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Position Paper

EdTech as climate criminal: Considering the excesses of the ICT sector, and Higher Education's complicity

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Abstract

This study was undertaken to highlight the ecological impacts of EdTech, the excessive nature of modern digital technology, and to examine the need for sustainable practices in the ICT sector with education's involvement therein. The environmental impact of EdTech remains an underexamined consequence of the use of digital technology in education contexts, one that is not often considered among other known issues pertaining to digital education. This impact is growing exponentially with the now systemic usage of Artificial Intelligence in the sector. The selection and adoption of EdTech tools is deeply influenced by institutional policies and governance, which have remits to reduce ecological impact and carbon footprint, but rarely consider digital technology and EdTech as part of the harmful contributors. Understanding and addressing these interconnected challenges is critical for aligning EdTech with planetary and social equity goals. Actionable insights are drawn from the empirical examination of case studies; selected socio-technical educational practices, in which computing technologies are embroiled, including solar-powered websites, self-hosted systems, and upcycled hardware infrastructures. The research is directly influenced by the principles of Climate Justice and permacomputing. These perspectives provide a lens for evaluating the ecological, social, and cultural dimensions of EdTech and for proposing sustainable alternatives. By connecting the critical analysis with possible solutions, it opens avenues for constructive dialogue on aligning digital education with ecological responsibility, aiming to offer critical insights for policymakers, educators, and technologists.

Keywords:

AI in Higher Education, Sustainability, Climate Justice, Permacomputing, Ecological responsibility, EdTech

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Introduction

This position paper considers the responsibilities that the ICT (Information and Communication Technologies) sector, EdTech (Education Technology) and, as substantial users, education institutions have in the climate crisis. The primary focus of this piece is on the environmental harms caused by these technologies, while recognising that many social, ethical, and educational harms are also present. These damages are seen as deep intersectional moral injuries but are not examined in depth in this piece. I primarily focus on highlighting that the unchecked growth-based model that most technology companies employ has a direct impact on the environment. Subsequently, I argue that it is vital that we reconsider large technology — especially global hardware, software and infrastructure (Google/Alphabet, Amazon, Facebook/Meta, Microsoft, Apple, and their subsidiaries; Big Tech) — vendors in the frame of climate criminality, and that they and their products become understood as ecologically devastating, and ecocidal (Comber & Eriksson, 2023).

I focus on Higher Education (HE) institutions, which are mostly publicly funded and in Ireland are mandated to, in line with national roadmaps, reduce their environmental impact. The continued overlooking of EdTech as a site for reduction is the crux of this article. These arguments emanate primarily from the Irish HE and digital technology contexts, considering the dual heavy use, and high concentration of Big Tech headquarters in the country. I propose that hardware and software impacts of EdTech should be considered alongside conventional HE consumption and Greenhouse Gases (GHGs) emission areas such as transport, utilities and waste management. I propose that a radical act toward genuine sustainability would be through the review of HE procurement processes. These should focus on sustainability and ecology as the primary criteria for selection. The Irish and international education sector holds many large contracts with Big Tech, so a radical reconfiguration of EdTech could produce meaningful economic, institutional and social change. Whether HE has any genuine interest in sustainability, or the capability to reconfigure its ICT usage remains to be seen.

