Four ways Canada can solve the technical talent shortage

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Ira Needles had an appointment that he wasn't going to miss 60 years ago. Something was on his mind, something grand and disruptive. His test audience was a meeting of the Kitchener-Waterloo Rotary Club on August 27, 1956.

Needles, the president of B.F. Goodrich Canada Ltd., issued a challenge to Canadian universities and industries: if Canada was to meet its ambitions to the end of the century, it needed to find another 150,000 engineers and technicians.

He spelled out the solution – the tight integration of classroom learning with on-the-job experience – in the Waterloo Plan, which became the blueprint for co-operative education at the founding of the University of Waterloo in 1957.

It's time to renew the challenge, with a different imperative.

In the mid-1950s, Canada needed engineers who could build machines, bridges and mines, pull oil out of the ground, and send satellites into space.

We still need those skills. But software is going to rule the 21st century.

Software will increasingly shape our lives in the analysis of the digital trails we leave doing seemingly ordinary things, such as using our smartphones and debit cards. It will get us to work safely in driverless vehicles.

The answers we need to deal with climate change and pandemics are as likely, if not more so, to be found in software-generated modelling than in test tubes and wind tunnels.

We need another 150,000 experts, all right. We need mathematicians and software and computer engineers to achieve remarkable social and environmental improvements by making sense of all that data.

So how do we come up with these people?

• **Bring coding classes to elementary school.** Our kids are learning to use computers, but few get the opportunity to learn their underlying language.

By making coding part of the core elementary curriculum, more students from a wider variety of backgrounds will be inspired to pursue careers in technology.

• **Expand co-op programs.** Sixty years after Ira Needles made his speech, the University of Waterloo is producing some of the most highly sought after technical talent in the world. UW's differentiator is its co-op program, which enables students to gain valuable work experience from companies ranging from startups to multinationals.

But entry averages for some STEM (science, technology, engineering and mathematics) programs are incredibly high. By saying to a student in high school: "Here's the bar to get into engineering. Don't do anything to screw it up," we're encouraging the wrong kind of behaviour if our goal is to produce more risk-taking innovators.

Let's provide the University of Waterloo with the support it needs to expand its co-op program, and create more programs like it across Canada.

• **Through gender equality and parity.** Women make up half the population in Canada, yet remain vastly underrepresented in some STEM fields. They account for about 23 per cent of Canada's engineering grads aged 25-34, and 30 per cent of graduates in the same age bracket with degrees in mathematics and computer science.

Grade-school programs that encourage girls to take an interest in mathematics, engineering and coding certainly help. But we have to go a step further and expose girls to career paths and female role models in these traditionally male-dominated fields. These examples are critical to increasing girls' sense of belonging and interest in the fields.

• **Through immigration.** Current iterations of the Temporary Foreign Worker and Express Entry programs create bottlenecks, slowing the flow of the specialized talent needed to help Canadian companies adopt new technology and boost productivity.

If we are to meet the federal government's stated ambition to turn Canada into a global innovation hub, we need faster, better processes to bring in the smartest people in the world. The delays only make Canada less competitive and force Canadian tech companies to build teams in other countries.

Let's establish a visa program, in which tech companies that need skills apply on behalf of candidates who have them. Then get approvals done in three weeks instead of several months, and advantageously tie the program to Canada's Express Entry system to help workers become permanent residents.

Ira Needles wondered whether Canada had enough engineers and technicians to exploit the resources of his era.

We should be asking the same questions about ours.