

TOY STORY

STEM cells of education

Augmented reality and IoT-driven educational toys are helping children bone up on basic scientific concepts, reports **Romita Majumdar**

Ritam Ghosh's parents fondly remember their son taking apart every toy car, clock-wound toy animal, pen or even cycle chains to try and see how they worked. Back in the 1980s, this meant that his toys often had to be replaced. But the investment paid off as their son's skill with machines ensured that he got into a premier engineering institute after he finished school.

In 2019, Ghosh's seven-year-old son Ivan is having a very different sort of childhood. The boy never takes a crack at dismantling a toy — partly because toys are of better quality today and cannot easily be taken apart, but also because Ivan and his peers spend much more time playing games on tablets and smartphones rather than with physical toys. So much so that when the family experienced a wifi disruption last month, the boy

threw a fit because he had to go without his online games. That is when Ghosh realised that his child needed mentally engaging activities that can help him innovate on his own.

Child psychologists have been saying the same thing for a long time. They have

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pointed to the negative impact of letting children spend long hours on the internet where they get readymade answers to their queries rather than learning and experiencing knowledge as a rite of passage.

"The current generation of children are running between tuition, classes and school so when you leave them on their own in a playground, they don't know what to do," says Mona Gajre, professor of paediatrics at the Paediatric Neurodevelopment Centre, Mumbai. Gajre suggests a mix of structured and unstructured playtime for children

where they can innovate and create, going beyond just learning new skills.

To address this need, a number of products and technology startups are coming out with smart and fun learning options for children, especially in the science, technology, engineering and mathematics (STEM) fields. These educational toys and games help children understand basic concepts while improving their cognitive and analytical skills.

Take Smartivity, which has developed augmented reality (which combines computer-generated images with the real world to provide a composite view) and STEM-based educational toys. Co-founder Tushar Amin says that though all four founders of Smartivity were alumni of premier engineering institutes, they know that they made it because they managed to game the system.

"We crammed formulae and secured good marks. There was no practical understanding of the concepts involved. We aced gear-ratio problems in secondary school, but saw an actual gear

system only in our second year of engineering," says Amin.

Smartivity's toys, games and puzzles, which are based on augmented reality (AR) or Internet of things (IoT) technologies, help children develop an understanding of STEM concepts and encourage logical thinking. For example, once children finish colouring an AR drawing sheet, they can interact with their creations through the AR app. So if they have drawn an animal or a bird,



they can listen to their call, feed them or watch them fly. Smartivity's image processing and colour recognition technologies ensure that the picture they have coloured comes to life on their screen in 3D. The company has worked with leading multinational brands like Glaxo Smith-Kline (Junior Horlicks), Aviva, Hewlett-Packard, and AXIS Bank to develop and distribute its educational toys.

Others are making a similar effort to help kids learn STEM concepts in simple and fun-filled ways. "STEM education is the future. So we need to ensure that children are taught these subjects in a way that they understand," says Tarun Bhalla, founder and CEO of Avishkaar. Bhalla has set up more than 400 robotics and tinkering labs across the country after he left his job at Microsoft more than a decade ago.

Avishkaar's products, tailored to different age groups, help school children understand the concepts of different types of machines and robots and encourage them to build simple machines. For instance, a programming kit for 11-year plus children teaches them to use programming concepts like variables and constants and decision control structures like loops. All programming is done on their in-house OS platform called Avishkaar Maker Studio, built specifically for young users.