

## **Toying with the Singularity: AI, automata and imagination in play with robots and virtual pets**

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### **Abstract**

To grasp the emerging possibilities of new developments in the Internet of Toys, critical attention to the layered relationships of material technology and intangible imagination is needed. This chapter explores children's imaginative and playful engagement with toys that demonstrate AI or autonomous behaviour (here robots and virtual pets). It takes a workshop on the design of a new robotic gaming platform as a central case study. Close descriptive and analytical attention to moments of interaction with such toys is essential to fully grasp the complex relationships between global technological imaginaries – in this case of AI and artificial life - and the material and embodied workings of imagination in play.

### **Keywords**

Robots, AI, imaginative play, technological imaginary, computer games

### **Introduction**

Eight Year 5 children sit around a large table in a primary school classroom. Asked to draw and talk about their experience of and ideas about robots, they talk excitedly:

- It could be a household robot... a microwave here, and a washing machine there!
- Mine looks like a snail!
- I'm thinking of Droidius from Star Wars...

- Brian! The confused.com robot! [two of the children recite in unison the words of a recent TV advertisement for this price comparison website featuring a comic robot]
- None of the robots in adverts are proper robots.

The workshop leader picks up on this last statement. “So what’s a proper robot?”

- Uses proper technology, not just wires.
- You can program it!
- Brian’s probably just remote controlled.
- R2D2!
- Mine’s like a snail...

This chapter will explore the various and layered ways in which imagination and imaginative processes intersect with the development, promotion and everyday reception of and play with new playful technologies for children. As commodities and consumer technologies, smart, automated, networked and hybrid toys emerge from the commercial and technical systems and processes of design, manufacture and dissemination that foster the introduction of all new technological devices, their design shaped by imaginative processes that are inextricably industrial, technical, and cultural (Oudshoorn & Pinch, 2003; Balsamo, 2011). As consumer technologies, their reception is heralded by speculative and ideal visions of their future place in everyday lives presented in advertising, marketing and packaging, visions that aim to capture consumers’ imaginations (Boddy, 1999; du Gay et al, 1997). Theorists of technoculture paint broader canvases of global imaginaries, technological imaginaries, new ontologies of virtual, hybrid, cyborgian or posthuman near-futures of which individual artefacts, systems or relationships might be either evidence or symptoms (Allison, 2006; Flichy, 1999; Haraway, 1985).

Toys however are a distinctly ambiguous type of consumer technology, and they track ambivalent paths through these layered imaginaries. For my argument here, they are distinct among industrially-produced artefacts in their mobilisation of imaginative processes in three significant ways. Firstly, as industrially produced commodities and technologies toys are by and large not instrumental: they are designed *for* imagination, to foster imaginative play. Secondly, over centuries they have served as microcosmic models of social, cultural and technological orders and attitudes, or have been regarded as a kind of training or education of young imaginations in the skills and values of the adult world (from building blocks to toys soldiers and dolls houses) or the forces and phenomena of the natural world (optical toys, scientific toys). And thirdly, recent developments in the use of advanced networked, interactive, virtual and mechanical technologies in toy design add to longer-established commercialisation, franchising, and ‘mediatization’ of toys. From themed LEGO sets to transmedia systems such as Pokémon to videogames and children’s virtual worlds, global media corporations attempt to engineer and monetise imaginative play. This has led to the generation of intense popular and academic debate over whether we are seeing a withering of imaginative potential in children’s lives in the twenty-first century (e.g. Giddings, 2014b; Hjarvard, 2004; Kline, 1993; Wasko 2010).

In this chapter I will argue that to grasp the emerging possibilities of new developments in the Internet of Toys critical attention to these layered relationships of material technology and intangible imagination is needed. Moreover, taking toys that demonstrate AI or autonomous behaviour as a central example, I will argue that close descriptive and analytical attention to moments of interaction with such toys is essential to fully grasp the complex relationships between global technological imaginaries – in this case of AI and artificial life - and the material and embodied workings of imagination in play. Recent developments in robotic toys

are integral to the broader category of the Internet of Toys as on the one hand they are often designed with networked capabilities and social media connectivity. On the other hand, they exemplify significant facets of digital toy technology that can be found across the range of Internet of Toys objects and systems, including sensors, cameras, autonomous behaviour and AI, interaction algorithms, Augmented Reality, game platforms, and data storage. I include virtual pets (both physical and virtual) in this discussion, which further blurs the distinctions between categories of robot, ‘bot, game characters, game worlds and toys.

My aim then is to acknowledge the importance of the imaginary in the design, dissemination and adoption / adaption of playful technologies whilst arguing that this imaginary dimension needs to be anchored in the material and technical characteristics of the play objects and systems themselves and – importantly - in the embodied and imaginative playful relationships and events they engender. As Minna Ruckenstein notes, ‘toys are designed both materially and semiotically [...] the materiality of toys intertwines with prominent ideologies and narratives’ (Ruckenstein, 2010, p.501). It is only by describing the intimate and contingent relationships between particular toys and technologies and their playful use that we can both resist overly optimistic or dystopian predictions of the near future of children’s playful technoculture and explore the nature of play in that technoculture.

