Toward a Civics of Technology

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Teacher educators often encourage technology integration as a means to improve education. However, the COVID-19 pandemic highlighted the acceleration of more invasive technologies offering quick “fixes” in schools and society. Building on the assumption that technologies are not neutral and neither are the societies into which they are introduced, we offer an ecological and critical vision whereby teacher educators might critically inquire with their students into downsides and harms of technologies as they work toward more educational and just futures. Teacher educators can encourage future and in-service teachers can enact a civics of technology by rejecting their role as passive users of technologies and acting as citizens who make informed decisions for more humane and just classrooms and communities. The authors share their efforts through the recently launched Civics of Technology project to create critical community and offer edtech audits as an illustrative example of practice.
Teachers should use technology to improve education. This statement is distinctly uncontroversial. The challenge is not whether to use technology, but how to do so. Various technology integration frameworks have been developed to help teacher candidates and classroom teachers think through their decision-making when using technology (e.g., Kimmons et al., 2020; Koehler & Mishra, 2009). The larger field of educational technology has produced professional standards, scholarship, summits, and more to accomplish this goal. Then, the COVID-19 pandemic upended the world and forced teacher educators into emergency remote teaching (Hodges et al., 2020). What might we learn from this shock to our educational system?

Dan (first author) was recently with a class of 7th-graders in person and asked them to evaluate their relationship with technology. It was not long before a student chimed in, “I hate Zoom.” Heads nodded around the room in agreement and a deluge of complaints about online learning followed. Dan shifted from guest teacher to online learning therapist. How could the tool that allowed for students and teachers to be together when a pandemic forced them apart be the edtech villain? The purpose of Zoom is to facilitate real time audio-video communication across geographic distance. Yet, many in teacher education can relate to the toll Zoom meetings, fatigue, and lag took over time. We share this vignette neither to evaluate Zoom as an educational technology, nor to critique the rapid adoption of Zoom or other technologies during the pandemic. Instead, we offer a different assumption to accompany the one with which we opened: Teachers should examine technology to improve education. Citizens are increasingly forced to determine which hardware and software are most ethical to use, which websites or apps encourage democracy, and which technologies encourage human flourishing. Where will future teachers and their students learn to make such decisions?

The accelerated shift to use—and depend on—emerging technological tools, companies, and systems in schools both exposes a gap and provides an opportunity for a curriculum in educational and ethical decision-making. In schools, corporations raced to “fix” the problems of education during the pandemic. Schools often supplied devices to students who needed them and, in some cases, they were preloaded with surveillance technologies, including keystroke-surveillance software and desktop mirroring capabilities. While the companies claim to protect students, these technologies resulted in some of the most vulnerable students being harassed by administrators. This included the outing of transgender children to their parents who were then questioned on mental health grounds (Keierleber, 2021). What choice do teachers and students have on whether such surveillance technologies are used in schools?
More so, the rapid development and adoption of more invasive digital technologies demands curricular attention on possible harms and drawbacks. Data brokers often sell scraped third-party data to the highest bidder regardless of their intent. The largest educational technology conferences often devote a high percentage of sessions on how to use Google products but scarcely any concerning whether educators should use the products of a company that disguises their education business model and profits from surveillance capitalism (Lindh & Nolin, 2016; Zuboff, 2019).

Selling the data of children to companies mirrors trends in broader society. A phone app sold the location data of people who visited abortion providers (Cox, 2022). Another technology company scraped all pictures they could online (without consent) to sell to police and advertisers in ways that could disrupt the notions and rights of privacy with disproportionate threats to immigrants, refugees, and Black, Indigenous, and People of Color (Hill, 2020). Numerous technology companies have revived the dystopian, science-fiction concept of a metaverse and proposed it as a new path for human life that de-emphasizes shared physical spaces as part of social life. Where in the school curriculum are students studying intrusive personal data collection or shifts in digital infrastructures and experiences? Are students’ experiences with surveillance and other technologies in schools preparing them to accept or challenge these practices in society?