My position is situated in conjunction with growing ‘Critical EdTech Studies’ (Decuypere et al., 2025) and ‘Computing Within Limits’ (Becker & Mühlberg, 2025) conferences. These perspectives expand the ecological impact of education institutions beyond the campus to their supply chain. EdTech is thought to enable or aid education, yet its infrastructural ways—borrowed directly from the tech sector—cause ecological damage that conflicts with fundamental educational values. In that trajectory, EdTech is here understood beyond traditional sense of the term where technologies are used to support teaching, learning and education (Facer & Selwyn, 2021). Instead, I see EdTech as the collection of technology tools that are *conditional* to *Education.* Many Higher Education Institutions (HEIs) have deployed Virtual Learning Environments (VLE) and possibly peripheral ‘plugins’ or other EdTech ‘solutions’ such as TurnItIn. I scrutinise this kind of EdTech here, but I also consider all the institutional digital ways-of-doing, such as email, online meetings, grade access, timetabling software, etc. These are the technologies that mediate and give access to higher education. Existing scholarship discusses the assumed “neutrality” of technology (Toczé et al., 2022) and its social, political and ecological harms. As stated above, in this piece, I focus on ecological damage—not because it is more important than other harms—but because sustainability choices at the institutional level have legitimate, yet unused, potential for transformation and Climate Justice. I believe that EdTech and its supply chain are overlooked when institutions analyse their ecological impact and aim to draw focus to these here.

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Three possible actions

Critical EdTech scholar Neil Selwyn, in a research seminar (2022) provided a simple framework for investigating the ecological impact of technology in education, which structures this article. He outlines three possible collective actions:

1. Business as usual (doing nothing)
2. "Greening" EdTech
3. Burn it to the ground

Using this structure, the following first section problematises the current state of mainstream computing and what will happen if we continue "as usual". It explains the excessive nature of ICT, detailing direct and indirect emissions related to consumption, and adds information about cloud and edge computing, which highlight the risks of growth for growth's sake.

The second section examines the reactionary "greening" of existing computation practices. Because most of digital technology's ecological impact occurs during equipment manufacture, greener strategies must involve using existing hardware for as long as possible, as well as considering recycled hardware, and ultimately halting new device production.

Finally, "burning it to the ground" explores what would happen if we eliminated—or at least severely limit—digital technology, considering radical alternatives and computation within "limits".

1. Business as usual

The technologies that classify as 'traditional' EdTech (Google Classroom, Blackboard Collaborate, Canvas, but also those that are conditional to modern Higher Education in Ireland for example Microsoft 365, Google Workspace, MS Teams and Zoom) rely on constant connection, always-on services, infinite storage, heavy computation, streaming services and content delivery networks (Selwyn, 2022). All these features, hidden from the consumer under terms such as 'cloud computing', echo the worst of capitalist consumerist (Stiegler, 2011) models and set the scene for how deep the rethinking of the internet complex[1] (Crary, 2022) that has infected EdTech needs to be; these models of ICT are excessive and unreasonable. We have been taught to expect that digital technology needs to be always accessible, from anywhere, at any time, with infinite storage, from any device, at practically no cost, and delivered rapidly. The internet's 24/7 pervasive presence is what EdTech builds on. The most recent and outrageous example of the excessive nature of EdTech is how rapidly and uncritically HE institutions have adopted GenAI (Guest et al., 2025).

None of these 'AI' tools reasonably support education purposes, yet they have inserted themselves into HE and EdTech. Microsoft has leveraged its Office suite used by many HE institutions to shoehorn 'Co-Pilot' into Universities, and subsequently made itself an EdTech

[1] Neologism used by Crary for the purpose of gathering the multitude of elements (platforms, tools, protocols, infrastructure, practices) that "become inseparable from the immense, incalculable scope of 24/7 capitalism".

