

# Writing Landfills: A Critical Technological Literacy Approach to Electronic Waste

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This article considers the ethical implications of e-waste in computers and writing and how we can use Selfe's (1999) critical technological literacy to help students understand these issues. Drawing on Selfe's *Technology and Literacy in the 21<sup>st</sup> Century*, and further examining the status of e-waste as an environmental issue, I will introduce approaches and assignments that ask students to critically consider their own e-waste and how it impacts our field and professional practices.

Countless new communication tools, such as phones, computers, tablets, smartwatches are introduced to the market each year. A 2015 Gallup poll found that iPhone users buy a new iPhone as soon as the cellphone provider allows it (Swift, 2015). These purchases add to the 24 individual electronic products that a 2013 study by the Consumer Electronics Association found the average family owns (McCue, 2013). I fully encourage students to bring these electronics, these writing and reading tools, into class. We use our class time and tools to gather information and create texts. These tools are important to our writing classrooms as we use them to prepare our students to compose and design in ways that attend to both audience and medium. In using these tools in my own writing classes, I work to instill a critical technological literacy, advocated by Cynthia Selfe (1999) to promote “reflective awareness of the complex set of socially and culturally situated values, practices, and skills involved in operating linguistically within the context of electronic environments” (p. 148). I encourage my students to make meaningful choices when composing in these environments; they should be effective, not used because they are available or might look cool, and students should consider what the audience understands and has access to.

But a growing problem is how rapidly these tools proliferate each year, and how they, as Jennifer Gabrys (2011) wrote, are “designed and developed within material cultures of disposability” (p. 79). This modification of tools now presents an ethical challenge as to how writing instructors consider the life-cycles of these tools, and the impact they have on our field and our students. Now, as a part of “helping [students] to understand and be able to assess the

social, economic, and pedagogical implications of new communication technologies and the technological initiatives that directly and indirectly affect their lives” (Selfe, 1999, p. 152), we need to think about the hardware itself in terms of sustainability, both physically and ethically, and what happens to them when they have lost their usefulness, quickly face obsolescence, and become electronic waste (e-waste). We need to incorporate this new reality into the reflective practice that informs their rhetorical choices in order to help students understand the process and end-results of not only the texts they produce, but the devices those texts are accessed on. Students should be aware of the larger impact of these technologies on our environment, especially as students compose texts for their professional and civic lives in order to think about their roles as citizens in this growing technological literacy. Dànielle Nicole DeVoss (2009) acknowledged that “As a field, however, we have not established a large-scale environmental sustainability initiative. Nor have we looked critically at our own technological footprints” (“Sustaining the Environment,” para 4). Now is the time to do this.

This article argues that the obsolescence of communicative technologies and e-waste is a crucial element to be addressed by critical technological literacy. Influenced by Selfe’s seminal work *Technology and Literacy*, as well as previous literature examining the problematic nature of e-waste and how environmental practices have already been addressed in writing classes, I will discuss two assignments that will help students think about these issues and how closely connected these issues are to our professional practices.

## E-Waste

As mentioned earlier, so many of our technological communication tools, such as tablets, phones, and gaming systems quickly grow obsolete, and consumers are buying more and more devices to replace the ones they have. This increase in technology production is a new phenomenon, so the concept of e-waste is a fairly new consideration of technological advancement. E-waste can be defined as electronic equipment that is no longer of use or valuable to users. In other words, if an electronic device is not being used, whether it no longer works or no longer satisfies the user, it is e-waste. Sunyoung Kim and Eric Paulos (2011) attributed the acceleration of e-waste to the launch of the iPhone 4, writing “In just a single day, most of those fully functioning and relatively state-of-the-art mobile phones suddenly became of little to no use: migrating into desk drawers, storage bins, and garages” (p. 1). E-waste, like electronics themselves, is growing at a rapid pace. One reason for this is because, as Kim and Paulos further argued, most people don’t consider obsolete technologies the same as generic, everyday waste because many of these materials still work

or because people still have a sentimental connection to the technology. Gabyrys (2011) has also suggested that this connection to technology has added to the problem of e-waste when she stated, “when electronic devices shrink to the scale of paper-thin and handheld devices, they appear to be lightweight or free of material resources” (p. 5). Size and weight, if not heavy or cumbersome, may give users the notion that these devices are not as harmful as they actually are.

