INTERVIEW

Children and technology

Jon Sutton talks to **Nicola Yuill** (University of Sussex)

You head up the CHaT (Children and Technology) Lab – have I met a fellow technophile?
I'm actually completely useless with technology… I don't have an iPhone or an iPad, I'm a very low-tech person. But the whole point of the Lab is that the technology allows you to tweak the environment in particular ways, to alter behaviour. So it's like an experimental technique, it's just much easier than doing button boxes, those things that experimental psychologists typically do. When you've got technology you can make huge alterations to people's behaviour.

So it's a means to an end? If you're looking at social cognition and how children learn conversation, presumably they manage just fine without technology, so the technology isn't necessarily the most important part of what you're studying – it's just a way to do that.
Absolutely… I did my PhD on theory of mind, and then the whole idea was that you could focus on cognition and how it plays a role in social interaction. From the 80s that was a massively influential paradigm – let's look at social behaviour, but from a cognitive point of view. But even when I was doing my thesis, I always had this idea that you haven't really got it if you don't know how to use it. Wittgenstein said 'meaning is use' – the meaning of a word is how people use it. So in the same way, you haven't got theory of mind until you can apply it usefully.

I did this wonderful study on second order false beliefs with my supervisor Josef Perner, inspired by the Austrian highway code. I was a keen cyclist at the time, and the research was all about a car driver opening the car door in front of a cyclist… who's to blame for the accident? You have the theory of mind module, but there's no point in having it, if you can't use it. It's the social life aspect.

That's what my own research looked at, how that theory of mind was put to use in social situations.
And theory of mind was hugely productive as a theory, but in some ways it almost over-cognitivised behaviour. So a little while after my thesis I spent a couple of years working at the ethnography unit in Cambridge, sitting in the corner with a notebook watching children. It's taken me a while to realise how useful that was; it's made me more interested in actual behaviour and underlying mechanisms.

A simple example with technology is the interactive whiteboard. If children are working in a group, you can compare the collaboration when the whiteboard is vertical rather than horizontal. Their behaviour is completely different.

So if it's on the wall and the teacher is using it, or if you lay it out for the kids?
Yes, that completely changes your behaviour and that's because of our psychological attributes – how good we are with peripheral attention, how we communicate with each other through gestures and glances, how we know what the other person's doing. We've used multi-touch table tops to look at collaborative processes in children. You can make it so all can act at the same time or only one person can, and look at differences in how children behave at different ages. When you can only do things one at a time, there's then got to be some rule about who goes first which can cause problems for the younger children. Seven-year-olds are different to nine-year-olds, they had real trouble with that condition, because they spent all the time talking about how they were going to do the turn taking and arguing about it. So according to the children's own abilities they interact with the constraints and opportunities of the technology.

And that's the idea behind the 'Augmented Knight's Castle' I've seen?
Yes. This was the bit of Playmobil which a designer, Steve Hinske of ETH in Zurich, augmented and brought to a workshop we run on using technology to support collaboration. He said 'I've made this toy, the AKC, but I don't really know anything about children and I'd like someone to evaluate it'.

How's it augmented?
Under the base there's a load of gubbins, antennae, microprocessors those kinds of things… for me it's just magic! The figures have got little tag on the bottom, so when you put a figure somewhere in the castle the computer knows where the figure is and which figure it is, so it identifies itself, and what the figures say depends on where they are and maybe who they are with. So if the knight goes into the courtyard he can say 'let's watch the jousting', if one of the enemy knights comes to the dragon the dragon might roar, if the princess comes up he might not roar. When children play with it, we find some really quite strong and replicable affects that they play more cooperatively.

That's fascinating, because even though there's quite a lot of 'gubbins', what you're doing with that is actually quite simple. So if it's having those effects on play, it might be the kind of thing that classrooms could actually use. When you go into classrooms do you find the presence and the use of technology that your research suggests there should be?
Well that's a big question… one of the things that I find quite frustrating is that the work that we do in the Lab shows that technology supports social interaction. If you think about the picture that technology has, it's the lone adolescent in the cupboard. And people then say 'well, you've got all this social networking': but it's different, it's very virtual, where I think what we're interested in is co-presence, co-located collaboration.

Think about personal computers in the early days: schools never had enough money to have one for everybody, so something that has been designed for one

reading

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person to use has got two children sitting there, and they've got to have some division of labour. Even though technology is coming into schools – things like iPads, that I'm sure it would be wonderful if schools have them – if you look at what they are used for, it's very much a digital textbook, as personal devices.

