Time to plug back in? The role of "unplugged" computing in primary schools
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Since ICT changed to Computing in the 2014 National Curriculum, lots of much needed advice has appeared for primary teachers about how they might teach computing. One of the more consistent messages in this advice seems to be the encouragement to try out "unplugged" activities – lessons or sequences of lessons that teach some aspect of the computing curriculum without actually using a computer. These range from completing simple worksheets or playing at being a robot to choreographing dances or solving logic problems with marbles and much more.

"Unplugged" computing activities have been around for a very long time. Some of the most interesting ones can be found on the csunplugged website (http://csunplugged.org) and have been used for over 20 years. The authors of these activities claim that they enable children to learn fundamental computer science concepts without confusing the ideas with a specific programming language. They also suggest that not using expensive computers makes their activities accessible for all. In the UK, the 1998 QCA Scheme of Work for IT contained many "Setting the Scene" activities that helped pupils to connect the work they did with a computer to alternatives without technology. One of these activities – a lesson that asked children to "program" each other as if they were robots and was suggested as suitable for year one children has recently appeared in computing lessons aimed at year six.

But there are some differences in how "unplugged" activities are conceived of and used. In the 1980 classic "Mindstorms", Seymour Papert explained how children could learn to program by making connections between the Logo turtle and their bodies (he called this body-syntonicity). He encouraged children to "play turtle" and physically act out the problems they were trying to solve on screen. Here the "unplugged" activity was not an alternative to using the computer but rather a way to better understand what was happening and to solve problems.

In contrast, some "unplugged" activities are more focussed on introducing and explaining concepts without providing a context in which these make sense. And often the obvious context in which to introduce these ideas is when children are creating their own programs. There are many examples of developmentally appropriate technologies that even very young children can use to create programs. Some of these have been used for a long time, for example, programming Bee-bots or Roamer, and on-screen software such as Roamer World to 2simple 2go. Others are newer: Scratch Jr requires iPads or Android tablets to work but allows Key Stage One children to create meaningful animations and games for each other to play.

It might be argued that the emphasis on "unplugged" activities reflects the rise of "computational thinking" as a key outcome of the curriculum. Computational thinking is the current big idea in computing education and it is used as a term for the critical thinking skills used when solving problems with computers. But as Kafai and Burke (2014) point out, programming is not only about individual thinking but is also about creativity, self-expression and social participation. These things are more easily achieved if we let the children plug back in and experience the power of using their computational thinking to actually do, make and share something.

There is definitely a place in primary computing lessons for children to step away from their computers or iPads and discuss ideas, compare problems and plans, and to explore key concepts. However, these ideas, concepts and problems should be rooted in authentic contexts and these can often arise from the act of tinkering with computer programs. Children will better learn how a computer follows a precise algorithm by finding out what Bee-bot does than by being told by their teacher to be the Bee-bot. On the other hand, even young children will find it helpful to 'play Bee-bot' in order to solve a problem that are stuck on.

There is a place for "unplugged" activities in primary computing lessons but we need to use them judiciously. We should try to ensure a closer relationship between unplugged activities and plugged-in ones and make sure that unplugged activities only make up a small proportion of the learning time available for teaching computing.