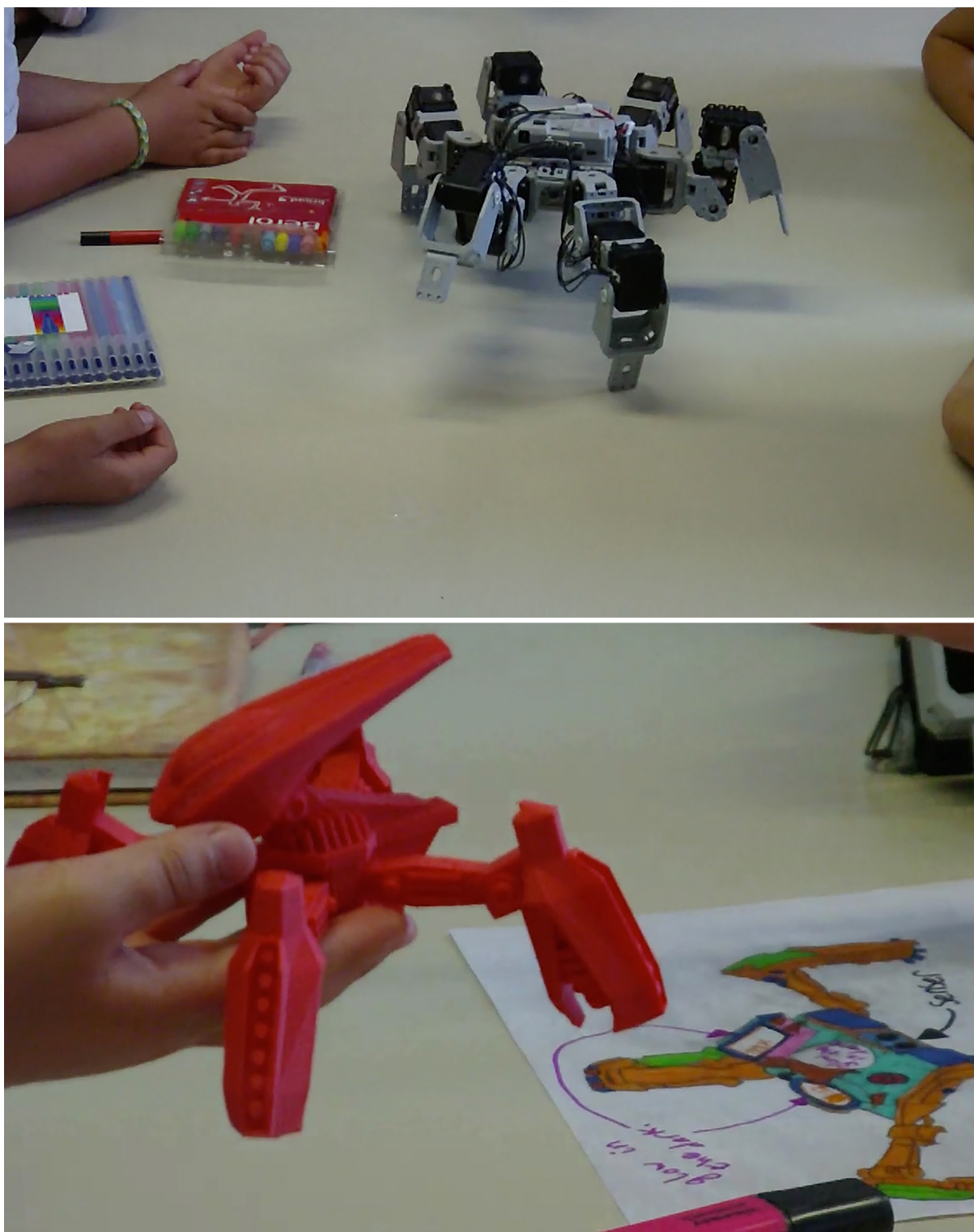
### **Introducing the robot**

The robot twitched, then jerked into life, its front legs rearing up threateningly something like a tarantula responding to a threat. Its servos whirred and the whole device clattered noisily against the melamine-topped table. With involuntary gasps and a collective ‘whoaaaa’ the children started back from the object in front of them

that had instantly transformed from a boxy and technical looking assemblage of grey plastic elements, joints and wires into an uncannily alive-like creature.