problem. GenAI tools such as ‘ChatGPT’, ‘Co-Pilot’, ‘Grok’, ‘Claude’, ‘Mistral’, ‘Llama’ and ‘DeepSeek’ have been criticized for their bias tendencies, (Fast et al. (2016), Founta et al. (2018), Hutchinson et al. (2020)), the ‘black boxing’ of their logic (Bagchi (2023)), and their blatant disregard for copyright law (Langlais, 2024; Stackpole, 2025). They have also been noted as vicious threats to academic integrity and data privacy. All of these should be primary concerns for HE institutions, but still, GenAI successfully continues its deliberate disruption of HE. Of key concern for this paper is the well-reported ecological issue of the training, deployment and use of GenAI tools, which are excessive consumers of electricity, potable water and large emitters of GHGs (Barratt et al., 2025; Harvey, 2025; Mazzucato, 2024; Thier, 2025). While the initial reaction to AI in HE was one of panic, the current state seems to be one of full embrace, as Tressie McMillan (2025) says: *“Academics initially lost [their] minds over the obvious threats to academic integrity. Then a mysterious thing happened. The typical higher education line on A.I. pivoted from alarm to augmentation. We need to get on with the future, figure out how to cheat-proof our teaching and, while we are at it, use A.I. to do some of our own work”*. The GenAI in Education phenomenon shows how provisional EdTech is to large technology vendors. The appalling adoption of GenAI at the very least brings HE’s integrity into question (Watters, 2025). At worst, this adoption shows how prior “careful and consentful models of digital education are being replaced” by what Costello and Gow (2025) call Authoritarian EdTech: a technologically mediated educational regime that concentrates decision making power in a few corporate and state actors, eliminates authentic consent and choice, employing opaque and massive data centric infrastructures, and ultimately subverting democratic, deliberative, and independent forms of learning.

The tailspin of EdTech is reflected in infrastructural pressures. Data centres are being deployed faster and larger than ever, particularly in Ireland, to support ‘cloud computing’, with enormous environmental impact (FoE, 2004). Acts of ‘edge computing’ (where computational tasks are offloaded to clients such as users’ laptops, PCs and smartphones) must also be understood as an acknowledgement of the excessive nature of EdTech, and an “outsourcing of the burden of computation to others” (de Valk, 2021b).

‘Business as usual’ then, does not bode well for the climate crisis. ‘Business as usual’ equates to ‘doing nothing’, which is not a standstill, the detrimental impact of EdTech continues to grow (Comber & Eriksson, 2023). Pressures, such as the AI craze above show that ‘doing nothing’ makes HE more complicit in the accelerating climate crisis.

2. ‘Green’ (Ed)Tech

It is worthwhile considering then, what efforts are being made to rebalance EdTech’s consumption excesses, because for a brief period, in the early 2020s Big Tech pivoted its marketing material to “green” digital services (Google, 2022). Vast claims were made about greening technology, none bolder than Microsoft, who claimed they would achieve carbon negative performances by 2030, and acknowledged the grandeur of this claim as a ‘moonshot’ (Smith, 2020). Time has shown how the pivot to AI has “blown several tech giants’ sustainability pledges entirely apart” (Pasek, 2025) and how Big Tech had “zero intentions of actually taking business decisions to make [their pledges] happen in reality” (Joshi & Marx, 2025). From 2020 to 2023, Amazon’s operational carbon emissions grew by 182%, Microsoft’s by 155%, Meta’s by 145% and Alphabet’s by 138% (Poidevin, 2025; UnionU & Alliance, 2025).

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In Ireland, data centre expansion is projected to reach 31% of national electricity use by 2027 (Bresnihan & Brodie, 2021). Regulations are slowly beginning to hold operators accountable, but the data centre sector has entirely outpaced any production of renewable energy on the island (Daly, 2024). The result of the expansion of AI, justified by its unfettered adoption in HE, has been a proliferation and sustainment of fossil fuel usage for electricity production, where most data centres in Ireland are now directly connected to the gas network (as an electrical generator source), or have on-site diesel generators (Robinson, 2022).

Sustainability and growth, the idea of Green Tech, is antithetical. "Technology […] cannot and does not diminish resource use, evidence points to the opposite." Digital technology, particularly in the GenAI spheres has a false hope of being a "way to tackle climate change" (de Valk, 2025). This misinformation persists as a result of misreporting, the industry's aggressively lobbying against regulation, and is simultaneously describing itself as 'green'. This is a definition case of greenwashing (Suarez Estrada et al., 2025). Let it be noted that any carbon capture or carbon offset token currently lack any evidence of any genuine sustainability benefit, and they "will inevitably be revealed as a fraud anyways" (Pasek, 2025).