But these outlooks on our own dated or unused technology are harmful. The United Nations Sustainability Council reported that, 41.8 million tons of e-waste were generated world-wide in 2014 but only 15-20% of this was recycled (“Discarded Kitchen,” 2015). Even when they are “recycled” they are often sent to other countries where they are scavenged for parts. Kristi Apostel and Shawn Apostel (2009) observed this phenomenon, stating machines are sent to “China, India, and various developing countries, where they are picked apart by hand, exposing impoverished workers to the hazardous components inside” (p. 2) More distressingly, dioxins from these electronics can filter through to water and soil of these countries, making countless inhabitants of these countries sick (Beech & Jirenuwat, 2019). Finally, it is important to note that the amount of global waste is expected to grow by 8% per year (Leblanc, 2018). As so much of professional communication is global noting the larger impact of these technologies is important for our students to understand.

## What Can We Do?

Many in writing studies have discussed how to use writing as a way to advocate for better environmental practices (Dobrin & Weisser, 2002; Goggin & Waggoner, 2005; Myerson & Rydin, 2014), while others have proposed forms of “eco-” pedagogy to help students more deeply investigate environmental issues (Killingsworth, 2009; Tinnell, 2009). While this work encourages a critical lens and action in writing on critical environmental concerns, they do not address the physical nature of the tools they use to accomplish these writing goals. Teaching writing as action and critically approaching how we write about the environment is important in the long run, but still overlooks the material component of technology. Caroline Stone Short (2014) connected how we write about technology to the material aspect of technology and argued that a large problem with the material aspect of technology is how we refer to it in terms such as “virtual” or “new media” and how those terms encourage upgrade. Short wrote, “Although ‘the virtual’ and ‘new media’ work to ‘write over’ the histories of outdated digital technologies, the effects of these devices remain substantial” (p. 292). Writing about technology may change student mindset of how sustainable our devices truly are, but this may not account for these devices filling up landfills.

There have been some suggestions about what can be done regarding e-waste at institutional and pedagogical levels. At a campus level, Apostel and Apostel (2009) have suggested taking steps such as moving outdated machines to underfunded departments or other schools. Further, they suggested creating a freecycle list among academics so that still useful machines go to new homes. Meredith Zoetewey Johnson (2014) advocated for green computer labs that rely on power management through thin clients and strategic software. These changes at the level of faculty and administration are important approaches in reducing institutional e-waste and providing plans to make the machines used on campuses more sustainable. In terms of how e-waste is addressed in the classroom, Robert P. Yagelski (2001) discussed including “consequences of our uses of technology in terms of our existence as being in larger ecosystems and global communities of other humans and nonhuman beings” (“Critical Technological Literacy,” para 3) in his non-dualist pedagogy for writing and technology. Writing about critical assignments, Shannon Madden (2014) argued that the university, through research and teaching, can resist exploitive corporate practices through writing assignments such as interface studies and analyzing the materiality of writing technologies by asking who is excluded from classroom practices because of the hardware. These are really useful suggestions, but to add to the longer-term awareness for our students, we must help them understand how writing for newer devices can isolate some users and can often impact how these users take in the information. Students must remember in their writing processes of writing for online environments, being online or digital means there is still a connection to the hardware that allows them and their audiences to access information.

## iFixit

One approach to bring the physical realities of our technology into the writing classroom was discussed at the 2014 Computers and Writing Conference when Jenny Sheppard and Jen England discussed student projects for iFixit along with Brittany McCrigger who works for iFixit. iFixit is an online wiki-type site that both provides users sets of instructions and allows users to contribute sets of instructions to repair their own electronics and other household items, including tablets, smartphone screens, and gaming consoles. Their focus is helping users think about repairing still useable devices rather than buying new items when something may go wrong. This includes elements that may seem unfixable to people such as replacing shattered screens, repairing broken computer fans, or replacing hard to reach batteries. iFixit advocates to end e-waste, and a large part of this discourse is that repair is more sustainable and better than recycling electronics. They state, “Apple tells everyone

that the battery isn't user-serviceable. That's where we come in, filling the ecosystem hole that Apple created by manufacturing a device without an end-of-life maintenance and disposal strategy" ("Teach Us," para. 3). iFixit works to educate users on how they can sidestep corporate interests through repair and how those repairs can help with the e-waste problem.

