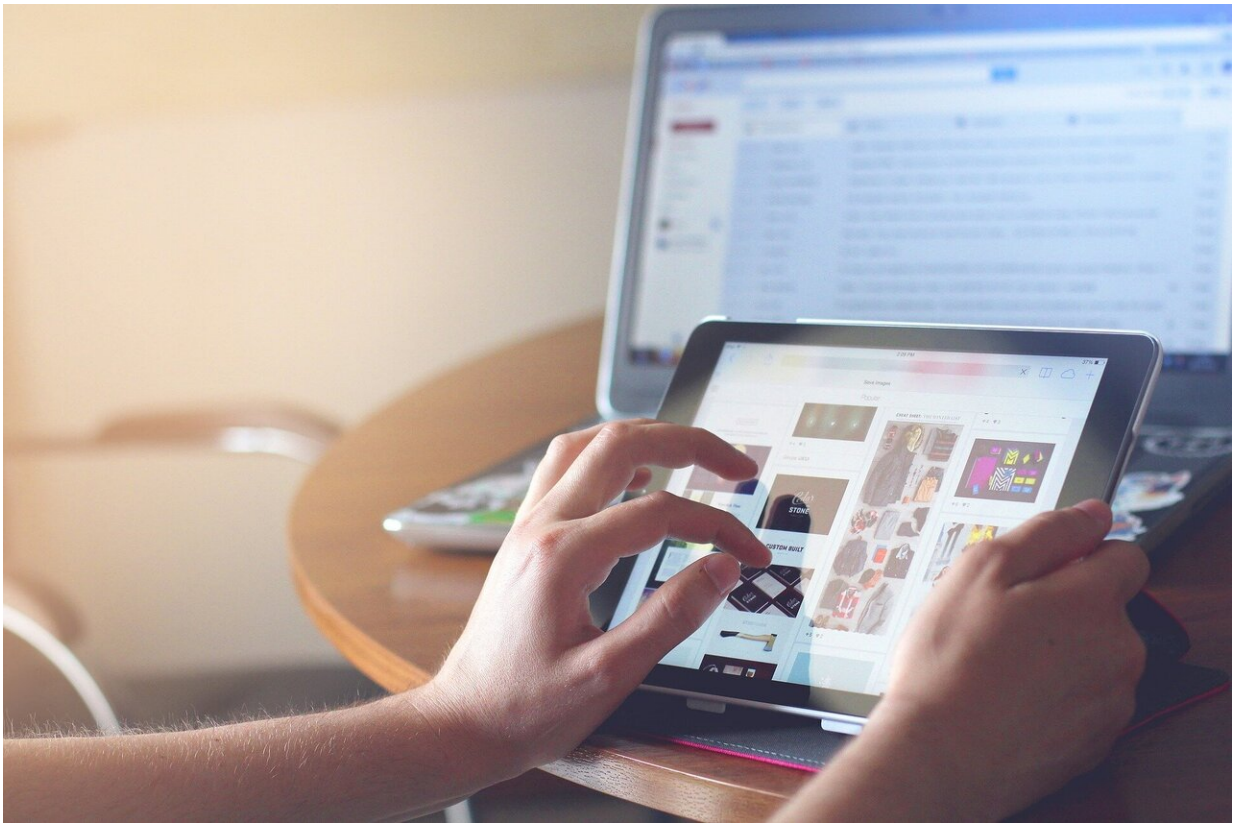


# Digital damage: Is your online life polluting the planet?

August 22 2022, by Fran Molloy

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Credit: CC0 Public Domain

Choosing digital meetings, shopping and even exercise classes over their in-person alternatives can substantially reduce greenhouse gas emissions by avoiding transport-related pollution, but the environmental impact of

our digital lives is also surprisingly high, says Human Geographer Dr. Jessica McLean, a Senior Lecturer in Human Geography at Macquarie University's School of Social Sciences.

"We don't often think about the various infrastructures required to do simple things like send an email or hold our photos—these digital things are stored in data centers that are often out of sight, out of mind," says McLean.

"If we think about it at all, we usually expect these services to be continual and think that there isn't really a limit on those digital practices," she says.

However, digital activity has a surprisingly high [environmental impact](#), says McLean, who has recently published a book on the topic.

