The Ecologies of Minimal Computing

By: Alex Gil

MOVEMENTS & MOBILIZATION

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I'm "just a librarian" to quote my youngest son, and that may be, but I'm one who strives to be a *just* librarian. My specific title is Digital Scholarship Librarian, and my job is to help faculty and students navigate advanced forms of computation and engineering in order to do their work. This sometimes means helping them architect interactive publications online; other times it means helping them use algorithms to analyze data or documents related to their research; and in rare, precious occasions, it means helping them build networks of scholars to work on a common task. To do my job right, I must keep up with most developments in computing and networking in their social and cultural contexts and, when needed, create new tech—always striving to make it both just and useful.

Access is not a binary of haves and have-nots. That binary assumes that anything worth having is up North.

About a decade or so ago, I set out to understand how scholars who work on culture, past and present, were using computers around the world. My curiosity followed a trip to Cuba as translator for a group of scholars from Canada, the INKE group, who specialized in the art of making web-based scholarly editions of important historical or literary documents. In Cuba, I had the opportunity to meet many other scholars who used computers in unique ways—ways I had never seen in the universities up North. I was invited to a potluck party to share academic articles that I brought with me on a USB. I saw how scholars used email chains to publish articles related to LGBTQ or Black Studies, and the scholarly richness of the intranet, including the rather Borgesian EcuRed, the Cuban alternative to Wikipedia. In short, I saw a completely different world—or ecology—of technology. For the first time, I came to understand that access was not a binary of haves and have-nots. That binary assumes that anything worth having is up

North.

The first result of my research into the world's different uses of digital technologies for the work of research and learning was a virtual journey of that world: "Around DH (Digital Humanities) in 80 Days" launched in the summer of 2014. After a year of making new friends in every corner of our social media planet, and a careful process of curation led by the volunteer editorial teams that followed, we selected 80 projects from around the world. Each day, for 80 days, beginning on Jun 21, 2014, we visited a different place, a different project. Seven years later, I'm still struck by the rich differences and similarities between the curated projects. In comparing them, we glimpse markers of power and money, clashing ideologies and models of governance, modalities of censorship and freedom, uneven access to constant electricity or the so-called open web, and various bandwidths. As a result, there is a cacophony of different practical solutions to keep scholarship chugging along: piracy and camouflage, DIY, repair, repurposing and reinvention, sneakernets and unnamed nets, and a host of other "architectures of necessity," to borrow from Ernesto Oroza.

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Much work remains to be done understanding these material and structural differences in their evolving specificity, and what these imply for justice in technology, but in this ongoing work, I also hope we guard against nationalizing differences. Differences in access to the internet and regimes of censorship apply as much to the United States as they do to Sudan. For example, in 2015 our team partnered to teach digital storytelling at the Rikers Island jail to our Black and brown youth imprisoned there under cruel and unjust conditions. Our students there have no access to computers, let alone the internet, other than in their memories. Yet we were able to use our own freedom of movement and small paper notebooks to carry their voice and code to Twitter.

Following Around DH, the "Rikers Story Bot," and similar early initiatives, I started to consider how I could pivot my job to focus on tech justice for a world with such textured differences and injustices. Would I continue to build software or digital solutions for the world of high-bandwidth and new computers where I work at Columbia University in New York? I couldn't. And I wasn't the only one who was noticing these things in our little world of digital humanities.

Tweets from Rikers Story Bots

Around 2015–2016, like-minded practitioners started meeting under the loose banner of "minimal computing" to dream of forms of research tech (hardware and software) built or used under conditions where computing capacity—such as hardware, software, education, network capacity, or power—is constrained. Minimal computing asks what happens when we reduce the design elements on the front end? The electricity we use? The labor that it takes to build, maintain, and learn? The processing power of the machines we use? Imagine, for example, building software that helps communities create digital repositories in low bandwidth environments, repositories that can then circulate outside the internet to avoid the prying eye of the government. Beyond contributing seed ideas to this burgeoning conversation, I set to work on rapid prototypes at our xpmethod group back home in New York. The first prototype I built was "Ed," a framework for creating digital editions of historical or literary texts—e-books, if you will. "Wax," built mainly by Marii Nyröp, followed Ed at our lab. Wax is a flexible framework used to construct low-cost digital exhibits and collections, perhaps one of the most common uses of computation in the humanities globally.

Each prototype is widely used and has led to demonstrable reduction in computation. However, the impact of both prototypes should be measured less by the direct adoption of our tools, and more by the questions they center for digital scholarship: how do we build for specific environments? How do we include researchers and learners in low-bandwidth environments? How do we insert our digital scholarship in censored regimes? And how do we teach enough computation to help researchers take more control of their digital production?

Today, we continue to explore the possibilities of computing under constraint by adding an element of urgency to what we do. We do this under the banner of mobilized scholarship—because tech justice requires more than just research. It demands research that will guide the creation of just technology, that helps those who create and maintain technology to avoid the catastrophe and slow hurt that result from the manic pursuit of techno-utopias and unscrupulous profit. I hope many here in Just Tech will accept

this challenge.