Digital Sustainability

Making Music webinar, 2 December 2024

Designing Sustainable Digital Futures

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FUTURE OBSERVATORY

the DESIGN MUSEUM

UKRI Arts and Humanities Research Council

digital humanities climate coalition

Climate change

- **Global warming** appears now to be breaching 1.5 degrees above pre-industrial levels

- 6 (possibly 7) out of 9 **planetary boundaries** crossed

- Risk of irreversible **tipping points** in Earth systems being crossed

- On the positive side **renewable energy generation** — wind, solar, hydro are rapidly being expanded

- Shift from "should we act?" to "how do we address **efficiency**, **uncertainties** and **justice** implications of different policies, strategies, technologies, etc. ..."

- Climate change is one aspect of **environmental crisis** among others, e.g. biodiversity loss.

2023

9 boundaries assessed,
6 crossed
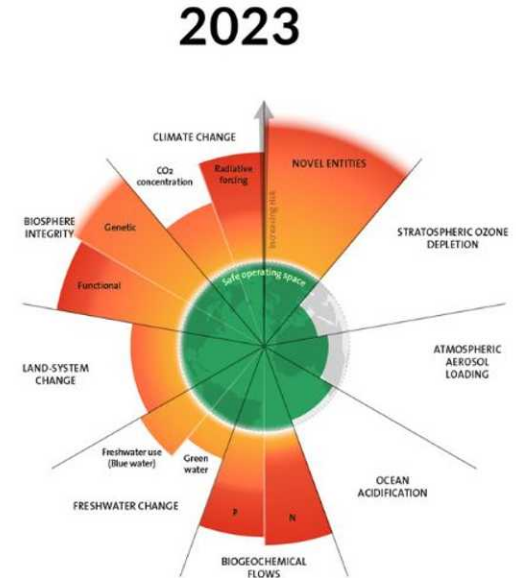
Environmental impacts of digital technology

Can we think of some ways digital technology might impact climate and environment?

Environmental impacts of digital technology

- **Energy use** — powering our devices, powering data centres and network infrastructure. If this is "dirty" energy, e.g. coal power, then there are carbon emissions, contributing to global warming

- **Embodied carbon** — carbon emissions associated with manufacturing devices, networks, data centres, etc.

- **Tech metals and rare earth elements**

- **E-waste** — processing e-waste can be harmful to workers and environment

- **Water** used for cooling some data centres

- **Indirect impacts** e.g. through changes in our practices

- **Rebound effects**: efficiency savings may be taken up by greater use (Jevon's paradox)

Why digital sustainability?

- Digital technology **is still a relatively small contributor** to global warming.

- Estimates within the past years are that it makes up **about 5% of our global carbon emissions:** similar to aviation - less than agriculture, construction, heating and lighting buildings, road transport.

- Digital technology enables us to do many things in **more environmentally sustainable ways** (videoconferencing vs. lots of travel).

- Digital technology has been **growing rapidly** and this is projected to continue — closing digital divide, rise of AI, etc.

- **Tech giants** like Amazon, Google, Microsoft, Meta have set aims and made claims regarding carbon neutrality / negativity - but their reports and overall global influence need ongoing scrutiny

Designing Sustainable Digital Futures 2024

- Funded by the Arts and Humanities Research Council / Design Museum Future Observatory, link with Digital Humanities Climate Coalition

- Interviews with organisations / individuals in arts, culture and heritage sector and those supporting them (e.g. tech / digital content / funding & reporting)

- Findings influenced design of the *Digital Sustainability Game*

- Recent report: *The Cloud and the Climate: Navigating AI-Powered Futures* (2024)

- Website Climateacuity.org

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Interviews with arts & culture organisations

- Range of digital practices: websites, social media, data storage, ticketing systems through to using or developing specific digital tools *for* sustainability

- Growing awareness of the environmental impact of digital technologies - but challenges, dilemmas and questions included:

  - As smaller arts organisations, how can we work out what actions will be most effective - *how do we know we're doing the right thing*?

  - How do we reconcile digital sustainability (and the extra resources this might involve) with our primary focus and funder / audience expectations?

  - How do we balance changing practices at individual or organisational level with the wider societal, cultural and policy shifts we also need?

- Examples of innovative and collaborative sustainability initiatives that linked arts & culture with technical skills

The Digital Sustainability Card Game

- Played in teams as part of an in-person **workshop** (ideally 2-3 hours to have time for discussion) adapted to different contexts

- Two types of cards: **Action cards** (things organisations do to improve digital sustainability) and **Event cards** (things happening in the world that are relevant to digital sustainability)

- Teams get **Progress points** and **Sustainability points** (most Sustainability points = 'winner')
- The focus is on **learning** (*what can we do?*), **discussion** (*what works best in what context?*) and **fun** (game dynamics)
- Today only involves a very brief demo & taster

Digital Sustainability Game: rounds 1 & 2 (choose 2 cards)

4 — Action

Benchmark our web presence

- We used freely available tools to estimate our website's carbon impact.
- We found many tools to help us. For example, www.websitecarbon.com from Wholegrain Digital.
- EcoGrader.com from Mightybytes.
- CO2.js from the Green Web Foundation is a JavaScript library to help web developers to estimate emissions.

14 — Action

Optimise videoconferencing

- We researched recent comparisons of the sustainability of different videoconferencing softwares, and chose the one that worked for us.
- Functions like "turn off incoming video" help us to save bandwidth.
- It's good to see one another's faces sometimes. But at other times, it's OK just to hear each other's voices.

If you like, describe how your attitudes and habits to videoconferencing shift.

