Inside Science

Computer science is playing a crucial role in fighting Covid-19, says **Muffy Calder**

It's sometimes hard to remember there was once a world where computers were not ubiquitous – where no pockets carried a smartphone, where no workplace had an intranet, where a message sent to the other side of the world could take months to arrive, and where working through the consequences of complex equations meant a lot of pencil and paper.

As a computing scientist, and head of the College of Science and Engineering at the University of Glasgow, I am taking a keen interest in the many ways the fruits of computer science are helping us live through the Covid-19 pandemic.

We are all aware of the contributions of the life sciences and epidemiology, but are we as aware of the transformative contributions of computing?

Many of us have found comfort by maintaining connections to friends and family through e-mail and video chats, for example with apps like Zoom and Skype. Group messaging apps have given us new ways to build and support communities. For example, my street has a WhatsApp group, which has been invaluable when parcels are delivered to the wrong address, or we want to plan for when we can next get together.

These, and other apps and the software services behind them, have enabled millions of us to work safely from home and children to participate in online classes – all vital to keeping the economy moving, maintaining social distancing and reducing infection transmission.

The services are underpinned by internet protocols, which were first laid down by computer scientists in the early 1970s, and more recent advances in cybersecurity and internet technology for reliable large-scale communication. The apps are visually appealing and easy to use because they incorporate years of research within the field of human computer interaction.

Epidemiologists have been able to model, predict and keep close track on infection rates because of new algorithms and advances in the power of computing hardware and software. It's easier and cheaper than ever to collect and store huge amounts of data on the variation and spread of disease, and never simpler to share data with colleagues around the world. Visualisation software has been essential, both for scientists to communicate with politicians, and for politicians and scientists to communicate with the general public – think "next slide please"!

Last but not least, computing has enabled internet shopping, from secure online transaction technology, to optimisation algorithms for logistics and home deliveries guided by GPS.

A hundred years ago, none of this technology was available to help manage the spread of a deadly influenza. Even 30 years ago, much of the computing infrastructure that has helped us cope with life and fight back against the disease simply didn't exist.

While there's still a long way to go before Covid-19 is under control, I am proud of my colleagues at the University of Glasgow who have been contributing to the underpinning research for many years, for example in human computer interaction, in algorithms and modelling, and computer communications. I am excited to be part of a field of science that has already done so much, and is set to do much more, to help us in these times.

Professor Dame Muffy Calder is Head of the College of Science and Engineering at the University of Glasgow.