What I feel very evangelical about is understanding the mechanisms whereby people collaborate. With the AKC, it's a simple way of adding context appropriate sounds to play, but it seems to work in a subtle way, in a snowballing way, to support social play. We've had it about four years now and we are still working out why it is that it makes the difference it does, how it alters children's attention. You don't have to teach a child how to play with an augmented toy, they just know. My PhD student Will Farr used the AKC with autistic children, and found effects on social play. Technology for children with autism is becoming a really big topic, we're running very fast to try to keep up.

Do you find that the rate of technological change meshes with the pace of academic life? Presumably by the time you have a grant to study a form of technology and its use, the technology has changed and it's yesterday's news?

It is interesting working with other disciplines. Like the ShareIT project with Yvonne Rogers at the UCL interaction centre… it is frightening how fast you have to do things. When the first iPad came out we were just towards the end of the grant, we got four iPads and did a study with them, which we really wanted to get out and it would be the first study on iPads. I collected the data in a day at the Brighton Science Festival, looking at how iPads could move away from being individual personal devices.

People hadn't really thought of taking the iPad, doing something and passing it on, using it in that collaborative way?

That's right. We also collected data at Brighton Central Library. I work with Dr Julie Coultas who runs 'Myths, Morphs and Memes' (tinyurl.com/mmmemes), which is all about the cultural evolution of knowledge, and how information gets transmitted and changed over generations. We had two-and-a-half-year-olds just coming in and using the iPads. So that's the other area where there's a speed of change. We're not digital natives. When I think of how I use technology, it's a world away from how a two-year-old might. I have had anecdotes from parents that their children are more familiar with touchscreen technology than paper.

But there has always been that sense that young people are more familiar with new technologies... my dad could never programme the video recorder! The way kids pick up an iPad these days is just an extension of that, because the technology is easier and there's more you can do with it.

Technologists will always tell you it's a step change, but maybe you can see a path there… I do think there's a difference in confidence. Technology will break and some eight-year-old will just come along and fix it.

Dr Nicola Yuill
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A lot of parents worry that their children spend too much time with technology. How does your research help parents ensure that children use technology in the right way?

My research has always been about technology that is co-located, to do with interaction. Technology doesn't have to be about time away from the real world. And technology has often been used for the teaching of social skills, directly. This goes back to what I was saying about behaviour. I've become converted to the idea that just looking at behaviour and environmental effects on behaviour is important. I've almost become a behaviourist! We've tried to tweak the environment to support one kind of behaviour over another. Rather than saying, for example, 'When you're talking to other people, you must make sure that you orient towards them and that you make eye contact at appropriate times', or 'This is a happy face, this is a sad face', we design an environment where collaboration occurs naturally, like the SCOSS software we developed. I'm not saying training isn't important, but there are other routes.

You can 'nudge' people in the right direction?

Yes. A lot of the technology we have developed is to do with scaffolding behaviour. Going back to that whole Piagetian thing, you've got two people who might not know the answer, but their interaction combined allows them to step up to a higher level of development. And the Vygotskian idea would be that a good scaffolder will provide just the right level of support, withdraw it when necessary. But we've found with some of the tasks that we've done, adults have different goals. Often if you're trying to get a child to succeed in a task you'll provide support for them to succeed. We're interested in the process of interaction. There might be times when you don't lead them to the answer, you're more concerned with how they've interacted with you to get to the answer. We'll be looking at software that supports peer–adult interaction in the way we've used it to support peer–peer interaction.

So there's quite a practical focus for the Lab?

For me, those questions are just not separate from theoretical questions. If you want to make a good intervention, you've got to understand the mechanics of the behaviour and how that relates to the environment, and you can only do that from a theoretical point of view.

The nice thing about working in an interdisciplinary environment is that I'm next door to Dave Leavens, who does work on attention, communication and gesture in primates. Primatologists are coming from this viewpoint of not over-attributing cognitive machinery, they will challenge you on every attribution you make… it's a very good sounding board, it makes you very precise about what you're attributing and what it is about the environment that's producing the behaviour you're interested in.

A constant flow of students with fresh ideas, branching out into different interdisciplinary areas...I can see why you've stayed here a while now!

It makes sense in retrospect, but I didn't plan it that way! I'm a heart person. I love the work I do; I end up boring people at social events because I talk about it so much. I never actually think about the strategic career path. As long as I've got the Lab and I can do the work I'm doing…