iFixit partners with universities for writing assignments to create instruction guides for various large and small items that can be fixed, rather than thrown away. These assignments have been a useful way to put writing into action as others have advocated, as well as introduce the concept of e-waste and the long-term impact it has on us. There are three different iFixit assignments to incorporate into the writing classroom. There is the larger "Standard Project," which is creating a full user manual, the "Fast Fix," which is used to fix smaller, household items, and the "Editing Project" where students go in and edit existing manuals and guides on the iFixit project. I've incorporated the Standard Project assignment into my technical writing, which at my university is a service class for engineering and science majors. While learning the more practical aspect of writing instructions, students (many of whom are already invested in environmental concerns because of their majors such as Wildlife Biology and Environmental Engineering) further analyze the issue of e-waste from a communication perspective they had not had before and begin to think critically about what their own actions as consumers and what their fields can do for this issue.

Another class I have incorporated this assignment in is an Environmental Writing course. This class, primarily for English majors, focuses on writing as a form of action for environmental discourse, and how power through writing in a variety of genres, including instruction guides, can create changes. Many of these students, while perhaps interested in environmental issues, are being introduced to more specifics of environment concerns, what they mean, and what can be done. Therefore, many students are just learning about e-waste at the same time they are learning how to take action. They are able to both create guides to add to the iFixit database, and take a critical lens to the iFixit mission on their website generally. For this course, I chose the "Fast Fix" project as one unit in the course to fit within the larger scope of the course. Incorporating an iFixit project, even the shorter version of it, invokes the spirit of Brenda Miller (2000) who wrote, "Inherent in any goals to inspire a change in behavior resulting in environmental rhetoric and action is the need for sensitivity to those not familiar or empowered economically and technologically to access the material" (p. 165). As part of the assignment, we discussed audiences and users of both the technological devices and iFixit and the potential challenges for those audiences.

Activities in both courses do focus on writing as action, but they also help students think about the ethical concerns associated with technology and the

more general throw out culture and begin to think more about how their own technologies impact their lives. Many students turned to electronics in their own homes that don't work, including toasters, electric kettles, even an electric guitar. Student not only think critically about the sustainability and life-cycle of electronics, they also get the practical takeaways. Many students write in a style they have not used before. Additionally, iFixit makes these projects incredibly intuitive with countless resources to help students take on a project with many different moving parts. They provide manuals on how to write technically, how to take pictures, and how to edit and proofread with grammar guides. When students complete a "checkpoint" (various draft stages of the project), the iFixit team replies with constructive feedback within a few hours to a day. They also keep in close contact with instructors, checking in throughout to get a larger sense of how students are engaging with the project. Students receive very practical experience; they are writing in a genre they have most likely not written before. They work in teams and must work with a specific style and meet very real deadlines. Students also reported being more engaged and expressed their excitement of having written in a new genre and added another writing experience to their résumés and portfolios.

## Technology Inventory

A technology inventory is another assignment that asks student to interact more with their critical literacy of technology and begin thinking about all the technology they have had access to as individuals and as part of their families when they were growing up. This assignment is based on the technology autobiography. The technology autobiography assignment asks students to reflect on the technology that has had an impact on their life and perhaps influenced the choices they made in education and their careers. As Karla Kitalong, et. al. (2003) wrote of technology autobiographies, "In writing narratively and autobiographically about their own relationships to technology, students reveal both idiosyncratic and culturally embedded responses to rapid technological changes" (p. 220). Further, they stated that the autobiography "provides an opportunity for students to reflect on their own attitudes and practices concerning technology" (p. 230). The technology inventory asks students to do similar work, and this reflection also challenges them to acknowledge their relationship with the technology as a material object. Critically reflecting on the life of their gadgets helps students understand their own relationship with technology and how continuously relying on new technology has a global impact on the communication we do worldwide.