(fig.1)

There were two robots: the large grey animate one assembled from a proprietary robotic kit; and a smaller, palm-sized orange object. This smaller one was a 3D printed maquette produced to indicate the scale and eventual look of the toy under development. It had a distinct style and feel, an alien mix of arthropod and a military vehicle from a science fiction film (fig.1). However, strictly speaking, there were *no* robots in the classroom. The small orange object was inanimate, non-mechanical, with no smart digital capacity. The grey tarantula's movement was remote controlled by Silas, the robot toy project's lead designer, as yet it had no autonomous or sensing capabilities, aspects often taken as key elements of a robot (Winfield, 2012). There were however a set of material objects, intangible ideas and excited imagination that added up to a range of ideas – expressed through talk, drawing and play - about robots in general, robots past and present, fictional and actual robots, and a robot toy to come.



**Fig.1**

The children and virtual robot were gathered at a workshop run at an inner-city primary school in Bristol. The research was supported by a Prototype Funding award from the

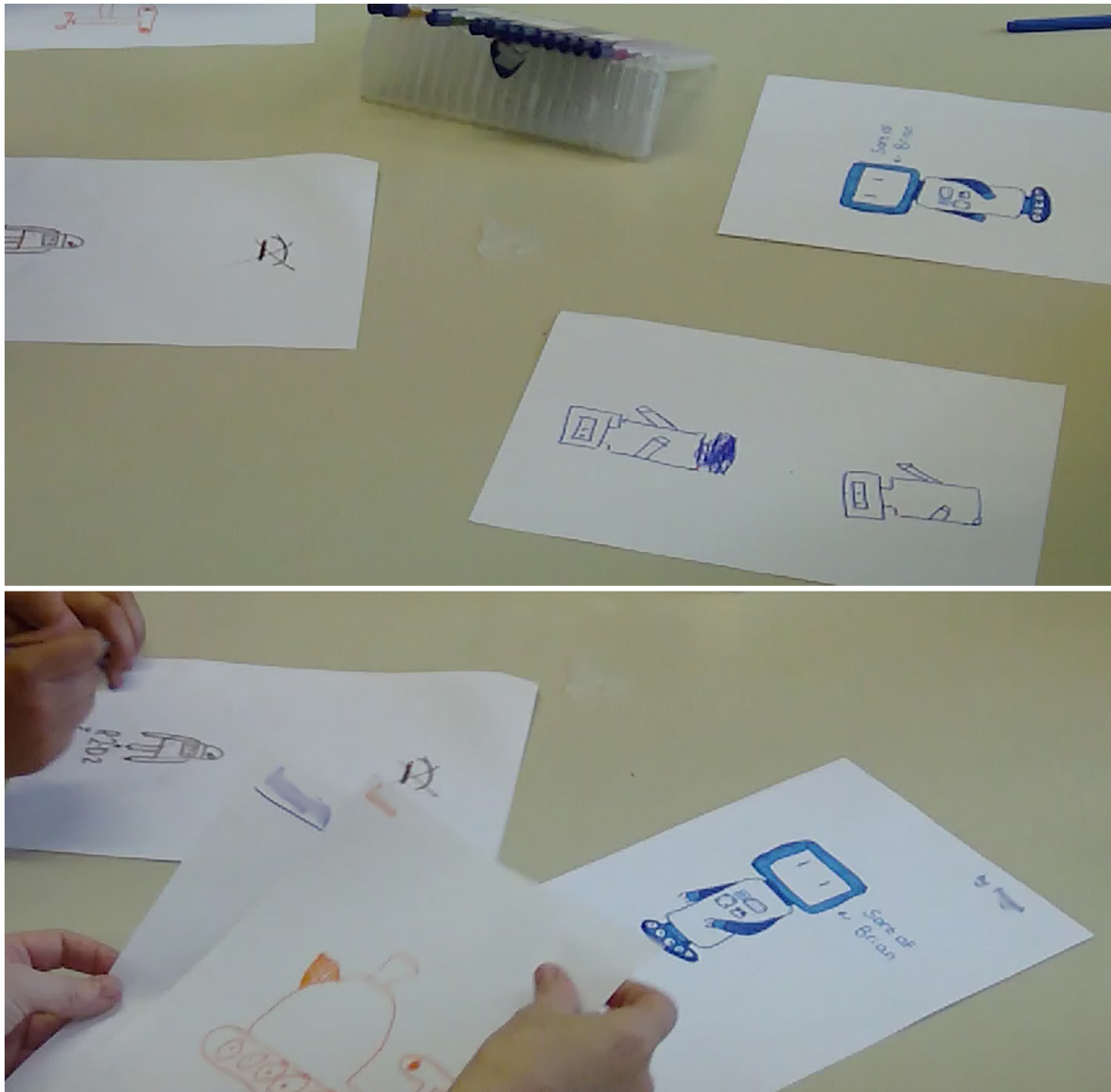
REACT, a Knowledge Exchange Hub for the Creative Economy funded by the Arts and Humanities Research Council (UK). The start-up robotics company Reach Robotics were developing a robot-based computer game platform, in which physical robots would be controlled by an app. This stage of the research looked to explore the balance between technology and user experience, focusing on the everyday and popular contexts of play with technology.

