

Self-Powered Edutainment

This article introduces educational toys as one of the 100 innovations that shape "The Blue Economy". This article is part of a broad effort to stimulate entrepreneurship, competitiveness and employment.

The Market for Educational Toys

The world market for edutainment toys reached in 2010 \$5.5 billion, more than tripling in size in five years time. One quarter of all toys are sold in the USA. The educational games will continue to grow rapidly as the cost price for electronics continues to drop. However, the parents are driving the market with their clear demand to manufacturers to increase the educational value of toys and gadgets. Since 30 percent of the babies in the OECD are born to affluent mothers who set education as the number one priority for their children, sales will continue to expand for years to come. While this trend is strong across the board, the Asian parents excel in their commitment to lift the intelligence of their progeny, especially in nations like Korea, China and Vietnam. They follow Plato's wisdom, the Greek philosopher who wrote in his standard work *Laws*: *"We should learn to use children's games to channel their pleasures and desires towards activities in which they have to engage when they are adult"*.

Toy makers have expanded their product range and now target edutainment to babies as young as 9 months. Nintendo, Playstation and Xbox have first penetrated the market with simple games void of any education. Now, the providers of content to the hardware such as Electronic Arts Inc. (USA) are spending a billion dollars on product research and development entering the electronic educational toys which offers better margins than the average Disney or Pixar branded toy. Since working mothers spend more than double the time than working dads (48 vs 19 percent) to be a parent rather than to develop their professional career, they have the greatest influence on the content of learning and toys.

The most sold learning toy in modern history is Rubik's Cube, the 3-D mechanical puzzle invented in 1974 by the Hungarian sculptor and professor of architecture Erno Rubik. By the end of 2011 nearly 400 million "magic" cubes have been sold worldwide. The LEGO company offers colorful interlocking plastic bricks which can be assembled to construct vehicles, bridges and even robots. The toy concept was originally designed in 1932 by the Dane Ole Kirk Christiansen who produced wooden toys that play well (*leg godt* in Danish). Already in 1947, the company converted to plastics to facilitate the interlocking. The LEGO Group estimates that over 400 billion LEGO bricks have been sold over the first fifty years of existence. The company manufactures each year 360 million tiny rubber tires and thus could be considered the largest tyre maker in the world. That is just one percent of the 36 billion units crunched out annually, good for \$2.8 billion in sales in 2010. LEGO has since expanded to games, videos and even amusement parks.

The Innovation

Experts question the desirability of exposing children to learning at a very young age who still need to play. Some academia argue that a cardboard box, a puzzle and a set of wooden bricks would teach the children just as much as an application on the iPad. Then, there are video games which are offering educational content like SIM City in addition to being fun. Still, video games with edutainment remain a tiny segment of the market. One of the more innovative ideas is to turn toys edible for toddlers. Now that traditional education is increasingly permeated with electronics, and since children learn differently using computers and iPads, key question remains when and how could the children learn about the electronics?

Jordan McRae grew up as an inventor and is an avid diver. His dream is to innovate in the area of renewable energy, clean water and ocean conservation. He believes that the world is currently facing the most challenging problems in these three areas. He studied at MIT and is committed to find simple, sustainable and scalable solutions. He built up a network of designers and inventors from around the world who share his passion while moving fast on the learning curve through co-innovation with partners in diverse places like Hong Kong, Guatemala and France. He partnered with Shawn Frayne (Case 12) on the flutter technology -which is still under development- with the expectation that one day it could operate without any metals. He reflected on learning platforms for electronic systems that are solely powered by solar energy. He wished to create a tool that snaps together without wires or soldering. He envisioned a system that could be changed quickly by rotation. It seems like a blend between LEGO and Rubik's cube powered forever by the sun.

Jordan and his team came up with B-square, a strange brand name since it is a 3-D device. A more sophisticated name has been used as well: the Solarduino. It is based on (1) the Arduino-Square, an open source micro-computer that allows the development of computer software, and integrates a wide range of electronic hardware for prototyping, (2) a solar square producing energy with light, (3) a square with three white and color LEDs and (4) a battery square that stores the power. Each square has a magnetic contact in the corner that snaps together and transmits simultaneously electric signals and power. This facilitates fast assembly and adaptation by simply rotating the squares. These B-squares are equipped with micro-suction so that these can be fixed to a window or a wall. That was a great inspiration from the geckos who have been practicing the concept of adhesion without glue for millennia. The whole set-up is expandable and modular. This multifunctional approach, that creates a platform for learning by designing and doing open source using only available electronics, is a typical Blue Economy approach to innovation.

The First Cash Flow

Jordan and his team work fast. A first quick sketch set the project in motion in January 2011. It took three months to define how to integrate solar energy into a versatile, portable and simple toy for hobbyists, students and anyone else. A supervised test with 2 year olds quickly

demonstrated that it takes less than 10 minutes to figure out when and how the lights turn on and off, or change color. Whereas the ideas were great, the money supply was short. Jordan and Shawn turned to Kickstarter, a funding platform for creative projects and raised in 30 days from 1,110 backers a total of \$145,000 dollars, through the pre-sale of their invention. The interest was overwhelming and extra cash was now on hand, not from investors but from early starter clients. The team could take the time to perfect their proposal and improve. Getting started with a business whereby your first one thousand clients provide the first monies, eliminating the need for financing from banks or investors, implies that the inventors can carry the stick forward with great independence, while outperforming most start-ups on cash flow. If you are profitable day one, you not only have a great technology, but also changed the rules of the game of innovation.

The Opportunity

B-squares are intended to make everyone comfortable with the core of electronic gadgets, and be inspired to create their own devices based on the functions they image. The B-squares are not for the hackers who solder themselves, or the makers who have a certain comfort level with electronics. The B-squares provide plug-in solutions and add functions to existing off-the-shelve electronic products following one criteria - the game of creativity. These squares can quickly turn low voltage direct current (DC) devices into solar powered ones. All these DC instruments can be connected to LED lamps eliminating the need for transformers. Every phone, iPad and computer charger can be replaced by a series of squares, empowered with a motion sensor to switch the lights on, or a beep every time the window opens or closes. B-squares are not replacing anything, they are adding usefulness and allow everyone to infinitely customize their electronic devices. Therefore the market potential is infinite.

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... Further information on the 100 innovations at www.theblueeconomy.org.

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