A technology inventory asks students to consider all the technology they remember having in their lifetimes and trace where it may have ended up.

The class begins with questions from the technology autobiography, such as, “What were your earliest experiences with technological devices or artifacts and what were they? What do you remember about using them? What were the popular gadgets in your house while you were growing up?” The assignment expands these to ask questions such as “Do you still have those technologies? Are they still usable? Were they passed down? What forms of technology are found in your home today? How did you receive them? How old are they? How do you decide to get new technologies? What has happened to your previous technologies?” These questions help to point students to ALL the technology they have interacted with in their lifetimes.

Most technologies they remember having are first cell phones, iPods, and portable gaming units. We also open the conversation to other electronics, such as televisions, DVD players, or the iHome charging/portable stereo-speaker unit. Students have fun with this part of the assignment, remembering the colorful iMacs they had, their first gaming system, and all the memories associated with them. As they begin to be critical, many students are unable to even recall what might have happened to them, but more often, students and their families still have outdated game consoles and cell phones in their home. One student counted 28 different electronics in their family home, but noted only 14 currently being used. Others discussed how they or members of their families have thrown out these electronics not realizing they could be recycled, or cited how recycling electronics is not as easy as recycling other materials or that the information about how to recycle electronics is not easily accessible. Whatever happened to all of their electronics, until the moment of their Tech Inventory, students essentially had no idea how much impact their technological devices have and how the physical aspects of these just remain, with no clear purpose.

The technology inventory is an assignment where the social and economic implications of the relationship between producer and consumer troubles students. Some students argued that smartphone and other electronic manufacturers need to be more responsible and find ways to make smartphones and other gadgets more sustainable by building them with fewer toxic materials and making them easier to repair. One student wrote in a reflection:

The idea that the consumer and not the producer is responsible for their waste is a fairly new one, and one I personally believe we need to reverse. As individual citizens, we can only make so much of a difference, however, if large companies take ownership of their trash and make products that last longer, biodegrade, or are otherwise are less wasteful. . .

This generated productive conversation about the roles each person has in a company when it comes to sustainability— from research and development to packaging and marketing. And many took these comments and



began to think about other ways they could work to influence electronic producers. They also begin to think about how to educate people about e-waste and what kinds of texts and messaging would be helpful in explaining how other people can make better, more sustainable choices, including writing public policy.

## Conclusion

It is then interesting to see where students take this awareness to further projects, thinking about ways to produce texts that can work across a variety of technologies, where users don't need to upgrade for the best experience; they think about lower tech solutions, making videos shorter, making more meaningful decisions about links, images and other information that may slow a device down. They start to think more critically about the modes they want to compose in and how different modes can impact the hardware the information is accessed on. They ultimately look at how the texts they create for the different rhetorical situations can influence purchasing decisions and the impact on the greater environment and think more reflectively and critically about the choices they can make in their designs. Further, the reflection on what has happened to all the gadgets they have used in their lifetime encourages them to trouble their purchasing choices, especially as newer models of smart phones, tablets, and computers are released nearly every year.

Access to technologies is still an important issue when teaching and preparing students to compose in electronic environments. But it is no longer the only consideration: we must begin to think access on too many devices and the damage this can bring to our environment and what can be done. The projects I have outlined are just a few ways in which academic institutions can respond productively to the environmental, and ultimately social, consequences of technological evolutions.

## References

- Apostel, Kristi, & Apostel, Shawn. (2009). Old world successes and new world challenges: Reducing the computer waste stream in the United States. In Dànienne Nicole DeVoss, Heidi McKee, and Richard Selfe (Eds.), *Technological ecologies and sustainability* (pp. 1–17). <http://ccdigitalpress.org/tes>
- Beech, Hannah, & Jirenuwat, Ryn. (8 Dec 2019). The price of recycling old laptops: Toxic fumes in Thailand's Lungs. *The New York Times*. <https://www.nytimes.com/2019/12/08/world/asia/e-waste-thailand-southeast-asia.html>
- Cleaning up electronic waste (e-waste). (2017, December 11). EPA.gov. <https://www.epa.gov/international-cooperation/cleaning-electronic-waste-e-waste>