The discussion quoted at the start of this chapter demonstrates how, in just a few seconds of talk and play, children's ideas about new technologies can be seen to be woven together from popular cultural and media characters and narratives (here from advertising and popular film) and scientific and technical knowledge (the significance of programming and autonomous behaviour in robotics), and inflected by whatever playful and / or educational setting pertains at that moment. The workshop leader was supported by the robot toy's lead designer, with the author recording the event with video cameras and audio recorders. This video and audio material formed the basis of a microethnographic analysis, a thick description of the interactions between children's speech, gestures, drawings, prototype technologies and workshop environment (Giddings, 2009).

The workshop was structured into two main sections. Before revealing the prototype objects, we asked the children to talk about their experience and knowledge of robots. The resulting chatter was marked by a collective fascination with Brian, a comical robot from a series of TV advertisement for a price comparison website. Two children were able to recite the dialogue from one of these adverts in full and in unison. Disney / Pixar's Wall-E featured very briefly, and Star Wars was mentioned, but with little reference to the names, characters or characteristics of particular droids within the films, beyond a fleeting reference to

Droidius<sup>i</sup>. It was clear that the first associations that sprang to mind were from popular media culture and not actual robots, nor, interestingly, toy robots. One girl pointed out however that none of these were real robots, and that Brian was probably remote controlled. Others concurred, suggesting an understanding of some specific features of actual robotic technology, notably the distinction between remote control by a human operator and pre-programmed behaviours. Two of the children had recent experience of actual robots, at a popular science centre in Bristol. They had taken part in a workshop in which they programmed a robot to use sensors to distinguish between coloured balls. No further detail was offered at this point, but the notion of sensors – and these children's hands-on experience of them – was to inflect the children's imaginary future scenarios for the robot from then on.





**Fig. 2**

We asked the children to draw robots as we talked. Most of these imagined robots were boxy, with screens for faces, perhaps a mix of Wall-E and Brian (the simple graphic eyes of Wall-E and two had caterpillar tracks rather than legs, like Brian). One drawing was even labelled ‘sort of Brian’ (fig.2). Another however was more rocket-like in shape and inspired by R2D2, and one had a dome-like body above caterpillar tracks – its creator announced repeatedly, apparently no less surprised than everyone else, that it had turned out to be a snail robot.

There was no evidence at this point of anxieties prevalent in adult discourse on developments in robotics, in job-losses due to automation, to artificial intelligence and notions of robots ‘taking over’ or the ‘singularity’, the putative future point at which artificial intelligence exceeds the capacities of human intelligence and control. Nor, it seemed, had the children picked up on more benign developments and predictions for everyday robots such as vacuum cleaners or pets. It was clear that whatever these children’s understanding was of an everyday life of robotic interaction it was imagined primarily in terms of characters from popular media entertainment, and even then only those very recently experienced.

However, the children’s imaginative engagement with and exploration of the possibilities of a robotic toy shifted significantly once they had seen and played with the actual prototype. I will return to this, and its implications. First though it will be useful to open up the broader conceptual frameworks that articulate ideas of imagination, technological design, and lived experience.

### **The technological imaginary**

The role of imagination and the imaginary in the anticipation, design and reception of new technologies (both instrumental and for entertainment / consumption) has been explored across a number of disciplines concerned with technological development and consumer culture. Producers and marketers of new consumer devices spin what William Boddy called ‘instrumental fantasies’ of their future place in consumers’ lives, “an implicit fantasy scenario of its domestic consumption, a polemical ontology of it as a medium, and an ideological rationale for its social function” (Boddy, 1999, in Lister et al 2009, p.254). These are facets of what has been called the ‘technological imaginary’. The concept of the technological imaginary draws attention to the ways in which visions of emerging or speculative technologies are deployed to promise a better society, to overcome existing social, political or

environmental challenges. It “refers us to the way that new technologies are taken up within culture and are hooked into, or have projected onto them, its wider social and psychological desires and fears” (Lister et al, 2009, p.70), and “draws attention to the way that [...] dissatisfactions with social reality and desires for a better society are projected onto technologies as capable of delivering a potential realm of completeness” (Lister et al, 2009, p.67). Thus a technological imaginary might envision idealised, utopian visions, whereas a similar imaginary and symbolic operation drives anxious and dystopian predictions for current and emergent technologies.

### **The Tamagotchi imaginary**

Sherry Turkle’s pioneering work on children’s imaginative engagement with computer technology and media is key here. Her observations of children’s negotiation of ideas about life, consciousness and the animate in smart toys in the late 1970s and early 1980s remain pertinent for the study of Internet of Toys today. Importantly she documents children’s philosophical interpretation of the nature of the artificial intelligences with which they are playing. These are synthetic and machinic enough for the children to be clear they are not conversing or playing with an actual intelligence, but sophisticated and responsive enough to be regarded as acting ‘as-if’ they were intelligent. Children playing with interactive electronic toys such as Simon know they are not alive in the same way that the child or a pet is alive. But they are, as one nine year old girl said, ‘sort of alive’ (Turkle, 1984, p.41). In their degree of autonomous behaviour (asking questions, responding to answers, competing with the child in games) they are quite different to other toys, ones that are by and large imbued life and intelligence only by the imaginative and manual action of the child him or herself. In addition to the long-established as-if realities of play with toys, these toys and devices bring a new

degree of sort-of life, and to play with them is by necessity to respond to them as if they were alive, again in new ways.

