

Say NO to educating children as computer programmers

The Centre for Creative Education is very concerned about the Department of Basic Education's plans to introduce a curriculum that introduces **CODING** (computer programming) and **ROBOTICS** (computer operated mechanisms) as compulsory activities for young children, while putting more and more emphasis on learning through **ICT DEVICES**. As developers of teachers for Early Childhood and Primary Education, we regard these plans as dangerous for children's healthy development.



In the article below, our Academic Head describes the negative effects on children, should such plans become a reality.

Say NO to coding and robotics: Introduction



At the time of writing (2019) there is a tendency to think that exposing children to information technology at an early stage (primary school or even earlier) will increase the quality of their education and their ability to become citizens in a world much influenced by digital media. In the State of the Nation Address, the President mentioned the aim to equip all school children with tablets. Furthermore, the Department of Basic Education is planning to introduce a compulsory addition to the curriculum, in which children are trained for the basics of computer programming (coding) and robotics.

At first sight, it might seem logical to introduce gadgets and technological thinking earlier and earlier in schools, in a time when adult humans are becoming more and more connected to technology, but a closer look at how children develop shows that it is much more important for them to have a childhood in which they can learn to think and act freely and creatively, without being moulded into digital thought processes from an early age. The view that 'earlier is better' is therefore unfortunate. As this view might be driving the Department of Basic Education to unwise decisions, it is essential that we consider various aspects of the question, and to make a clear statement against the proposed intensification of ICT driven learning in primary schools.

Free development of a child's thinking, vs robotic thinking

Everyone knows that the earlier a child is exposed to impressions, the more impact these impressions will have on the child's development. In the same way that bad nutrition, at an early age, has long-term effects on physical development, and that traumatic experiences greatly affect the child's emotional well-being for many years to come, the ways in which a young child is guided in developing his/her thinking leave a distinct footprint in how he/she will think as an adult.



It is for this reason that we should educate children to learn to think as freely and creatively as possible, with an emphasis on human values. While we should develop the right and left hemispheres of the brain in a balanced way, the left brain is already over-emphasised in our lives today.

Training children from an early age to think as computer programmers, exclusively focussing on rigid, logical rules and principles, will be detrimental for the children's developing thinking skills. Parents and educators of young children can experience daily how their children still think in an explorative, imaginative way.

Only adolescents, during their secondary education, are learning to engage with fully logical and abstract thinking. This kind of thinking too early forces the children into loss of creativity, and a rigidifying of how they learn about their world, as if the world can just be explained in true and false statements.

Many scientists, inventors and IT innovators state that they contribute their own achievements to having grown up as creative and free thinkers, not to having been immersed in technological thinking from a young age.

Earlier ICT learning is neither better, nor useful



It is wishful thinking that surrounding children with gadgets and technology would improve their understanding of curriculum content (language, maths, etc.). Where technological gadgets have been introduced, they tend to cause a rather lazy attitude to learning, which is often confirmed by pupils' lowering of literacy and numeracy skills. Using a calculator tends to stop pupils' connection to a mathematical problem – they punch in some numbers and jot down the answer without being mathematically active.

Grammar and spelling skills go down the drain as soon as pupils expect the spelling checker to alert them of their mistakes.

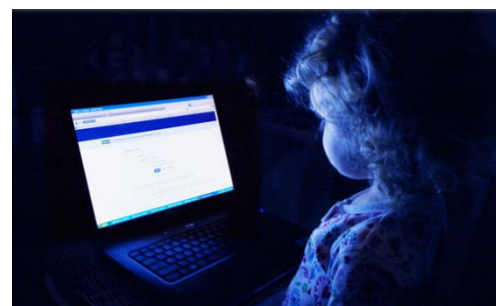
And while the learning of the regular curriculum content is more likely to suffer than to benefit from a technological approach, there is equally little reason to stand behind the other aim for pushing ICT skills into the early years of education: those who say that children had better be prepared early for becoming users of technology forget that in the years it takes for a primary school child to become a school leaver, the technology has already rushed ahead to such an extent, that the exposure during primary education is then hardly relevant any longer.

Those of us who spent high school time on coding in its early stages really wasted our time in those days, as none of those skills appeared to be relevant for becoming computer literate at the time we became professionals. It takes adolescents or young adults very little time to learn everything they need, so there is no rush to do this early in their education.

The thought that early coding and robotics are necessary to prepare future citizens is as illogical as training piano tuners to get more pianists. Everyone uses computers, as they are a very useful tool for an enormous range of modern-life applications. However, the particular skill of programming does not contribute significantly to people's abilities as future users of computers in their field of expertise, as all such areas (e.g. graphic design, architecture, video editing, etc.) have different modes of working.

Screen time at home and in school

Continuous warnings reach us about the increasing amount of screen time in children's lives. Already before cell phones became popular, paediatricians advised to limit the amount of time children spent watching television. More recently, very disturbing reports have described the effects of smart phones on children, as the hours spent by children using screens are rapidly increasing. Many organisations are promoting a reduction of screen time, as



the Campaign for a Commercial Free Childhood states it: Unplug to CONNECT, Unplug to LEARN, Unplug for HEALTH, Unplug and PLAY.

While many parents already struggle to let their children reduce screen time, the effect of schools introducing screens is clearly the opposite of what is needed: to let children grow up in real life, to learn real things and to really interact with each other.

