

Low-tech learning

In the second part of his article on the effects of screen technology on young children's brain development, **Dr Aric Sigman** suggests alternatives to ICT in early year's education.

Aside from securing a place in history, Galileo, Magellan, Freud and Einstein had one thing in common. Whether exploring and discovering the New World, another world, the lunar landscape or our inner landscape, each man became curious - and satisfied that curiosity culminating in astounding discoveries - without ICT. Even moonwalker Neil Armstrong never encountered a computer as a child, and when he did as an adult in the lunar module Eagle, it had less processing power than a mobile phone today. These explorers and discoverers had the most low-tech of childhoods and any tools or instruments they did ultimately use entered their lives at a much later stage. And the tools of their trade remained precisely that: tools to aid not supplant learning

themselves in response to his new environment. From infancy, billions of these brain cells intertwine into vast integrated networks that enable more and more sophisticated thought. By age 4 to 5 a child's fundamental cerebral architecture is complete and his "three pound universe" is an internal map that reflects the external world he's experienced. A child's brain is akin to a muscle that needs to be flexed. Coincidentally, physical exercise helps precisely the types of brain development needed to explore and discover: specific areas of cognitive function that are rooted in the frontal and prefrontal regions of the brain. Movement and exercise increase breathing and heart rate so that more blood flows to the brain, enhancing energy production and waste



PHOTO: IVERNA GARDENS MONTESSORI, LONDON

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years long before brain-imaging techniques were developed to demonstrate the superior neuro-cognitive benefits. These activities have stood the test of time and remain at the forefront of educational musts today.

should be those that children are naturally drawn to want to work with, with little or no encouragement from adults. And children should be allowed to check their own work in order to learn not to be afraid of making

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and enquiry. In fact Armstrong had a highly practical outdoors childhood and was very active in the Boy Scouts. As a child Darwin spent his time hands-on with nature, collecting specimens. And the only notable technology in Einstein's childhood was the violin he learned to play from age five. Technology may have developed apace but the way to cultivate our children's sense of wonderment and their ability to explore and discover hasn't changed a bit. Young children first need to familiarize themselves with the real world using and integrating all their senses before they can move on to outsourcing those processes through the virtual world of ICT, or those processes can be spoiled. The rapidly developing brain needs to be primed through experiences that place plenty of 'cognitive demands' on it. And real-life hands-on learning is hands-down the best method.

From birth, a child's 100 billion neurons are primed to organise

removal, cerebral blood vessels can grow. Merely walking can improve learning ability, concentration, memory and abstract reasoning - the higher mental processes and 'executive functions' that involve planning, organization, and the ability to mentally juggle different intellectual tasks at the same time.

In order to foster a child's curiosity and then arm that curiosity with the necessary cognitive skills, a young brain must be challenged to paint pictures with sound through listening to stories, imagine things with little help and just a few oblique subtle clues. Children need to hold, feel, rub, taste, see and move things to educate their neurological and cognitive infrastructure with a basic understanding of the real world. But this is nothing new. Montessori schools were incorporating the precise activities for optimum cognitive development into a child's early

Two elements of the Montessori curriculum in particular stand out as examples of what children should be doing during their early years: Practical Life and the Sensorial area. Sensorial exercise cultivates the child's careful observation and draws their attention to specific features that need similarities and contrasts to be identified through the use of all senses. The child's mind has to judge, compare, classify and draw conclusions. Practical and sensorial exercises arouse curiosity in children because they are difficult enough to represent a real and meaningful challenge. An understanding of basic math is cultivated in a similar way by using hands-on learning materials that make abstract concepts clear and concrete. This practical, sensorial approach allows children to experience how the world works in practice, to gain an understanding of materials and processes, and to make judgments about abstract concepts. The activities or 'toys'

mistakes and that few discoveries in life come easily, so that they can try again - i.e. explore and ultimately discover.

While ICT may serve as a powerful tool, it must be introduced and used judiciously at much later ages - ideally at least age 9 - or it can subvert the development of the cognitive skills and curiosity it was intended to foster and enhance. And so while early use of ICT may spoil these key aspects of a child's development, real world activities nourish our children's curiosity while naturally disciplining their methods of enquiry and preparing the next generation of great explorers and discoverers to claim their place in history.

Dr Aric Sigman, Fellow of the Royal Society of Medicine, Associate Fellow of the British Psychological Society and author of *Remotely Controlled* explores these issues further in the book *The Spoilt Generation*.