Coding For Fun or For the Future?

By Danit Gal

SYNOPSIS

As Singapore introduces new educational measures to promote technical literacy and competence among younger generations, it should at the same time carefully plan the technology-enabled future it intends to create. To this end, Singapore can take a more balanced approach.

COMMENTARY

ON 10 JULY 2019, S. Iswaran, Minister of Communications and Information, announced a new educational enrichment programme in support of Singapore's digital future, called Code For Fun (CFF). Led by the Infocomm Media Development Agency and Ministry of Education, CFF is a 10-hours long introductory coding course promoting computational thinking and problem-solving skills.

Coding (for) the Future

CFF's aim is to make coding more accessible and enjoyable for schoolchildren in the hopes that it will encourage their pursuit of further technical training, leading up to a career in the field. With this initiative, Singapore follows North American, European, and other Asia Pacific counterparts in introducing coding as part of its education syllabus. This global movement marks the importance of such educational initiatives for promoting technical literacy, confidence, and competence among younger generations.

Cultivating Hardware Talent

These efforts are expected to boost the technical capabilities of nations and support state-wide digitisation. Alongside the expected commendable outcomes, there are two additional factors we ought to keep in mind as we prepare for a digitised future: the

need to cultivate hardware talent, and how society prepares for an intelligently automated future.

CFF focuses on software programming. This stands to reason as software programming is an attractive field with quick payouts and significant scaling opportunities. However, developing hardware talent is also very important. Cultivating hardware talent is challenging, as it requires more time and resources.

But if there is anything we can learn from contemporary technology tensions in Asia, it is that hardware is essential because the lack of talent may create an over-dependency on other states which may bind a state in times of crisis.

For example, China is struggling to achieve technological indigenisation and independence and South Korea has difficulty in finding alternatives to Japanese chemicals. The hardware market is in fierce competition, affecting the entire technology supply chain.

Where Singapore Lags

Singapore lags in hardware development and relies on imports to power and sustain its digitisation ambitions. This places two limitations on Singapore's development:

Firstly, computing power and capabilities are expensive.

The more powerful and advanced software becomes the more computation it demands. This creates a costly structural Singaporean dependence on foreign imports that could limit the speed and quality of Singapore's planned digital growth;

Secondly, foreign hardware can also create costly, structural vulnerabilities for Singapore's digital ambitions. From simple errors to sophisticated hardware hacks, the base layer of Singapore's digital operations can get out of its control. This puts various facets of Singapore's Smart Nation ambitions (political, social, and economic) at odds as the country strives to initiate a safe, secure, beneficial, and powerful local digital revolution.

To moderate this risk, the CFF could be modified to spark early interest in both hardware and software development. Such introductory courses already exist. A Singaporean move towards increasing the scope of technologies introduced to children would be cost-efficient and strategic.

Even if Singapore chooses not to invest in developing indigenous hardware, understanding how hardware works is essential to both properly using and maintaining it.

Preparing (for) an Intelligently Automated Future

Focusing on basic coding and computational logic may promote occupational relief for the manpower shortage in the software industry in the short-term. There is a pressing need for more technical talent and world governments are doing well to prepare younger generations for surging demand. But in the long run, the intelligent automation

wave already upon us seeks to replace more intelligent physical and virtual menial tasks, including routine coding.

While coding will not be fully automated in the near future, instances of intelligently automated coding already show extremely promising results. Machine-learning-powered algorithms code more efficiently than humans and demonstrate surprising creativity in doing so.

In 2006, NASA used machine-learning-powered algorithms to create the enhanced 'evolved antenna' now in common use. In 2017, researchers at Google Brain created 'AutoML', which created another machine-learning-powered programme that proved superior to all of its human-made counterparts.

How CFF can be Better

Initiatives like the CFF can address these issues by introducing additional attributes not so easily picked up by intelligent machines. Out-of-the-box critical thinking, human-centricity, and an ethical-backbone are essential for a sustainable and beneficial technology-savvy workforce. In a looming future where machines code better and more creatively than humans, we must design technologies that complement rather than replace us.

The CFF initiative can be even better if it is expanded to teach hardware skills, critical thinking, human-centricity, and ethics. We can multiply children's hardware and software development possibilities to help them create robust technologies, and help them understand what technology can and cannot do.

This can inspire them to not only make more or better technology, but also make and use technology to better the world around them. Preparing our children for a digitised future is about more than how to make it, it is about how to make it a good one.

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