



Inventors' inbox

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By Mark Sheehan and Patrick Andrews



Our resident and far from infantile inventors, Mark Sheehan and Patrick Andrews, exchange emails on how to create educational and environmentally-friendly children's toys.

Patrick: I'm writing this in October, which means that the first civic decorations are appearing in the streets.

The toy business is highly focused on the whole 'Winterval' seasonal gift-giving process, but their product development activity never rests.

The ultimate toy would:

- suit girls and boys equally;
- appeal to adults as primary purchasers;
- be available in the shops or online at less than £30 (for a high-value toy);
- provide some educational effect;
- create enormous 'play value' via e.g. interactivity;
- expand or advance as the child grows up;
- be safe to use;
- allow easy storage;
- be recyclable;
- enable children of different ages to play simultaneously;
- develop intergenerational loyalty;
- benefit from peripheral products and community;
- support the many different kinds of play: boosting social skills, imagination, coordination and physical development.

Mark: In my book, you missed out a couple of important ones:

- robustly made, as there is nothing more annoying and frustrating – other than 'batteries not included' – for the kids, and parents, when a toy breaks five minutes into play;
- should be fun!

Patrick: Despite all these idealist criteria, I spent most of my growing up inhaling the fumes of plastic cement and paint while constructing models of war machines or collecting match heads as propellant for makeshift firearms (don't try this at home).

Many toy manufacturers seem to make the biggest profit from traditional games – basically, an anniversary upgrade to any cardboard-based board game will achieve approval at one of those strangely secretive toy fairs.

Mark: Yes, I know what you mean about children not playing the way we expect them to. We all know the story of the kid who throws away the toy in favour of its box, or is this just an old wife's tale?

I was the second youngest in a family of six, so hand-me-downs were part of the mix. A leg or wheel missing and teeth marks were quite common, although I did expect Father Christmas to be more careful.

On a personal note, I do hope that you have grown out of the glue-sniffing and gun-running phase, as school was a long time ago.

Patrick: It's Peter Pan syndrome, I reckon: all the lawyers I know accuse me of never wanting to grow up. They, however, have Captain Hook's disorder: always trying to run from that crocodile with the ticking clock of technology about to overtake them. So much for the panto season.

Faced by the task of inventing a great toy, I'm inclined to just write the word 'Lego' and stop right there. Let's face it, they have all the above boxes ticked, in addition to programmable robots, film characters and online gaming.

Mark: 'It's a brick!' OK, a cleverly promoted brick, I give you, but I never wanted to be a bricklayer (although a noble trade) as a kid.

I am now waiting for a thunderclap and a tug from the Lego police but, in my defence, I remember being disappointed that I never had enough pieces to make something good.

Patrick: I once made a Lego steam engine, with a square-section cylinder, but a side effect was a reduction in my stock of unmelted bricks.

Anyway, here's one idea for toys of the not-too-distant future: infinitoy. A company called Desktop Manufacture currently sell a 3D printer (or rapid manufacturing system) for \$5,000. In a couple of years, these machines will appear on high streets and people will send them plans for making pretty much any single-material items... including toys.

It's not too great a leap of the imagination that they will then rapidly become capable of creating internal wiring and sensors too. Maybe the costs will be low enough to have one in every home, mostly for the repair of household kit (using materials extracted from local junk), but vital in creating Junior's birthday present.

The difference will be that there will be much smaller toy boxes because when one plaything becomes boring (usually within a week or two) it can simply be remanufactured as something else – in fact, any toy in an effectively infinite catalogue.

Mark: Actually, I love the idea of kids making their own bespoke toys, that could really inspire them, but I cannot see a time in 'the not-too-distant future' where costs are still not prohibitive to all but the rich.

We should, in my opinion, focus on inventing a 'not-so-distant' mass market product, under your £30 spend.

Patrick: I was going to suggest, given all the processing power in handheld devices such as the iPhone, that inventing a universal dock/interface by which such machines could be dropped into a range of different electromechanical toys would be worth a shot – if people have forked out for some clever entertainment or communications hardware, it might as well get reused in infantertainment.