Turkle's articulation of philosophical and psychological concepts of consciousness, human-machine relations and life with empirical observation of actual technological encounters produced a nuanced and sensitive model of the operations of imagination in digital technoculture. As smart toys, and virtual pets in particular, hit the toyshops and public consciousness in the late 1980s, they were met with a distinctly dystopian technological imaginary in both the popular press and academic cultural critique. They represented the "technological erosion of emotion" (Kritt, 1999). Others saw in the Tamagotchi craze

a metaphor of our times, representing the blurring of boundaries, between real reciprocal relationships and surrogate, one-way imaginary ones. It highlights the dominant role of technology in our lives; no longer simply a tool for use in science and industry, but now a substitute for human relationships (Bloch and Lemish, 1999, p.295).

Here a late twentieth-century technocultural imaginary of postmodernist illusion and ennui finds in Tamagotchi play a dangerous blurring of people and artefacts, subjects and objects, and a waning of loving and caring relationships in an era of disposability and artifice.

For Anne Allison, the Tamagotchi epitomises a (less pessimistic) 'global imaginary', a transnational cultural economy of Japanese hardware and media products, embraced by children around the world. For her the new intimacies between the human and (newly animate) nonhuman epitomised by the Tamagotchi are less catastrophic but no less revolutionary: they are driven by increasing virtuality and a concomitant "cyborgian fantasy" (Allison, 2006, p.164). The Tamagotchi's play with "the boundaries of the imaginary is symptomatic of the social reality we inhabit: one in which virtuality is becoming increasingly

integrated into everyday life and movement” (Allison, 2006, p.179). For Allison these toys are not the harbingers of an unsettling virtualised world, rather they are an imaginative palliative to it they “both reflect and shape an imagination that not only fits these postindustrial times but also helps kids adjust to a world where the border between the imaginary and the real is shifting so quickly” (Allison, 2006, p.179).

What neither of these commentaries do however is consider the ways in which these overarching sets of ideas about an imminent posthuman (children’s) technoculture actually drive or shape children’s imaginative play with technologically sophisticated toys – or indeed whether they do so at all. Importantly they don’t fully account for the very particular contexts of play, neither the often ironic, phantasmagorical inversions of imaginative play (evident throughout the examples here) nor the particular mechanisms of games themselves as technocultural phenomena. So, the Tamagotchi is presented and marketed as offering a loving and caring relationship, but close attention to play with smart toys, robots or virtual pets however reveals a more nuanced and complex interplay of affect, mechanics and instrumentalism, imagination augmented with patterns that are schematic, algorithmic, procedural (Apperley & Heber, 2015)<sup>ii</sup>. The child must learn which buttons to press in response to particular virtual events and prompts as much for ludic as affective purposes (to level up the character, gain rewards, expend points or virtual commodities, and so on). And of course, as with computer games this is implicitly and entirely understood by the child, that it is a software system as well as an imagined companion.

So, without attention to the technical characteristics, possibilities and limitations in moments of actual everyday play, and the nuanced and nonlinear set of relationships between ideas, imagination, technologies and media characters they generate, critical work on the Internet of

Toys runs the risk of perpetuating idealist assumptions. Indeed, from government policy to the home and classroom, this adult idealism can be a source of conflict or negotiation over values and anxieties. Minna Ruckenstein's ethnographic study of young children and Tamagotchi in Finland for instance emphasises the complex interrelationships between the material characteristics and capacities of technological toys and their cultural framing as articulated in children's play. She notes a small but significant battle between young girls and their teachers over a technological and affectual imaginary of official approval. The teachers were invested in ideas that cuddly, animal-shaped toys were socially and pedagogically far superior to digital games and battery-operated toys, actively intervening in discussions about toys to encourage 'bonding' with their preferred toys. As one girl showed both her Tamagotchi and cuddly dog to the class she was asked which was best. 'This one', she said, holding up the Tamagotchi, 'because it can be fed'. The teacher resisted, 'It is a bit cold, like a machine. Beautiful soft doggy: such a cute face' (Ruckenstein, 2010, p.506).

Jackie Marsh's observations of a three year old girl's play with her (app-augmented) Furby is an excellent example of the articulation of a meta-level technological imaginary with an ethnographic eye for the details and textures of the lived moment. She teases out what we might call micro-imaginaries – contingent on and spun into existence by the intersection of the material affordances of the toy and the fleeting images, dramas, gestures and concerns that characterise young children's imaginative play:

she always plays a number of times with the toilet feature of the app, in which Furby is encouraged to use the toilet, and then she flushes it by pressing the button in the app and creating clouds of air freshener around the toilet. At one point, Amy pretends that she has Furby's feces on her hands (Marsh, 2017).

