Climate Literacy in Education

More Questions Than Answers

Using Mini-Case Studies to Raise Ethical Questions about Teaching in the Era of Generative AI and the Climate Emergency

Mark A. Sulzer, University of Cincinnati, Cincinnati, Ohio, USA
Macy Bruner, Finneytown Secondary Campus, Cincinnati, Ohio, USA
Robert Cornwell, McNicholas High School, Cincinnati, Ohio, USA

Abstract

The topic of generative AI is inseparable from environmental ethics. Drawing on four mini-cases from our own experiences, we explore moments that prompted reflection on the environmental costs of generative AI. We highlight how those questions are entangled with additional concerns of student identity, teacher identity, stances toward technology, data privacy, professionalism, ideology, and creativity. Our purpose is to provide a narrative resource for readers to respond with their own connections and questions about environmental ethics in the era of generative AI.

Keywords

Generative AI, climate emergency, environmental ethics, case studies

Introduction

It was 2022. Generative AI (GenAI) had arrived. Public-facing GenAI products appeared overnight, in large numbers, with unknown properties. Yet, as mysterious as they were, these products were quickly integrated into healthcare systems, finance, manufacturing, entertainment, and education. The rapid integration meant that teachers and students worldwide had become, both wittingly and unwittingly, daily users of GenAI. And why not? The GenAI zeitgeist was about endless possibilities, new methods of doing things, new ways of thinking, new ways of being.

We (a former ELA teacher and current teacher educator and two current ELA teachers) were like most people when public-facing GenAI emerged. We experimented. It was a fascinating time full of new lingo: large language models (LLMs), prompt engineering, emergent behavior, deep learning, hallucinations. Still, the exact role of GenAI in English education remained an open question (Nash et al., 2023; Young et al., 2024). Should we teach *with* GenAI tools? Teach *about* them? Or both? As we learned more about the environmental impact of GenAI, these questions became inseparable from questions of environmental ethics.

As of 2025, the data centers required to train and run GenAI products accounted for 4.4% of energy in the U.S. grid, a number projected to grow to 22% by 2028, and while sourcing energy through solar and wind is increasingly feasible, "data centers are expected to continue trending toward using dirtier, more carbon-intensive forms of energy (like gas) to fill immediate needs, leaving clouds of emissions in their wake" (O'Donnell & Crownhart, 2025, para. 8). Further, quantifying the full impacts of GenAI is complicated by the fact that we must factor in environmental and social costs: that is, the cost of developing the hardware (e.g., extracting rare earth metals), the cost of training and developing the software (e.g., energy and water use for network traffic), and a range of social dynamics, the effects of which remain unknown (e.g., outdated labor laws and compensation models, biases in the software, and psychological outcomes) (Hosseini, Gao, & Vivas-Valencia, 2025).

We wanted to refine our sense of this topic, by reflecting on our experiences with GenAI in our everyday teaching. To do so, we developed mini-case studies. We wanted to capture real moments that had given us pause in our work as educators. We conceptualize these mini-case studies as brief narrative resources for engaging with ethical questions about GenAI in the classroom. In keeping with a case study approach (Johannessen & McCann, 2002; McCann et al., 2022), we offer reflection questions at the end of each mini-case but do not have final answers. Things change. Technologies evolve. Environmental issues take new forms. Across the mini-cases, the topic of environmental ethics is entangled with our sense of self, our relationship to each other,

and our relationship to the environment. We intentionally wrote these case studies in their briefest form—"mini"—to allow educators space to respond with their own connections and questions about environmental ethics in the age of GenAI.

Mini-Case #1: DEFINE GOOD

I find myself at a meeting about teaching and GenAI. A consultant's eyes light up. He's telling me about the possibilities. "GenAI in middle school, in high school, and beyond. New avenues to build skills and knowledge. Training programs. Job opportunities. Personalized instruction. You name it! And the climate? Well, yes, you can use GenAI to do good for the environment if you'll just look at this here." He pulls out a series of GenAI outputs prompted by 7th graders. He spreads them across a conference table: image after image of happy sea turtles. We both take in the cartoonish smiles of the sea turtles in their pollution-free, underwater kingdoms. "It's good," the consultant is saying, "because the students came up with this on their own. They wanted to visualize a healthy ocean." I met the consultant's you-can-do-good-with-this-technology enthusiasm with distant nodding (credit to my Midwest upbringing): How are we defining "good?" Is using GenAI to visualize a healthy ocean truly good if the GenAI itself contributes to a less healthy ocean?

Mini-Case #2: I HAVE TO USE THIS

"Hey, Ms. Cornwell, can I work in the hallway on my project?" one of my students asks me as they transition to independent work time. I agree, reminding him I would be checking on him. As the class continues and student questions are answered, I peek my head right outside of my door to see what he's working on. He doesn't know that I can see him watching Michael Jackson music videos. I give him a couple seconds to transition tabs before I address him, but he doesn't. "Great song choice but not what you are supposed to be doing, right?" He looks puzzled at my redirection as if he is doing the right thing. "Well, Gemini is not working, so I do not know how I am supposed to do this project," he replies. I stare back at him, confused, and ask why he would need AI to complete his work. We unnecessarily go back and forth. He insists that he must use Gemini or another artificial intelligence tool. I know this student well; he would produce something more creative than what Gemini would have curated or suggested for him. And he knows this, but at the same time, his lens has shifted. He's become dependent on AI. He doesn't want to move forward without a safety net: an AI generated response he agrees with.. My concern is twofold: each attempt not only distances him from trusting his own thinking and creative abilities but it also consumes

an unsustainable amount of environmental resources. As students become dependent on using AI, what are the costs in terms of loss of student originality? What are the costs in terms of environmental resources?