I recently saw that someone had taped some articulated legs onto his iPhone and got it waking quite successfully, but I'd really like to see one directing swarms of radio-controlled robots. Playgrounds will be filled with kids and bots playing together in the same games (football might be too demanding but 'cybertag' certainly would be possible).

Mark: Your perfect vision is very different from mine. Rather than 'cybertag', I see 'cyberflict' robot wars and punch-ups.

Patrick: If you aren't keen on that approach, then why not consider the virtual skipping rope? This would consist of two handles, each containing accelerometers of the type that can be found in the Nintendo Wii for example. There would be no actual rope but the handles could detect whether the correct motion was being performed – so important in view of the current childhood obesity epidemic. Anything less than the correct motion – handles beep, indicating a trip.

After a predetermined number of correct skips, the user could plug a USB connector on one handle into another entertainment machine to get some extra amusement. The interesting thing here is that only actually skipping will count towards the reward, it would be almost impossible to fool the system into believing, by e.g. swinging the handles about, that you had done your exercise.

Mark: These virtual exercise ideas, though seemingly popular, defy all rational logic to me. Why not just buy the real thing, a skipping rope? It's cheaper and you would not look like such a plonker while in use. Do we not need to encourage our detached and obese children out of the comfort of their own front rooms or bedrooms into the open air to interact with other 'ankle biters'... sorry, children?

Bearing in mind everything that we discussed, I think we need to invent a futuretoy where the kids build it themselves and two players, or more, are needed to play with it – ideally in an open space, like a park (a bit radical, I know).

My idea

Make a DIY-moulded 'Frisbee'-style disc, but with a difference, to help create a new generation of throwers and product designers. I want this bespoke flying disc to ascend as it rotates (with the help of the flip of the wrist, a more angled throw and subtle air catching 'vee' shaped fins), and descends as it slows down, but much more than with traditional flying discs. More complex throwing skills would be required, improving coordination, because, as well as directional, you have to judge distances (depth of field) and wind movement.

Looking back at the more recent developments of these flying discs, I can see an array of add-ons, from lights, 'glow-in-the-dark' plastic and even sound. There are, however, few build-your-own ideas out there.

Armed with this information, I want to supply all the ingredients needed to do the job using a moulding system in one multi-purpose vacuum-formed pack (the pack also acting as one part of the mould), and all for well under the £30 spend.

A combination of the vacuum-formed pack (serving as the top of a disc mould) and a similarly made completing disc mould base, will give our inner disc shape mould required.

Place a rolled-up sealed helium latex tube (to lighten the overall weight) into the main body area of the bottom mould and insert a thin wire ring (this small load will help keep the disc upright in flight) into the lowest point around the slightly hollowed outer disc side walls.

Pour in a viscous material (to be established, with the properties that when a catalyst is whisked in, it will create a light honeycomb effect, with a strong smooth outer skin, within four or five minutes), into the base mould, over the helium tube and wire, encasing them.

Add the mould top (ideally screw threaded onto the base). Pour the viscous material into the mould via a small hole in the top (this hole is surrounded by a small inbuilt circular straight-walled cup, to accommodate a plunger). Fill the mould and half the cup, now using a supplied plunger. Press the plunger down into the cup to compact the viscous material into the mould under pressure and wait five minutes.

Unscrew, and 'hey presto' you have got the flying 'bisc-it'.

OK, it not very high tech or 'blue sky', but you could add in-mould labelling and other things, like lights and sound. The kids are the designers now, so can experiment themselves.

Patrick: I like the idea of providing a toy which is cheap and flexible enough to allow experimentation. The dinner table, though, is one arena in which kids are discouraged from such activity... "Don't play with your food," we say – but why not?

How about a toy which encourages kids to eat a healthy variety of different foods by rewarding them with a little fun?

A train set is laid out on the dining table in a loop. Each young diner wears a simple throatmike which registers when they are eating.

Once everyone has munched for, say, between five and 20 seconds, the train moves to the next person and stops.

Since we are into silly names, I'd call it the 'chewchew'.

A search carried out by the British Library Research Service (www.bl.uk/research) on 'flying discs, using DIY moulds' revealed nothing, but on 'flying discs' alone there were many, here are six of them: Patents WO0197938, US6247989, US6468123, WO2005069813, US5816879 and US4143483, which can be viewed on Espacenet.

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