Marsh notes that here ‘the AR technology of the app has promoted imaginative play that moves beyond the inorganic organized objects contained within the play. This shifts the imaginative play experience on to a different plane’ (Marsh, 2017). My interpretation of this is that whilst the app and toy play is no doubt predicated by an imaginative acceptance of artificial intelligence and autonomous behaviour, this dimension is not reflected on by Amy (as it was with Turkle’s informants). Rather it is taken for granted and the interactive and gamelike aspects of the app pull her into a much more hands-on engagement with virtual life - here hands-on in both actual and virtual terms, with even the latter having a distinctly tactile quality.

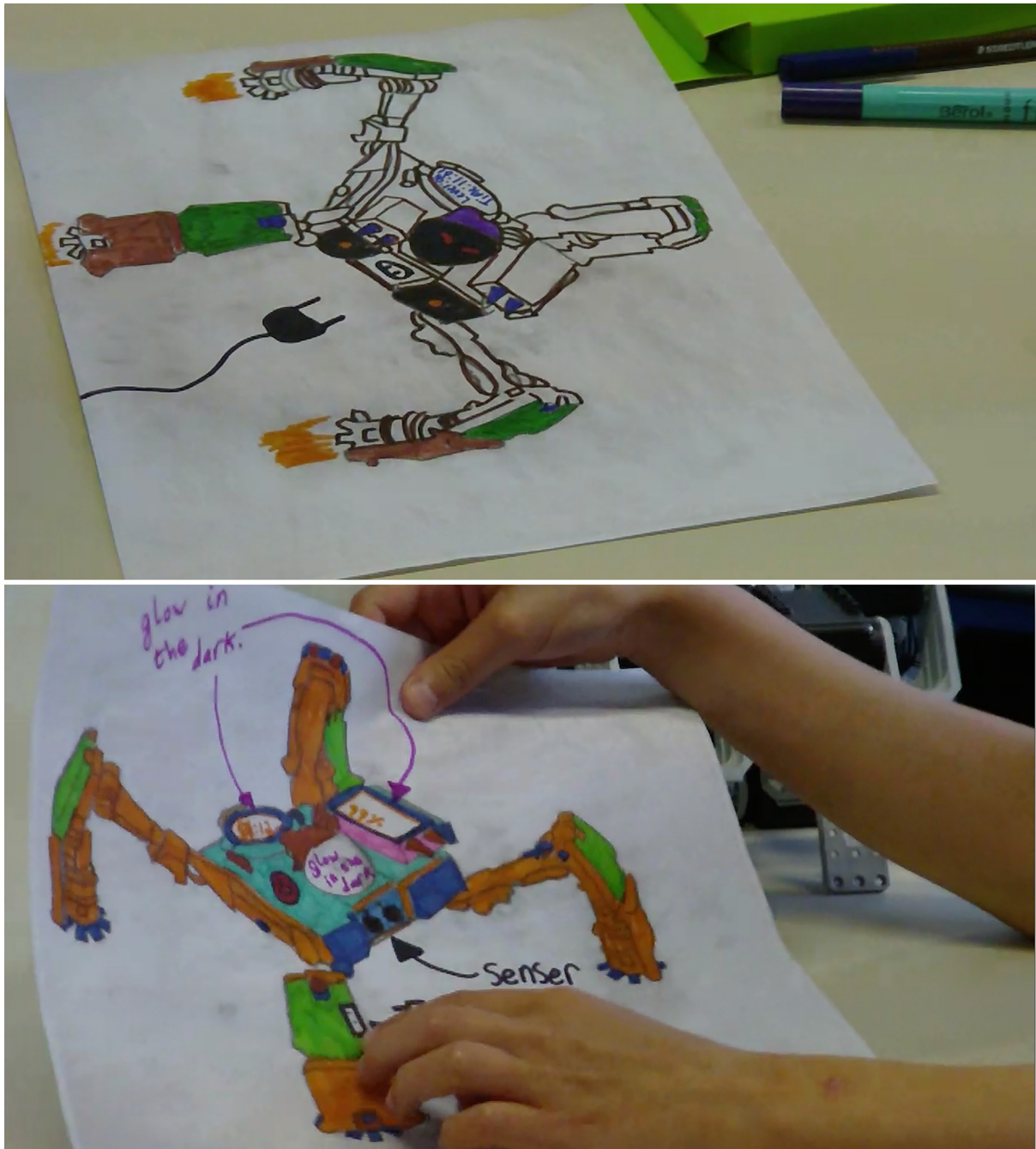
Marsh accounts for these tiny but vivid technocultural events through theories of posthumanism. In these terms, this encounter is as much a material instantiation of broader technocultural change as is an imaginary one. Citing Karen Barad’s notion of posthumanism an “ontological entanglement” of human and nonhuman entities, Marsh sees in the moment-by-moment contingencies of the co-constitution of Amy, the app and the Furby in play, a manifestation of this posthuman condition, a deep and complex mesh of domains (Marsh, 2017). In the micro-event above, the global strategies of Hasbro, the design and programming of a particular toy system and the playful, scatological and embodied imagination of a child collude in the simulation of a pungent dimension of (artificial) life. Thus, while Allison’s cyborgian fantasy projected a posthuman future from emergent popular technocultural products, here it is lived in the here-and-now, fully contemporaneous, everyday and generally unremarkable.

