Learning to program

Children learn to read and write from around 4 or 5, yet it seems natural to engage them in books almost from birth. So, **when should we start** to engage children in the world of programming?

Answering this requires us to reflect on **what it means** to be able **to program.** Being able to write an established computer language? Or with a language tailored for children, such as Scratch or Logo? Indeed, there are toys such as floor robots, which children as young as three or four can 'program'. How much can / **should we simplify programming in this way**?

To ask these questions might reflect **too narrow a focus on the nature of learning to program**. If we **consider other subjects** such as science or mathematics, we can retrace the efforts to emphasise their more **social, affective aspects** rather than just skills; to **develop understanding**, not simply procedure; to **link children's experiences** to their everyday world. Might these approaches be relevant for computing education? Should we **aim to provide children with a desire to program** before we teach them how? **What age** could we start to engage children?

In fairness, programming tools for children often do try to create engaging experiences: instructing a robot's movements; creating animations. Yet, although developing skills allow children greater possibilities to create more personal, meaningful experiences, these tools reflect a relatively constrained window into learning, where progress is often step by step, and interaction is through a mouse or button presses. What if we could **immerse young children in a more compelling vision of learning** to program, one that enables quite **powerful effects from the start,** and lets children **see the relevance of what they are doing** to their everyday world.

Children are already immersed in a programmed world. Hand driers start when you place your hands underneath. Doors open when you approach. Video games respond when you simply place a toy on a base. Prices display when you place your food over a scanner. Streetlights come on when it is dark. Computing is ubiquitous and we are designing more and more ways for technology to respond to people's, children's, everyday actions. What if we could **give young children tools to both understand** this evolving world, and start thinking of how they could **make their mark**?

Computing Education is entering an exciting time, where curricula around the globe are keen to immerse children from as early as possible. Products offer to engage children pre-school. But have we really **learnt the lessons of almost 30 years ago**? Logo had a vision; we need to ask **what we are doing differently this time**. It is no good saying society has changed to a five year old.

Our Position

We believe that Programming, and computing more generally, in children's early years has one key goal – **to inspire children** (and **adults**). To let them **understand how we have given instructions** to tools around us so they can **help us**. To **think creatively with peers and the teacher** about how we could give new instructions to help us in new ways. Programming, like other STEM subjects such as Maths, gives children a frame with which to understand the world, solve problems, and create new ideas.

Designs in the classroom should be related to the world children live in, and enable all children to achieve something truly creative (novel and valuable). Perhaps like the programmers of today who learnt by hacking computer games, an educational goal should be to provide the context with which to inspire children to learn more.

Dr Andrew Manches

www.magiccloud.co.uk

Our approach

The problem with learning something step by step from the basics is you need to have faith that the end point will be worth it. That is hard for younger children, or most adults perhaps. Better is to provide something engaging and ways this can be easily adapted for great effect: **hacking** in a way. Learning tools need to **scaffold** the complexity of what can be hacked. Perhaps we could use the term *Scaffolded Hacking* to describe our approach.

The Magic Cloud

The Magic Cloud is a product we have **designed, built and now sell in the UK** that aims to embrace our position. The Magic Cloud enables children, in four simple steps, to **give the computer instructions for what media file to show when they place an object on the Magic Cloud** (with a bit of RFID magic). **A child as young as 4 years** can make a computer play a video of them when a friend places a clay model they have made on the Magic Cloud.

The **programming structure** of the Magic Cloud is as follows:

If I place _[any object]___ on the Magic Cloud, then show ___[any media file]_____
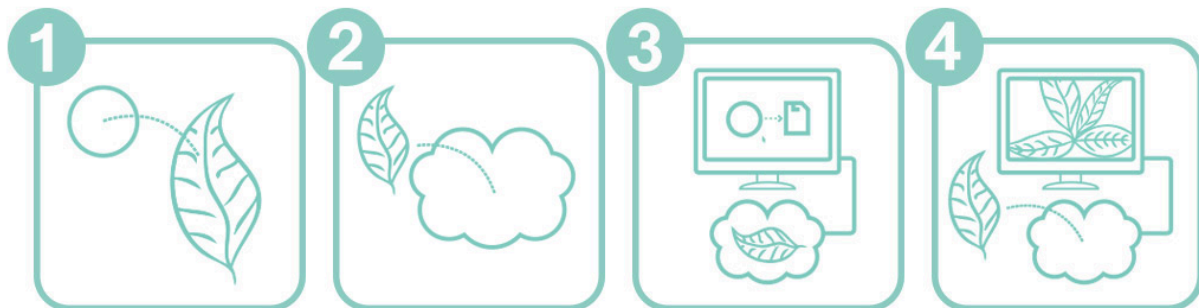
The Magic Cloud captures a **fundamental aspect of computing,** and by simplifying the programming, allows children and teachers to **focus on being creative** in the design and instructions. See our website for more information, computing curriculum links and examples: www.magiccloud.co.uk

At the risk of cliché, the **creative possibilities are endless**. With the Magic Cloud we wish to **inspire young children to do more**: to continue learning to program.

if I place my clay slug on the Magic Cloud

then show me describing what it does all day

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