to facilitate an exciting game:

> This behavior must challenge the player without being impossibly difficult, and be unpredictable enough to make the ghosts feel alive and responsive to the player's activity (Mateas 2003),

It is not only individually figured characters that must be ascribed intentionality but also to 'intelligences operating behind the scenes' for example, the sense of the presence of the enemy commander – or even the game as system itself - through actions of troops in an RTS. In this case we are closer again to Dennett's chess machine; it is not the knights and pawns that are played against as an animate entity, but again the computer system itself as player, the one that makes the Lego Racers go.

From the uncomplicated but highly effective behaviors of PacMan's ghosts, the tactical behaviours of military units in *Advance Wars*, to the convoluted conversational exchanges of the citizens of *Animal Crossing*, everyday play is now populated with simulacra. The initiation, prediction, anticipation of--and reaction to—the behavior of software entities (called "intelligent agents" in less playful computer systems (Wise 2011)), are quasi-social and technical practices now fully embodied by young children.

If contemporary videogames appear to leave little space for immediate reflection on the life or intelligence of the game characters, this due in part, no doubt, to the intensity of attention and reaction demanded by action-driven games – there simply isn't the time. It may also be due in part, as suggested above, to the mediation of the NPCs through their unnatural ecology – i.e. they are more at home in the *sort-of* world of the game than entities such as Furby are in the actual world.

Regardless of whether children reflect on the virtual life in their play or not, as players they must - to play the game at all - adopt the Intentional stance and 'engage the machine intelligence as machine intelligence (rather than as a pretense to human intelligence signified by the avatar simulacrum of a human…) (Simon 2007, 168). The player must accept the automata as sort-of alive, credit their nonhuman behavior with a level of logic or intentionality entirely appropriate for the task in hand. Often this is simple enough in principle, if trickier in action - avoiding, again, the FPS enemies for instance. Sometimes the player must try to work out in more detail what the enemy might do, what its encoded behaviors are. In the more strategic FPS *Call of Duty 2*, Bart Simon points out, survival on the cinematically rendered D-Day landings relies on understanding and working with the behaviour of the computer-controlled comrades:

> It becomes clear after dying the umpteenth time that sussing out the mechanics of the coop AI is crucial; you must move as a group, you must wait for cover fire, you must protect your mates, etc… There is almost no dialog here, your comrades do not pretend to be able to hold a conversation in the trenches, instead there is what I call a 'conversation of actions' and the increasing recognition that you must keep 'face' with the AI in order to effectively play and make meaning of the game' (Simon 2007, 168).

Simon's account could be considered a playful, experimental, ethnography of a synthetic society, a society that is uncomplex and singular in its relationships, behaviours and goals, but still dynamic and reactive. Detailed description of it as a social group or event highlights the profoundly machinic strangeness that underlies the photorealistic imagery:

> In one epic scene you are a Russian private storming a German held railway station in Stalingrad. You begin the scene crawling through pipes on your own and drop down into a room full of comrades in a fire fight. There is a sense that they know what's up and you take a moment to get your bearings then you move and a group breaks off to follow you. Depending where and how fast you move your comrades will take up positions nearby. If you move too far too fast you are on your own. You cannot direct the troop with menu commands (you are not in control in that sense) rather you must in a sense spend some time learning the algorithms that govern the movements of your comrades. The action is meant to be cinematic and thus a re-mediated Spielberg experience [clearly capitalising on recent popularity of *Saving*

> *Private Ryan* and its visceral beach-landing scenes] passing itself off as realistic but that feeling is mitigated by the strange inhumanity of your comrades… they don't speak, they do not appear as individuals, there is an endless supply of them. And yet, they act. They act on behalf of an AI module just as your avatar acts on behalf of you. The AI is tracking you and modifying its avatars' actions and you must learn to track it. This mutual tuning is done through action in the game, a *conversation of actions*; and once you find the rhythm combat is a cinch and the feeling when combined with uplifting music is euphoric (Simon 2007, 168).

Simon compares software chat bots and their attempted simulation of human conversation - and the derision they receive - to the often very technically limited 'AI' of games (often simple dialog trees). The game structure, trajectory and abstractions facilitate an ease and naturalisation of conversation (and conversation of actions) - the nonhuman nature of these soft playmates is accepted as part of the flow through the synthetic, conventional, gameworld:

> Coop AI opens up the field of exploration in a way that Turing test driven competitive AI has all but shut down (Simon 2007, 169).