At the beginning of this GenAI bubble, it was noted that roughly 80% of the sector's emissions stem from equipment production, and the remaining 20% from power consumption (Stonham & JISC, 2022). While this proportion may have changed as AI power demand increases, studying the ecological impact of computing must consider the hardware and infrastructure of digital technology. The simplest mitigation for any HE institution is to extend device lifetime and avoid unnecessary purchases (de Valk, 2021b; Stonham & JISC, 2022). Discarding and re-purchasing EdTech hardware at the cadence the industry requires generates roughly 57.4 million tonnes of e-waste annually (Rosane & Ecowatch, 2021). E-waste, among all other issues, releases potent greenhouse gases and toxic substances that harm the environment and impact human health (Stonham & JISC, 2022).

Meanwhile, manufacturers deliberately design devices for short lifespans and impede repair: Apple, Microsoft, Amazon, Google, Facebook, and many other manufacturers have been recorded lobbying against "right to repair" acts (Green, 2021). Security arguments are often invoked as reasons for hardware upgrades (Chen, 2021), but the underlying motive is forcing sales for business growth. Microsoft recently unnecessarily ceased support for Windows 10, hurtling 400 million devices to the waste stream (Koebler, 2025).

The inclusion of this section on computing hardware and e-waste is to draw focus on the lack of consistent and transparent consumption and emission reporting, as identified by JISC (2022), Daly (2024) and the ITU / WBU (2025). Scope 3 emissions (which cover the energy used by the utilities in the transmission and delivery of the energy, transportation (suppliers and customers), employee commuting, waste, investments, capital goods, franchises and much more (Stonham & JISC, 2022)) need to become mandatory reporting. Currently, in Ireland, Big Tech companies, and HEIs are only required to report on Scope 1 and 2, which often skews consumption/emission pictures dramatically. Scope 3 is essential in establishing where environmental responsibility lays and if, once again, HE has any interest in genuinely being sustainable, or merely 'acting' sustainably.

Given the out-of-proportion growth and consumption, systematic obstruction of repair, the massive embodied emissions of hardware, misleading carbon offset claims, and selective renewable energy deals (de Valk, 2021b), I believe it is reasonable to label these technology

companies as climate criminals. According to Europol, “environmental crime covers the gamut of activities that breach environmental legislation and cause significant harm or risk to the environment, human health, or both.” (Europol, 2022). For Comber and Eriksson (2023), computing can be seen as “a facilitator of ecocide [as] while the harms of computing are indirect, they are likely severe and widespread [and] have supported a long-term shift in consumption in society.”

Framing EdTech as a climate criminal also aims to bring into focus the complicity of the HE institutions: these used to be pioneers in building and maintaining their own (to scale) digital infrastructures (Angeli et al., 2022). But as HE governing bodies continue their “toxic trajectory towards commercialisation, commodification, and co-optation by extractive and exploitative companies” (Union, 2025), as seen with the incessant outsourcing of EdTech needs, and the blind embrace of AI, they will also become recognised as responsible for this environmental destruction.

3. Burn it to the ground

What would happen if we profoundly rethought EdTech from the ground up? How do we challenge corporate power (Stephens, 2026) to help HE achieve its fundamental goals, in tune with its own values, and not those of Big Tech? What follows is a number of observations and proposals on what to do to tune our use of technology in education environments towards liveable futures, while considering the complexity of implementing this, at scale, in HE.

Firstly, and centrally, self-hosting (running EdTech software locally on HE campuses) can drastically lower resource use. Angeli et al. show that self-hosted video conferencing tools such as BigBlueButton (BBB) require ~40% less bandwidth than Microsoft Teams and ~15% less than Zoom (Derudder & Greenspector, 2021; Suga, 2020). Implementing self-hosting in HE entails dramatic staffing and expertise reconfigurations. Considering how essential EdTech has become, it is surprising that most HE Information Technology services have not expanded proportionally. Reclaiming HE’s EdTech infrastructure with self-hosting firstly would signify a genuine ‘taking-of-responsibility’ of infrastructural needs but also offers the opportunity to redirect disproportionate Scope 3 emissions to Scope 1. It would offer multiple learning opportunities for HE students involved in Computing, Engineering and Environment studies, and give a sense of relationality to the technology that is a requirement of Education today.

