

An illustration of a factory scene. In the foreground, there is a large window on the left and a building with a grid of windows on the right. In the background, two tall smokestacks with orange and white horizontal stripes are visible, with white smoke rising from them against a blue sky. The style is painterly and somewhat abstract.

“We Can’t Fix It All”

“Okay, But What If We Try?”

What can HCI learn from the source-pathway-receptor framework?

Alice Ashcroft  
Lancaster University

Zoe Detko  
Ardea Eco-innovation

Pollution linkages are the connections between sources of pollution, pathways through which pollutants travel, and receptors that are impacted by pollution. These linkages are often broken down into three stages in environmentalism in to the source, pathway and receptor (SPR) framework.

This zine will share how, with an understanding of this framework, HCI researchers can ensure equitability in their developments both in terms of the environment but the users and those in marginalised groups.

source

The origin or point of emission of pollutants into the environment.

pathway

The route the pollutants travel from the source to the receptor.

receptor

The entity that is exposed and potentially affected by the pollutant.

Okay... SPR. How does this apply to tech though?



# Recognise the interaction.

Recognising the interaction between digital technology and environmental impact sheds light on how, in reducing negative environmental impacts, the positive social impact can be increased.



Emissions affecting the lives of people isn't a thing of the past.

An example of this can be seen with the creation of website that produce fewer greenhouse gas (GHG) emissions, also aiding individuals with slow internet connections or limited data plans.

A single visit to a 30 MB homepage would use both an entire day's worth of data for someone on a 1GB monthly plan, and emit 12g of CO<sub>2</sub>e (Lowe, 2021).

So we need to design websites with reduced emissions!

Reducing image sizes, avoiding auto-playing videos (Lowe, 2021), minimising automatic chatbot usage, and not integrating live social media feeds, are (great/good/another adjective of your choice) strategies for reducing GHG emissions; contributing to environmental sustainability as well as enhancing website accessibility from a data and design standpoint.

Images are the biggest source of GHG emissions on websites (Greenwood, 2021). However, only by optimizing them from JPEG, PNG or GIF to WebP formats, emissions can be reduced significantly (Hiskey, 2022), and less data is needed to access the website.

This is just one example.

## Knock On Effects

They knock marginalised groups even harder.



# The River Parallel

Cloud Computing is often seen as a cheaper alternative, but what is rarely considered is the environmental impact of this. Do we have to send data across the world and back?

That's a lot of energy!

If you have a limited water source, you'll have no choice but to drink the water. You might not have the data, but you still have to log on to pay your bills. Choice is a right, but still a privilege.



When you eat plants grown near a factory, do you know what you're eating? When you consume content online, do you know the quality of that too?



so many parallels!

### Bioaccumulation

when contaminants build up in organisms, becoming more concentrated than in their surrounding environment

### “intersectionality”

linguistically means the overlapping of more than one characteristic

### Biomagnification

when the concentration of a chemical in an organism is higher than in its food, mainly because the organism gets exposed through its diet

### Intersectionality

theoretically means how each overlapping characteristic has affected each lived experience in the person’s life, often disproportionately

TLDR: things are not always proportional...

the effect is magnified! sound familiar? (\*cough cough\* biomagnification \*cough cough\* intersectionality)

## The Polar Bear Parallel



Society’s Treatment of Multiply Marginalised Groups

Access to Education

Ability to Earn Income

Access to Technology

and there are so many more examples of this!

# What can we learn from The Parallels?

Consider the environmental impact of each stage of your developments.



Understand that the environmental impacts are directly linked to the accessibility of your systems.



Physical accessibility should always be considered. But how is social access considered in your work?



All references can be found at:  
[aliceashcroft.com/s/ict4s-zine-refs.pdf](https://aliceashcroft.com/s/ict4s-zine-refs.pdf)

With thanks to *Alla Varta* for their wonderful illustrations.





# References

Ashcroft, A. (2023). Reflexivity, interactions and intersectionality in HCI and CSCW. In Proceedings of the 36th International BCS Human-Computer Interaction Conference.

Dabiri, E. (2021). What white people can do next: From allyship to coalition. Penguin UK.

Freitag, C., Berners-Lee, M., Widdicks, K., Knowles, B., Blair, G. S., & Friday, A. (2021). The real climate and transformative impact of ICT: A critique of estimates, trends, and regulations. *Patterns*, 2(9).

Greenwood, T. (2021). Sustainable web design. *A Book Apart*: New York, NY, USA.

Hiskey, T. (2022). How I decreased my website's carbon emissions by 88%. [Online]. Medium. Last updated: 7 November 2022. Available at: <https://tomhiskey.medium.com/how-i-decreased-my-websites-emissions-by-88-e7eadc72200c> [Accessed 26 March 2024].

Loach, M. (@mikaalaloach). (2024, May 22). Activist at Shell's AGM asking a question about alleged crimes in the Niger Delta [Instagram video]. Instagram. <https://www.instagram.com/reel/C7QvJTBtM8u/?igsh=MXBibjlr3MwYzlmZA==>

Lowe, S. (2021). Council website emissions. Open Innovations. <https://open-innovations.org/blog/2021-05-28-council-website-emissions>

Robertson, R. (1994). Globalisation or glocalisation?. *Journal of International Communication*, 1(1), 33-52.

Schlesinger, A., Edwards, W. K., & Grinter, R. E. (2017, May). Intersectional HCI: Engaging identity through gender, race, and class. In Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (pp. 5412-5427).