- DeVoss, Dànielle Nicole. (2009). Introduction to section IV: Sustainability scholarship and the environment. In Dànielle Nicole DeVoss, Heidi McKee, & Richard Selfe (Eds.), *Technological ecologies and sustainability*. Computers & Composition Digital Press. <http://ccdigitalpress.org/tes>
- Discarded kitchen, laundry, bathroom equipment comprises over half of world e-waste. (2015, April 9). United Nations University. <https://unu.edu/media-relations/releases/discarded-kitchen-laundry-bathroom-equipment-comprises-over-half-of-world-e-waste-unu-report.html#info>
- Dobrin, Sid, & Weisser, Christian. (2002). Breaking ground in ecocomposition: Exploring relationships between discourse and environment. *College English*, 64(5), 566–589. <https://doi.org/10.2307/3250754>
- Gabrys, Jennifer. (2011). *Digital rubbish: A natural history of electronics*. University of Michigan Press.
- Goggin, Peter, & Waggoner, Zach. (2005). Sustainable development: Thinking globally and acting locally in the writing classroom. *Composition Studies*, 33(2), 45–67.
- Johnson, Meredith Zoetewey. (2014). Green lab: Designing environmentally sustainable computer classrooms during economic downturns. *Computers and Composition*, 34, 1–10.
- Killingsworth, M. Jimmie. (2009). From environmental rhetoric to ecocomposition and ecopoetics: Finding a place for professional communication. *Technical Communication Quarterly*, 14(4), 359–373.
- Kim, Sunyoung, & Paulos, Eric. (2011). Practices in the creative reuse of e-waste. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2395–2404). ACM.
- Kitalong, Karla, Bridgeford, Tracy, Moore, Michael, & Selfe, Dickie. (2003). Variations on a theme: The technology autobiography as a versatile writing assignment. In Pamela Takayoshi & Brian Huot (Eds.), *Teaching writing with computers* (pp. 219–233). Houghton Mifflin.
- Leblanc, Rick. (2018, December 31). E-waste recycling facts and figures. <https://www.thebalancesmb.com/e-waste-recycling-facts-and-figures-2878189>
- Madden, Shannon. (2014). Obsolescence in/of digital writing studies. *Computers and Composition*, 33, 29–39.
- McCue, T. J. (2013). 24 Electronic Products per household—got recycling? *Forbes*. <https://www.forbes.com/sites/tjmccue/2013/01/02/24-electronic-products-per-household-got-recycling/#3a43cc272c2e>
- Miller, Brenda. (2000). Multimedia pedagogy and environmental communication: The rhetoric of citizen action in the “information age.” In Nancy W. Coppola & Bill Karis (Eds.), *Technical communication, deliberative rhetoric, and environmental discourse: Connections and directions* (pp. 141–168). Ablex Publishing.
- Myerson, George, & Rydin, Yvonne (1996). *The Language of environment: A new rhetoric*. UCL Press.
- Selfe, Cynthia. (1999). *Technology and literacy in the 21st century: The Importance of paying attention*. Southern Illinois University Press.

- Short, Caroline Stone. (2014). The sustainability of our digital environments: The language of the upgrade path and e-waste. *Green letters: studies in ecocriticism*, 12(3), 286–296.
- Swift, Art. (2015). Americans split on how often they upgrade their smartphones. Gallup. [http://news.gallup.com/poll/184043/americans-split-often-upgradesmart-phones.aspx?utm\\_source=Economy&utm\\_medium=newsfeed&utm\\_campaign=tiles](http://news.gallup.com/poll/184043/americans-split-often-upgradesmart-phones.aspx?utm_source=Economy&utm_medium=newsfeed&utm_campaign=tiles)
- Tinnell, John. (2011). Scripting just sustainability: Through green listing towards eco-blogging. *Environmental Communication*, 5(2), 228–242.
- Teach us. (n.d.). iFixit. Retrieved July 1, 2018, from <https://www.ifixit.com/Info/background>
- Yagelski, Robert P. (2001). Computers, literacy, and being: Teaching with technology for a sustainable future. *Kairos: A Journal of Rhetoric, Technology, Pedagogy*, 6(2). <http://kairos.technorhetoric.net/6.2/features/yagelski/index.htm>