VISION

In this time of rapid technological disruption, education and the field of educational technology are still too often guided by, in the words of an early Facebook motto, a *move fast and break things* approach to adoption, education, and scholarship. As Ruha Benjamin (2019) put it, the field may need to “move slower and protect people” (p. 15). Educators can move toward a *civics of technology* that shifts people from passive users who accept technologies without question to active citizens who make informed decisions for more humane and just communities. Citizenship always operates in relation to the power to create narratives, set agendas, and make decisions. However, in the United States, Black, Indigenous, Latinx, and Asian Americans have often been excluded from full citizenship through racist laws or policies (An, 2016; Busey & Dowie-Chin, 2021; Rodríguez, 2018) or the disempowerment of tribal nations (Sabzalian, 2019). Therefore, justice-oriented notions of citizenship are often defined in relation to communities (Rodríguez, 2018; Vickery, 2017) and tribal nations (Sabzalian et al., 2021) as well as the nation state. Teacher educators can prepare teacher candidates
to critically inquire into technologies and their complex social effects in and out of schools. Such investigations can ensure that pedagogical and political decisions about the roles of technologies in our life are educational and just.

First, educators can help students examine technology by recognizing that technologies are not neutral. From an ecological perspective, technologies do not simply carry out their intended purposes, but always require trade-offs, result in disproportionate effects, carry ideological biases, include unintended consequences, and change people and our world (Postman, 1998). From a critical perspective, technology can include discriminatory design (Benjamin, 2019), algorithmic bias (Noble, 2018), or other forms of embedded or enacted forms of oppression (Heath & Segal, 2021). Acknowledging the non-neutrality of technologies is necessary to address the changes they bring.

Second, teacher educators can teach students to recognize that technologies reflect or extend the biases of the societies into which they are introduced. For instance, in a society where whiteness is privileged and normalized, it is not surprising that photograph exposures, facial recognition, and even soap dispensers which were not designed for darker skin may fail to work for People of Color (Benjamin, 2019; Buolamwini & Gebru, 2018). Drawing on critical perspectives can widen how students evaluate technology and move toward technologies, in and out of school, that are more humane, educational, and just in their development, adoption, and implementation.

By 2025, we aim to advance ecological and critical approaches to technology education in and beyond the teacher education field through our Civics of Technology project. We hope these efforts will build a community where teacher educators, teachers, and their students are empowered to critically inquire into the effects of technologies on their individual and collective lives and make informed decisions about which technologies to use or resist. There are numerous measurable ways that this growth can be identified, but we will focus on four efforts below.

First, we aim to grow a community of critical scholars investigating technology. We have already begun to cultivate a community of researchers. These contributors have authored blog posts, created curriculum, and participated in book clubs and livestream events. We have been inspired by their technology education scholarship around figure/ground analysis (e.g., Forsler & Ciccone, 2021; Mason, 2018), ecological perspectives (Garcia & Nichols, 2021; Nichols & LeBlanc, 2021), the Nature of Technology (Pleasant et al., 2019), and the harms of digital proctoring and surveillance (Logan, 2021). Growing our community will allow us to continue to ask critical questions to each other and the field.
Second, we aim to encourage growth in scholarly research in technology and teacher education that focuses on ecological and critical perspectives in technology education. Such scholarship may include studies that more fully attend to the trade-offs of educational technologies or action research projects on how to resist the effects of coded bias, oppressive algorithms, and more. Historically, many studies—including our own—have touted the benefits of educational technologies, unwittingly embracing a technological optimism. Instead of considering only how technologies improve learning, we might ask researchers to adopt a technoskeptical perspective and consider how technologies create new environments that cause ecological changes (Mason, 2018). This can open up scholarly spaces to investigate not just what educational technologies do, but what they undo (Postman, 1992). Scholars can interrogate not just the benefits, but the downsides. They can identify not only who might benefit from this technology, but who is harmed by it. We believe an increase in educational technology journal special issues, critical special interest group sessions at educational technology conferences, and a general normalizing of asking ecological and critical questions across the field will advance this vision. In particular, we aim to encourage more research that shares technology education from students’ perspectives, such as Forsler and Ciccone’s (2021) figure/ground analysis or Vakil and de Royston’s (2022) positioning of youth as philosophers of technology who confront technological surveillance of immigrant communities through documentary filmmaking.