The *Animal Crossing* series of videogames for various Nintendo consoles illustrates beautifully this opening up of co-operative AI for play. It also invites reflections on the temporal or durational dimensions of virtual gameworlds. Though very different in appearance, pace and gameplay from an FPS, like the FPS the 'social' world as a ludic event is entirely bound up with speed and rhythm. As a resident of a small village populated by animals, the player must, over days, months, even years, build and maintain relationships through conversation, buying and selling items, and exchanging letters and gifts. Everyday interactions are rarely dramatic, often just a simple exchange of pleasantries. The player communicates through the selection of a question or response provided by the game as short lines of text. This minimal conversation may at times intervene in a signficant event in the game, or it may simply be – like so much actual everyday conversation – an affectual exchange, phatic communication to sustain relationships and 'community.' An example of the former is when an animal tells the player's character that they are thinking of leaving the town. The player is given two or three options in a simple dialog tree, generally a plea to stay and one or two degrees of indifference. The appeal to stay will generally result in the animal's pleased surprise that the player's character cares so much and an emphatic decision to remain in town. It is not clear whether the general, "shooting the breeze" chat has any instrumental role in maintaining the general happiness of the animals, but the game strongly suggests that it does, and it seems to feel like it to the player[iv].

virtual time

> Late December 2008, between Christmas and New Year, a liminal hiatus in the hard work of festivities. I'm waiting for a knee operation and can't walk far or drive so we are mainly stuck indoors. We spend much of our time in a series of virtual worlds.
>
> Alex, Jo and I are in the lounge. Alex is playing his 'file' on Jo's *Animal Crossing: let's go to the city* on the Wii, Jo is playing the latest Pokémon game on his DS, but helping Alex when needed. I'm intermittently playing *The Legend of Zelda: the phantom hourglass* on my own DS. The boys go off into the other room for their tea (I can't help their mother much, so she is the only one not playing). The *Animal Crossing* game is set to "pause." Its

> background music tinkles away quietly, an animated sheet of house symbols scrolls endlessly and impossibly smoothly in the flat background, whilst a ticker-tape message slides past horizontally, pointing out – to no-one – that connection with the wiimote has been lost. I'm stuck in a labyrinthine level of *phantom hourglass*, and because of knee, I cannot sit at a desk and check an online walkthrough on my laptop, so my gameworld too is paused, on 'powersave', animation suspended. Alex sticks his head round the door to check the clock on the mantelpiece. He has been invited to visit by Rod, one of the animals in his village, at 5.45. As the gameworld is synchronized with the actual time –virtual time ticks away even on pause - Alex doesn't need to check the game itself. He has time to finish his tea before restarting.

Gameworlds unfold in virtual time as well as space, and their temporalities find rhythms with through those of the mundane world just as virtual space interpenetrates everyday space. Game systems manipulate time in diverse and exotic ways to fit or drive gameplay. A game of football in FIFA 13 looks very much like the (televized) real thing but its 90 minutes duration- displayed on the screen - flies by as players choose its duration (between two and ten minutes for each half). A turn-based strategy game, such as *Advance Wars*, has infinite patience when it is the human player's turn to deploy military units, whereas a real-time strategy game has is impulsive temporality writ large in its name (see Juul 2004). Sonic the Hedgehog famously faced the player and scowled, tapping his feet, if not immediately driven through his loops and platforms; other games have time limits to levels, or NPCs that will act on the player's avatar if it does not act itself. Whilst early adventure games would remain completely inactive between moments of human input, later games – particularly simulation games – once started will blithely play themselves until further human input is received[v]. Time in *SimCity* or *The Sims* can be set to fast-forward as decisions in the modelling of economies and behaviors are tested in imaginary time. Most games can be paused, or frozen at a save point, to be reanimated later.

Animal Crossing's charm and gameplay are predicated on its simulation of real-time.

> Amelia (an eagle), asks Joey (Jo's avatar in *Animal Crossing: let's go to the city*) to take a present to Aurora (a penguin) by 3pm.
>
> Seth (checking my watch): You've got 20 minutes then.
>
> Jo: No, here it's 25 to…

The game is set to the internal clock of the videogame console, so – if the console clock is set correctly – night, day, seasons, festivals and birthdays are marked throughout. Alex was allowed one year to stay up until midnight on New Year's Eve to see the celebrations in his *Animal Crossing* town. He was barely awake when the virtual townhall clock finally struck twelve (about five minutes before the explosion of noise in the actual street outside, suggesting virtual and actual time were slightly out of sync). A small group of animals gathered before a "Happy New Year" banner, were addressed by the tortoise Mayor, and watched a firework display. It looked anti-climactic to me, but Alex went to bed satisfied he had attended a real event.