The ‘reCluster’ project is a proof-of-concept data centre built from discarded, still functional hardware, inspired by the Right to Repair movement (Angeli et al., 2022). It aggregates older computers, laptops, tablets, (which are plentiful in HE) and servers into a virtualised cluster, that would be perfectly suitable to HE. It would extend device lifespans and delay e-waste. In public institutions, >80% of devices sent to be recycled are still operational (Franquesa et al., 2015). The reCluster shows huge potential for Scope 1, 2 and 3 reductions.

At a deliberately much smaller scale, we should consider how the Low Tech Magazine rebuilt its website on an off grid, solar-powered server in Barcelona, intentionally limiting power use and even going offline when sunlight is insufficient (Abbing, 2021). This shows how small, manageable and distributed EdTech infrastructure could be, in contrast to fossil fuel powered generators for hyperscale data centres. The Low Tech Magazine website displays real time battery levels and weather, making the energy constraints visible to visitors.

Meanwhile, it is essential that there is a strategic use of EdTech in the overall goal of making HE sustainable. Ong et al. and Tao et al. show that HE institutions can reduce their indirect ecological impact by carrying out certain activities online, selecting EdTech that simply consumes less and lasts longer. When all scopes are considered, online meetings (on non-excessive platforms) consume only 7% of the energy consumed for an in-person meeting and transitions from in-person to online conferences can lessen the carbon footprint by 94% and the energy use by 90% (Ong et al., 2014; Tao et al., 2021; Angeli et al., 2022). Selecting, appropriate, and to-scale digital tools needed in sustainable education, again draws attention to procurement practices.

These cases demonstrate feasible, low impact alternatives that align with climate justice and educational values. They provide concrete pathways for educational institutions to lower their digital carbon footprints while fostering learning about sustainable technology. These cases are just few that emerge from communities that are rethinking Computing within Limits (de Valk, 2021a). Out of scope of this paper, but worth continued consideration for de-escalation would be the areas of Salvage Computing, Permacomputing (.ibid) and indeed, Decomputing (McQuillan, 2024).

Conclusions

This paper positions EdTech not as an enhancement but as a structural condition of HE. It asks to critically and profoundly re-examine the ecological impact of EdTech and the broader ICT sector. It highlights how the unchecked growth-driven models of Big Tech companies intensify environmental damages, especially through hardware production, cloud computing, edge computing, and the invasion of HE by GenAI. By focusing on the Irish HE system, the paper shows how overlooked the ecological footprint of EdTech is and calls for a shift in how educational institutions evaluate and situate their technologies.

The paper considers three distinct approaches to mitigating the environmental damage caused by EdTech: doing “business as usual”, attempting to “green” existing practices, and considering more radical alternatives (“burning it to the ground”). It critiques the first approach, stressing that business as usual leads to exponential consumption. The second approach, “greening” EdTech, is critiqued for obfuscating meaningful sustainability, by greenwashing, to continue business as usual. Finally, the third approach—radically rethinking and scaling down EdTech consumption—is explored in more depth, advocating for solutions like self-hosting, repurposing existing hardware and rethinking procurement to reduce the carbon footprint of HE.

Through these perspectives, the paper positions HEIs not just as passive consumers of EdTech, but as complicit actors in environmental destruction. It calls for a reimagining of EdTech in educational settings, proposing that a reconfiguration of institutional priorities could lead to significant reductions in digital resource consumption and e-waste. The paper argues for a systemic rethinking of technology use in education, emphasising the need for institutions to take genuine responsibility for their environmental impact and their own infrastructural needs.

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