Along with the [greenhouse gas emissions](#) from substantial energy use by our personal computers, data centers and communication equipment, this impact also includes the water use and land impact from mining, building and distributing the metals and other materials that make up our vast global digital infrastructure.

## High-impact digital activities

Many researchers have attempted to calculate the individual carbon footprints of various technologies, and these often focus on the energy used by servers, home wi-fi and computers and even a tiny share of the carbon emitted to construct data center buildings.

Some of our greenhouse-gassiest digital activities include:

- Video calls: Just one hour of videoconferencing can emit up to 1 kg of CO<sub>2</sub>, require up to 12 liters of water and demand a land

area adding up to approximately the size of an iPad Mini, according to recent research from MIT, Purdue and Yale University—but switch off the camera and you'll save over 98 percent of those emissions.

- **Emails:** Professor Mike Berners-Lee calculated that a short email sent phone-to-phone over Wi-Fi equates to 0.3 grams of CO<sub>2</sub>, a short email sent laptop-to-laptop emits 17g of CO<sub>2</sub> and a long email with attachment sent from laptop could produce 50g of CO<sub>2</sub>.
- **Digital hoarding:** Data transfer and storage of thousands of photo, audio and video files, messages, emails and documents in an average US data center emits around 0.2 tons of CO<sub>2</sub> each year, for every 100 gigabyte of storage.
- **Binge-watching in High Definition:** Just one hour of HD streaming a day emits 160kg of CO<sub>2</sub> each year—but swap to Standard Definition video quality and that drops to around 8kg of CO<sub>2</sub> annually.
- **Using supercomputers:** Australian astronomers each produce 15 kilotons of CO<sub>2</sub> a year from super-computer work—more than their combined emissions from operating observatories, taking international flights and powering office buildings. However, Dutch astronomers produce about 4 percent of these emissions, as the Netherlands national supercomputer uses 100 percent renewable energy.
- **Artificial Intelligence:** Training a large AI model emits 315 times more carbon than a round-the-world flight.

## **Beyond the individual**

Deconstructing the many and varied impacts of our increasingly digital lives can be overwhelming.

"There's a lot to take in, and many of these figures will change

depending on things like the use of renewable energy that is being taken up by some digital corporations and many individuals," says McLean.

"This highlights the complexity of this challenge, showing that understanding and addressing digital sustainability goes beyond individual responsibilities, and is more fittingly held by governments and corporations."

She says that the onus should be on governments to regulate a greater transparency on how digital corporations use energy, and to require regular reporting on sustainability targets.

"Most device manufacturers subscribe to a 'planned obsolescence' paradigm, rather than circular economy—for example, big tech continues to produce smartphones that are not designed to last."

McLean's recent research, published in *Cities* with Dr. Sophia Maalsen (University of Sydney) and Dr. Lisa Lake (UTS), found that while university students, staff and affiliates were concerned about the sustainability of digital technologies, there was a big gap between their intentions and actual practices of sustainability in their everyday digital lives.

"People expressed concern for the sustainability of their digital technologies, but they had limited opportunities to do anything substantive about this issue," she says.

## **Digital 'solutionism' is the wrong approach**

Concepts like the paperless office, remote work and virtual conferences often come with a promise of lower environmental impacts—but McLean says these can be examples of "digital solutionism."

"It's time to question whether being digital is always the most [sustainable solution](#)," she says.

McLean says that our society is becoming increasingly entangled in the digital via the exponential growth of intensely data driven activities and devices, from the Internet of Things to Big Data and AI.

However, she points out that this digital immersion isn't universal.

"There are uneven patterns and gaps in these digital affordances, both within Australia and across the Global South," she says.

Her book, *Changing Digital Geographies*, explores alternatives to our current exponential digital growth, and its impact on our natural world.

"There are many alternatives for how we live digitally, from making decisions about what's 'good enough' to changing the whole digital lifecycle and the way it is regulated," she says.

"Individuals cannot be expected to resolve these issues; governments need to regulate and corporations need to act, to improve our [digital future](#) and make it sustainable."

**More information:** Jessica McLean et al, Digital (un)sustainability at an urban university in Sydney, Australia, *Cities* (2022). [DOI: 10.1016/j.cities.2022.103746](#)

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