The clock and the world's temporality in *Animal Crossing* are completely integral. The clock isn't a measure of time, but virtual time's arrow itself, driving forward the events, economies and relationships, not just ticking along beside them. The game has some elaborate measures built into its fiction to avoid temporal paradox, manipulation, or collapse. For example, in the 3DS version, *Animal Crossing: new leaf*, the player can buy turnips once a week from a boar called Joan. These can then be sold at a profit later in the week (the player must check the turnip prices each day –

i.e. every actual day of the week - to determine the best time to sell). A player could quickly build up funds by repeatedly resetting the world's clock to effectively "fast forward" from Joan's arrival to the optimum market conditions. However the gameworld's artificial-natural laws foreclose this market manipulation and, as Joan explains, if the clock is changed, the turnips immediately rot and cannot be sold. *Animal Crossing's* temporality is integral to its social and economic systems too, which are in turn the basis of its gameplay:

> The game design intentionally draws on the passage of time to create both emotional resonance and economic value in the gameworld (Kelley 2007, 181-182).

The games is a virtual economy through which natural resources, commodities and affects flow. The player gathers natural resources for exchange for currency ("bells"): fruit, shells, insects, and fossils are shaken from trees, beach-combed, caught in a net, or dug out of the ground. Though the buying and selling of furniture, ornaments and natural resources in a series of little shops gives the impression of an economy of mercantile capitalism, it is in effect a simulation of pre-capitalist *symbolic exchange* in the anthropological sense. Rather than accumulation for its own sake, exchange here follows the logic of a gift economy (Mauss 2002 [1950], Baudrillard 1993). Animals ask a favour (to supply an apple or particular type of fish) and then reward the player with an object (an item of clothing, furniture or ornament), or they often respond to a visit or kind word from the player with a gift. Both pleasantries and objects flow between characters, cementing relationships and the virtual community. The bells accumulated by the player from these transactions are either fed back into the community through public works (park benches, bridges) or are spent on personal adornment or on enlarging and decorating the player's house, in an odd mix of municipal socialism and potlatch performativity.

The circulation of affect is not constrained to the virtual world. Happy animals - who often sing and dance when especially pleased - delighted Jo and Alex, for example when the boys had remembered a character's birthday (again in actual time, once a year) and visited its house with a present. Conversely, Jo once inadvertantly opened a present he had been asked by one character to deliver to another and was upset almost to tears by the donor's angry disapproval.

This is an economy primarily of affectual circulation then - gift-giving, deliveries, writing and posting letters, short pre-rendered and often surreal conversations with non-player characters - the collusional flow and circulation of virtual objects initiating and sustaining relationships (and actual-world emotions) through exchange and gifts, flattery, the coining of new nicknames or characteristic greetings, delivery of presents for others, the finding of lost items. And gifts are - the anthropologist Marcel Mauss would approve - always reciprocated.

[…]

---

[i] University of Edinburgh research project on unsupervized computer joke generation. "Natalie Haynes's Brave New Algo-World," BBC Radio 4, Wednesday 8th January 2014, http://www.bbc.co.uk/programmes/b03nt9vk

[ii] In their multimedia flexibility and ludic affordances, smart phones and mobile devices are toys for older children and adults too (see Lister et al 2009, 252-253).

[iii] Though probably not an issue for most WoW players in the age group covered by this book, there have been legal challenges by Blizzard, the game's designers, to the external production of software bots that automate key aspects of the game for players, such as resource-gathering and fighting. These are games that can play themselves. http://news.bbc.co.uk/1/hi/7314353.stm

[iv] the animation of toys, objects and environments seems intrinsic to the psychic dimensions of children's culture from the magical living objects of fairy stories and the animation of toys in play to game avatars and virtual pets. There must be a connection with D.W. Winnicott's theories of transitional objects, "which must seem to give warmth, or to move, or to have texture, or to do something that seems to show it has vitality or reality of its own" (Winnicott 1974: 7).

[v] or until the entropy that such games have designed into them (precisely to necessitate and prompt human input) brings about the crash of the simulated city, country or ants' nest in a virtual economic and/or environmental catastrophe