## **Revealing the robot**

This complex tangle of the material and the immaterial, the tangible and the intangible, the technical and the imaginary was evident too in our robot workshop. In the first half of the session then, the children's robotic imaginary was largely shaped by popular media, inflected with some scientific knowledge. It changed markedly once they had actually seen, touched, and controlled the 3D printed model and the animatronic prototype:

- Those look like lasers! [shooting noises] It could twist its head and kill you!
- I would build a Lego city and make it destroy it! It would be like Godzilla! It doesn't look nice and kind!
- If it was mine, I would make it walk first. Then I would make its front legs come [gestures it rearing up with her arms]
- [responding to a question about playing with friends with two robots] They could work together to destroy a city.
- Or battle together with their front legs! Ninja!
- If I had one on my own, I would make a park for it to go through, to follow and path and turn corners [one of the children who had been to the robot workshop].  
Sensors.
- If it was that size [points to the small 3D printed model] I'd make a spider costume for it to use to trick people – I'd send it into my sister's room.





**Fig. 3**

On the one hand, unsurprisingly, the children immediately began to imagine how the robot might be played with, what features might be added and what playful possibilities they might afford. As I watched the video back later it became evident that the children's imaginative engagement with the physical and moving robots was kinaesthetic and bodily expressive as well as simply cognitive or symbolic. As they excitedly invented possible scenarios and events for the future robots in their everyday play, they gestured – the dramatic motion of the

robot's front legs was performed, forearms held up with hands bent down at the wrist, moving rapidly up and down as a large spider or praying mantis might attack its prey. Once the children were familiar with the form and interactive movement of the proposed robot toy, we asked them again to draw as we talked. This time the drawing activity was framed as a design exercise and they were asked to work with photocopied outlines of the proposed robot – to suggest ways in which it could be coloured, patterned, and augmented as a physical object. Unsurprisingly the constraints and framing of the drawing activity drove a more precise and concrete set of ideas about what the toy might look like, what its capabilities might be, and what future playful events and scenarios it might bring about. Lights and power sources were drawn on, screens / faces added, and sensors incorporated. This second drawing activity and its attendant conversations were characterised by a mix of dramatic scenarios and technical practicalities. Here, a girl drawing yellow flames shooting from her robot's feet share ideas with the boy next to her:

- [quietly] Jetpacks
- Yeah! Jetpacks would be epic! On its feet.
- [both gesture and vocalise the sound and motion of a rocket-like take off]
- It could land on the sky!
- It could land on the ceiling!
- Oh yeah, a charger input
- A charger input should be in its bottom [they giggle conspiratorially]

(fig.3).

On the other hand though - and the sneaky spider costume hints at this - much of the conversation was shot through with a distinct unease about aspects of the proposed toy. The insect- or alien-like and combative-looking character of the design did not alarm them, but

something about its potential autonomous capabilities caught the collective imagination in ways both exciting and unsettling. This became particularly evident when Silas explained a key feature of the planned toy:

- (Silas) Something else about these robots that I forgot to tell you. If you leave them by themselves, they can just walk around and have fun by themselves. Is that a good thing or not?
- (All) No!
- If you go on holiday, it could move around and break things and then when you get back it could have gone, or gone outside and you can't find it.
- Or it could just be walking on a table and just fall off and break.
- It's creepy – if you're reading in a room and it comes up to you [laughs].
- I think it would be scary if you just left it at the end of your bed, in the middle of the night it was just crawling on top of you.

One girl imagined another nocturnal, near-nightmarish, scenario:

- If they were like at the bottom of your stairs and they somehow climbed up the stairs to your closed door and started banging on your door because they wanted to come in. They know it's the door to your bedroom, because they want that person to start playing with them.

Silas asked her if it would be better if it didn't crawl, but moved like a different animal

- No, I like it to crawl, but only when I want it to.

Surprised by these misgivings, Silas suggested adding a switch that would let the owner decide whether the robot can go off by itself or not. This was generally seen as a good idea. It also reminded one of the children about her experience with a Furby toy and there followed a number of rather implausible anecdotes about family travails with Furbys that wouldn't turn

off and would talk and sing in the night, or that needed to be put in a cupboard under the stairs because it woke up in the light.

- It just does its own stuff, and annoys you at night, so you couldn't get to sleep

One child compared another toy favourably with Furby:

- I have a toy called a Blue Nose Friend, a teddy. It doesn't move around but it talks and it's got a switch, so it doesn't just go off and talk by itself and be really annoying.