Mini-Case #3: FEELING STUCK

A student sits in the corner, on the same website. Again. He has been on the same website for three class periods. He types his request into the box, images pop up on his screen, and he quickly types something again into the "ask anything" box. He watches it attempt to create exactly what he's envisioned. I approach him to ask what he's working on. At this point, he's going to have to turn the project in late. He's frustrated, feeling stuck in a GenAI vacuum. "They can't get this flying car right!" I also feel stuck, unsure whether to allow the student to continue to use AI for his project or not allow him to use it at all. I'm thinking that if we're going to allow this technology in educational settings, we must first teach students effective GenAI usage and prompt engineering. But then again, should we be teaching it in the first place? How do we balance the dilemma of teaching our students about their environmental impact and the hazards of using GenAI while also teaching them effective usage of GenAI?

Mini-Case #4: KEEP TRYING

I'm working with student-teachers on how GenAI might help us in streamlining some of the "I need an example of this" or "I need an example of that" tasks of teaching. I have my reservations, but we're experimenting and talking through ethical questions together. Ok, so I need a printable cube template to make three-dimensional cubes for a class activity (long story). This moment is my moment to experiment. I ask ChatGPT to make a 2D printable cube template so we can make 3D cubes in class. Here's how that goes:

Figure 1: First Attempt

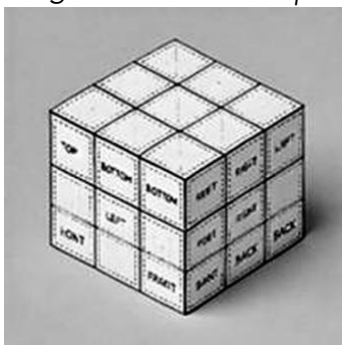


Figure 2: Second Attempt

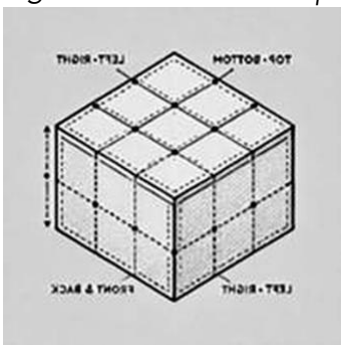
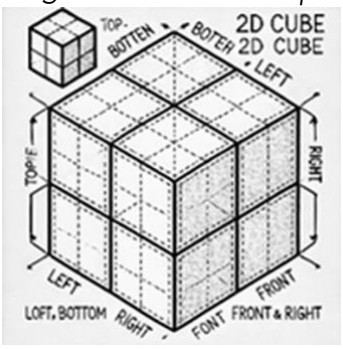


Figure 3: Third Attempt



I keep telling it no, no, that's not what I'm looking for. It responds each time like a cheery butler. It has complete confidence that the next attempt will be exactly what I was looking for. Just one more chance. That's not it. And one more. No. And one more. Nope. So, I'm left wondering: What is the purpose of that cheery tone? To convince me that it really understands what's on my mind, as if to say to me that I just need to keep trying and trying and trying as it swallows up my human-created language into its model? Who's benefiting the most from this exchange? And how much water did the LLM consume in these failed attempts?

Concluding Thoughts: More Questions Than Answers

The climate emergency is the defining challenge of our time. As we explored our experiences with GenAI through the lens of environmental ethics, we found ourselves with more questions than answers. While our individual decisions to use or not use GenAI factor into the big picture of the climate, we're also aware that solo actions are not enough (Beach, 2023). Our personal decisions operate under a constellation of powerful forces. In a perfect world, we'd just opt out of GenAI and let the environment breathe a little easier. Our world, of course, is not perfect. Our ethics are tied to a system of people, desires, trends, technologies, policies, and laws. GenAI is now embedded in daily life and even if we were to account for every GenAI product we (unwittingly) use in a day, we'd probably undercount. Try as we might in the classroom, we cannot operate outside of that system. We are interconnected through environmental ethics. This is the theme we kept returning to in our the mini-cases. For us, this theme implies an overarching question: What does our new GenAI world reveal about the interconnectedness of environmental ethics?

Interconnectedness is a prominent theme that has been taken up by climate scientists such as Hope Jahren in *The Story of More* (2020), Bill McKibben in *Here Comes the Sun* (2025), and Robin Wall Kimmerer in *Braiding Sweetgrass* (2013). We are not individuals making individual decisions. We are connected to each other, to plants, to animals, and to all the natural world. Through these mini-cases, we see this theme of interconnectedness playing out at the classroom level, leaving us with precarious waters to navigate and imperfect decisions to make. Whichever direction we go, perhaps we must lead with awareness that what we do here (in the classroom) matters to what happens out there (in the environment) and that here and there is actually one place, not two. Similarly, there is no *you* and *me* in environmental ethics; there is only a *we*. In this era of GenAI, we need a new critical awareness about the

interconnectedness of environmental ethics. Such critical awareness is necessary for advocating the policy interventions needed to protect the planet.

By discussing the mini-cases above, we found ourselves in spiraling conversations that always featured a new topic to explore: imposter syndrome, student privacy, equitable access, biased information, and administrative policies that become outdated as soon as they are issued. Our challenge has been to see each new issue as not truly new but yet another iteration of our ethical relationships with each other and our collective responsibility for the health of the planet. Our hope is these mini-cases serve as resources for conversations.

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