Third, we seek to learn from scholars who have created programs with critical curriculum that center students and advance justice. For example, we are inspired by critical approaches to technology education by scholars in learning sciences and African American Studies. Dr. Sepehr Vakil of Northwestern co-created the Young People’s Race Power and Technology Project (YPRPT) as “an initiative that brings together undergraduate students at Northwestern with local high school students along with activists, artists, and technology experts to investigate the impact of Artificial Intelligence and Big Data technologies on marginalized communities in the Chicago area.” In another example, Dr. Ruha Benjamin at Princeton University created a Tech Freedom Schools for the 21st Century summer institute through the Ida B. Wells Just Data Lab (https://www.thejustdatalab.com/) where undergraduate students examine issues of data justice in different institutional contexts such as healthcare or education. We see both of these efforts as examples of the type of work we aspire to learn from and enact in our teaching and research.

Fourth, we seek to collaborate with our community of scholars to increase the number of curricular approaches, activities, and lessons available
for practitioner use. Many teacher educators develop outstanding activities for their own classes but are not shared with colleagues. We aim for a central repository where teacher educators can share their technology education work. There are many models for scholarly curricular projects such as the Civics Online Reasoning curriculum developed by the Stanford History Education Group (SHEG) (https://cor.stanford.edu/). We plan to follow a similar model that is informed by research and theory to offer curriculum resources which educators will find useful. The use of such resources in classrooms will provide indicators of whether we have succeeded.

**IMPLEMENTATION**

To understand what it might look like to advance a civics of technology in teacher education let us return to Zoom. It is a technology—maybe more than any other—which is associated with the pandemic. In general, Zoom operated under our first assumption: Teachers should use Zoom to improve education. On-campus classes turned into Zoom sessions overnight. The emergency shift lasted into the next school year, and some classes and programs moved online permanently (Moore et al., 2021). Yet, we scarcely saw any educational attempts to figure out what we were getting ourselves into with videoconferencing technology broadly and Zoom specifically. If education is to be responsive to the world which students inhabit then we believe teachers should examine Zoom to improve education. Teacher educators are uniquely positioned to encourage such examinations. For example, Autumm Caines offered an ecological investigation of “the Zoom Gaze” with an accompanying facilitation guide that troubles the medium of Zoom through play (Caines, 2020; 2021).

We include numerous approaches that could be used to critically examine Zoom on our recently launched Civics of Technology project website (https://www.civicsoftechnology.org/). Each of the following curricular approaches could help us examine Zoom alongside students in teacher education programs:

- **Asking Five Critical Questions about Technology**: Inspired by Neil Postman’s 1998 talk, Dan Krutka, Scott Metzger and Zack Seitz (2022) developed what they call technoskeptical questions to position teachers and students to critically inquire into the collateral, unintended, and disproportionate effects of technology. These questions encourage students to take a skeptical disposition toward
technologies to consider possible downsides. They can be used by educators when discussing technologies of the past or present to consider ecological and critical perspectives. Adapted for Zoom, the questions are as follows: (1) What does society give up for the benefits of Zoom?; (2) Who is harmed and who benefits from Zoom?; (3) What does Zoom need?; (4) What are the unintended or unexpected changes caused by Zoom?; (5) Why is it difficult to imagine our world without Zoom? Asking such critical, ecological questions about Zoom, or videoconferencing more broadly, could encourage teacher education to think not just about what technology can do and facilitate, but what it can undo or harm.

- **Conducting Edtech Audits**: We encourage educators to conduct an edtech audit or questioning that evaluates educational technologies to determine if they are ethical and just. We offer three possibilities on the website: a *technoethical audit*, a *discriminatory design audit*, and a *critical questions* framework (see, https://www.civicsoft-technology.org/edtechaudit). For example, Ben Gleason and Marie Heath (2021) carried out a technoethical audit of Google Classroom during the pandemic, finding that the design nudged pedagogy toward a teacher-centered approach, while the surveillance capabilities fostered carceral practices in schools and homes. In another example, Dan Krutka, Zack Seitz, and Ahmed Mohamed Hadi (2020) conducted a discriminatory design audit of Zoom at the onset of the pandemic. They determined that Zoom prioritized profits over people, which resulted in lax security and the proliferation of racist and sexist Zoombombs, among other problems.

While the Civics of Technology project is only months old at the time of this publication, we are hopeful it will help us learn lessons from the rapid technological changes induced by the pandemic. We envision this work—both in the field and in our project specifically—helping us strive for a more informed and just relationships with technologies in schools and society.

**References**