Learning from a person, not from software or videos



Each teacher knows that his or her role in the process of children's learning is crucial. The interaction between a teacher and the children is a human encounter with essential qualities, which include interest, motivation, reviewing progress and being an example of an adult from whom the child may observe human values in action. Good teachers know how to inspire pupils, to activate them and to give them the challenge they need.

Learning from technological equipment soon turns into the opposite of the above. When a video replaces human interaction, people tend to become passive recipients. In educational software pupils are taken through learning activities that may intend to activate them, but in fact hold their attention superficially, merely asking for correct commands. As a result, all these technology-based learning moments are lacking the full-life experience that a teacher can achieve with pupils: namely that there are things that are worth learning, we practise them together and we become pleased with our achievements. In fact, the technology steers the children away from the teacher, as they become accustomed to passive 'infotainment' and find it more and more challenging to engage with the teacher afterwards.

Real activities, vs. virtual (un)reality

There is no comparison between a walk in nature and watching the same on a screen. There is no reality in the virtual world. Especially for children, it is essential to experience as much as possible of our real world, through playing, and later through meaningful interaction with the world, in making things and experiencing real phenomena, especially in nature. However, our digital world gives the false impression that we have connected to something, which was only a picture on a screen. This superficiality especially affects children, who can only develop a meaningful connection to their world on the basis of real experiences.



A highly questionable approach in the proposed curriculum



The Department of Basic Education appears to be working on a curriculum that will deliberately introduce coding (computer programming) and robotics into our children's education as early as Grade R. The draft document that is being circulated suggests that its writers are very much in favour of promoting technological interaction to very young children, without realising how inappropriate their approach is.

In the educational software described above, children will be subjected to often simplistic ideas from software developers without well-founded ideas about child-friendly materials. Instead of manipulating something that is real, the children will be drawn into a virtual world, with virtual tools based on programmatic thinking, which is not developmentally child-friendly.

The world view of the curriculum developers, described in the draft document, is particularly simplistic and unrealistic. The document states that medical doctors will lose their jobs because artificial intelligence is already able to diagnose medical problems 95% correctly – this makes one wonder whether the author would rather consult a robot instead of his/her GP.

Also teachers are expected to lose their employment. Apparently the authors have blind faith in their own skills in terms of teaching their children. Interestingly, the alternative schools in Silicon Valley (USA) cater for large numbers of children from high-tech IT professionals, who know how important it is for children to grow up and learn in a non-technological environment.

Say NO to enforcing coding and robotics and ICT-based learning on young children

This document has been written as a strong plea to stop ICT-based learning and lessons in coding and robotics in all primary schools.

High school students can easily learn how to use computers as a tool for gathering and processing information, but do not need to become computer programmers. Primary pupils learn better from their teachers than from technological gadgets, and the detrimental effect of programmatic thinking on children's developing brain makes compulsory coding an unwanted activity for our children that we must prevent from being introduced.



We urge the Department of Basic Education to turn away from the draft plans, as to avoid that the nation's children are subjected, compulsorily, to this highly questionable approach. We need to insist that South Africa lives up to its constitution, which allows Freedom of Education that enables parents and educators to make wise choices for the children in their care.

Further reading



Plans announced:

[12 April 2019 - DBE confirms coding plans](http://www.insideeducation.org/) from <http://www.insideeducation.org/>

The controversial draft document: [DBE Concept Document Digital Skills ver 8](#) (PDF, 2.8MB)

Article by Lowell Monke: [The Human Touch](#) (PDF, 300KB)

Keith Buzzell, 2015, The Children of Cyclops: The Influences of Television Viewing on the Developing Human Brain first edition 1998 published by AWSNA

Flyer [Healthy Kids in a Digital World](#) and webpage [Facing the Screen Dilemma](#) from commercialfreechildhood.org

The Telegraph Education (UK), 21 Feb 2019: Teaching children coding is a waste of time, OECD chief says <https://www.telegraph.co.uk/education/2019/02/21/teaching-children-coding-waste-time-oecd-chief-says/>

Joe Morgan, 6 Dec 2018: I'm a Developer. I Won't Teach My Kids to Code, and Neither Should You. <https://slate.com/human-interest/2018/12/against-teaching-kids-to-code-creativity-problem-solving.html>

KayCee Rossouw, 19 Nov 2018: Bill Gates and Steve Jobs raised their kids tech-free — and it should've been a red flag <https://www.algoafm.co.za/article/kaycee-rossouw/97837/bill-gates-and-steve-jobs-raised-their-kids-tech-free-and-it-shouldve-been-a-red-flag>

Science News for Students (Mary Bates), 5 June 2019: New risk from too much screen time <https://www.sciencenewsforstudents.org/article/new-health-risk-too-much-screentime-sitting>

About the author

Willem van der Velden, Academic Head of the Centre for Creative Education, is a keen computer programmer. He developed the online system used by all staff and students. He only learnt about computers from the age of 20 and is grateful for his non-digital childhood, in which there was time for reading, music and outdoor activities. His daughter of 13 easily finds her way on electronic devices, despite not using these at her school. Willem lectures a variety of subjects, including Maths and Music, and is passionate about developing teachers who have the interpersonal skills to help children with inspired learning and social wellbeing.



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