This collective anxiety about nonhuman intelligence and autonomous movement was generated not by a general dystopian technological imaginary of robot supremacy and AI singularity, but by the specific technical characteristics of the proposed toy and their imagined place and activity within the safety of the children's homes and bedrooms. The robot's material, mechanical, and behavioural aspects are inseparable from imaginative response and speculation: here the unsettling possibilities of an animate and autonomous creature were ameliorated with a set of ideas for technical solutions that reinstated a reassuring degree of control over the machine (see also Hilu, 2016)<sup>iii</sup>.

The anxiety about the toy's potential autonomy manifested itself more subtly as well, inflecting ostensibly practically-driven ideas about its design and possible behaviours. As noted earlier, two of the children had recently participated in a workshop in which they programmed a robot to sense and respond to its environment. Probably as a result of their explanations, sensors appeared as salient technical features in the drawings (fig.3). A grasp of robotic sensing also shaped a recurrent theme in the children's imagining of the robot's

movement in their domestic space. This began with one girl's answer to a question about how the children imagined they might play with the robot:

- If I had one on my own I would make a path for it to go through, to follow, and turn corners
- Like sensors!

After Silas had discussed the toy's worrying capacity for autonomy, the affordances of sensors seemed to inflect further less-nightmarish but still anxious scenarios. Early on, one of the children who had attended the programming workshop imagined the robot walking about on a table, its sensors maybe keeping it on the table or perhaps failing, resulting in the robot falling. This image of the robot falling off furniture appeared repeatedly thereafter, a mix perhaps of the underlying disquiet about artificial movement with more familiar worries about dropping and breaking delicate and expensive toys:

- It should be smart, really smart, but not too smart. Not smart enough to not jump off the table, then obviously if you put it on the table it could be your fault if it breaks because it's your responsibility.
- When it's walking around it could have sensors on it so that if there was a step it could sense the step and go off somewhere else
- [...]
- I'd like sensors... so if it was on a table it wouldn't just walk off the end. Even if you did try to control it off the edge it wouldn't do it.

So now the physical and behavioural capacities of the projected robotic toy were salient in a set of more or less anxious micro-imaginaries. These scenarios and designs were partly technical, practical speculations about the ways in which the robot might behave and behaviours it might be capable of depending on actual components, and partly a much more

detailed and collectively generated vision of how it might exist within and interact with their domestic space, family relationships, play, and dreams.

## **Conclusion**

Even after forty years of smart and interactive toys, videogames, virtual pets, and more recent developments in robotic and networked toys, it appears that concepts and dramas of artificial life and nonhuman autonomy persist in children's play with them. However, close ethnographic studies of children's play with toys and other consumer technologies have demonstrated that these ideas about life and nonhuman agency vary significantly according to the particular toy or system in play, the backgrounds, relationships and even recent TV viewing of the children playing. They warn against simply assuming playful behaviour from the instrumental fantasies of the toys' marketing and instruction, and challenge ideal (utopian or dystopian) imaginaries of virtuality, simulation, cyborgian or globalised subjectivity. But the broader technological imaginaries are no mere abstractions or illusions, they shape the design and reception of toys as technologies, facilitating and scaffolding certain kinds of play whilst never fully determining it. They mesh the material characteristics and operations of the technology, the culture and sociality of the play environment, and images and dramas from the children's media environment, and – not least – with the phantasmagorical imaginations of children themselves. Imagination and materiality interact and co-constitute with and across each other at global and extremely local intersections.

And play itself effects distinct cultural and technical environments and attitudes. A 'lusory attitude' to materials, spaces, objects and ideas is never far away in children's interactions and conversations. The ideal completeness of the toy's advertisement and packaging is rarely

if ever realised. In imaginative play anxieties and excitement blur and flip, agency and control is surrendered and inverted, subjects become willing objects and objects come to life.

## **Acknowledgements**

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<sup>i</sup> As far as I am aware there is no 'Droidius' in the Star Wars narrative universe. This could possibly be a conflation of the droideka robots and General Grievous.

<sup>ii</sup> This overlooks the long history of mechanical and clockwork toys for children, construction toys, the sophisticated engineering of pop up and interactive books that date back at least to the first commercial toy production in Germany in the late Eighteenth Century (see Opie, Opie, & Alderson, 1989).

<sup>iii</sup> There are issues here of the nature of 'animation' in play with toys. Children have always brought their toys to life, and a possible delegation of that control to nonhuman agency is clearly not necessarily seamless. Moreover there are echoes here of much longer imaginary about toys – children's stories and cinema are full of stories of toys that come to life, particularly at night, stories that can be both reassuring (a favourite toy as friend, from Starewicz's *The Mascot* (1933) to the Pixar / Disney *Toy Story* films) or unsettling and scary (the *Child's Play* films, *Pinocchio*).