22 — Action

Care for our devices

- We buy extended warranties, and make it easy for staff to get devices repaired.
- We guard against smashes with phone cases, screen protectors, and so on.
- We use and store devices within recommended temperature range.
- We avoid overcharging devices.

If you like, describe your company's strategy, and challenges you overcome.

Digital Sustainability Game: rounds 3 & 4 (choose 2 cards)

11 Action

Compress our images and video

- To minimise our image file sizes, we use tools like Shortpixel, TinyPNG, ImageOptim, and ImageAlpha.
- We use video sparingly. We compress video with tools like Handbrake.fr.
- YouTube or Vimeo embeds might not be optimal. We're interested in alternative platforms like Mave.io.
- WebM and MP4 formats sometimes have the edge on MOV and AVI. But it really all depends on resolution and compression.

23 Action

Extend laptop battery lifespan

- We use our laptops' built-in power-saving features such as Smart Charging.
- We avoid extreme temperatures.
- We aim to keep the battery between 20% and 80%.
- We reduce the number of programs running simultaneously.
- We avoid storing a fully charged or fully drained battery for a long period.
- With most modern devices, leaving it plugged in at 100% isn't as bad as it used to be, but it's still not ideal.

15 Action

Know which everyday activities are just fine

- At our company, we foster awareness of which impacts are big, medium, small … or teeny-tiny.
- We heard the advice not to send "thank you" emails. But we rejected it. A typical short text email has roughly 1-2% the impact of a single Google search, or 0.01-0.02% the impact of a single ChatGPT query.

If you like, describe how your company does this.

Digital Sustainability Game: rounds 5 & 6 (choose 2 cards)

18 Action

Don't store data we don't need

- We created processes to reduce unnecessary data storage.
- We regularly clean up junk data and 'dark data.'
- Image files take up way more space than text files. Video files take up way more space than image files. We prioritised the heavy file types.

If you want, when you play this card, describe how your company reduces the storage of unnecessary data.

33 Action

Check suppliers for greenwashing

- Our IT suppliers claim to be green!
- We do our own detectivework. We also like to use resources like Corporate Responsibility Monitor and Zero Carbon Analytics.
- There are so many ways to be sneaky: omitting parts of Scope 3; reporting carbon but not methane; choosing a dodgy baseline year; using misleading terms like "carbon neutral"; misusing carbon offsetting; etc.

40 Action

Know when not to use AI

- Our AI Impact Assessments include environmental sustainability.
- AI can do wonderful things. But it is also connected with many ethical, legal, and technical issues.
- Some issues have included plagiarism, hallucinations, bias, and explainability.
- There can also be a big carbon cost to training and deploying AI models.

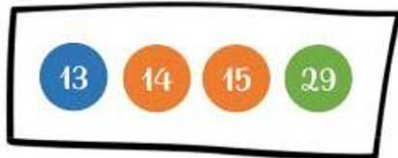*Or maybe you want to go even further? Optionally, describe your radical action.*

Digital Sustainability Game: next rounds

Event

Search engines results start to favour green web design

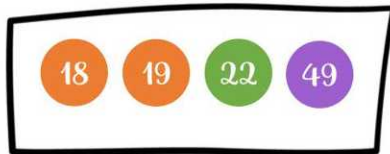All players gain a **progress point** for any of these actions:

13 14 15 29

Event

Tech giant Giggle is failing to meet its decarbonisation pledges

All players: lose all **progress points** unless you have any of these:

18 19 22 49

Event

Policy: Choose your own event!

A globally agreed method for quantifying the social and environmental impacts of ICT? A global fossil fuel subsidy ban? A massive Greener Newer Deal? A more enforceable sequel to the Paris Agreement? A climate reparations framework and Just Transition Fund? Something else?
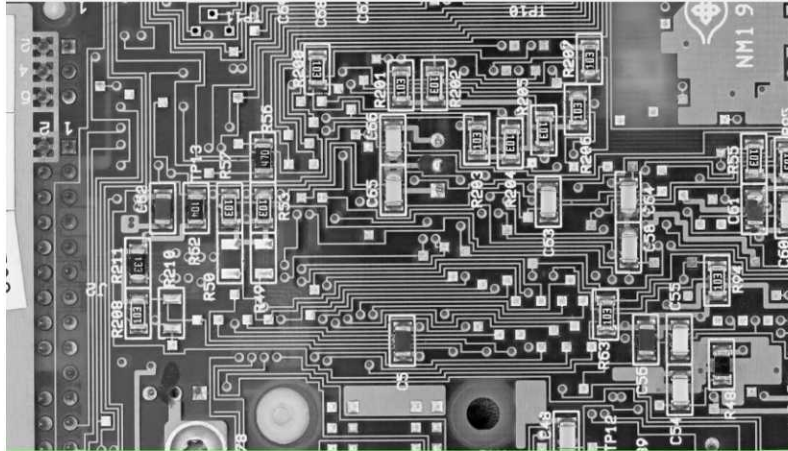
All players convert all **progress points** into **sustainability points!**

Further resources

- The card game and rule book

- Our website Climateacuity.org

- DHCC Toolkit: https://sas-dhrh.github.io/dhcc-toolkit/ (see game and instructions under 'teaching')

- Our report, *The Cloud and the Climate: Navigating AI-Powered Futures* (2024) contains more detail on renewable energy procurement for data centres (and lots more).

- Recent FT article, 'Big Tech's Bid to Rewrite the Rules on Net Zero' discusses Amazon and Google's competing visions for the next iteration of the GHG Protocol.

- Zero Carbon Analytics's *Greenwashing Guide*.

- Carbon Market Watch (carbonmarketwatch.org) to find out about carbon credits.

Thank you!

https://forms.gle/NoPihJ7a99huQiCC7

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