



Civic Community Archiving with the Platform for Experimental Collaborative Ethnography: Double Binds and Design Challenges

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Abstract. Community archives serve an array of purposes and types of communities (fan clubs, scientists in particular disciplines, ethnic neighborhoods). We discuss here *civic* community archives; civic archives, like “civic science,” have expressly progressive political aims, question established order, and contribute to inclusive knowledge production and prosperity. Designing civic archives involves many types of analysis and poses many design challenges. In this paper, we share an analytic framework developed to guide the design of civic community archives, drawing on both cultural theory and our experience designing archives for different kinds of communities, with different purposes, within larger ethnographic projects. We question how to characterize “the community” in community archive projects, and the stakeholders in such projects. We ask what should be collected in community archives and for what purposes. We also ask how, by design, community archives can connect diverse users, analog and digital components (including human and technological), and complicated pasts to creative futures. Throughout, we call out the double-binds of civic community archiving, delineating risks and possible pathologies as well as generative potential. We approach the work as cultural anthropologists and ethnographers involved in building the Platform for Experimental Collaborative Ethnography (<https://github.com/PECE-project/pece-distro>), open source digital infrastructure for sharing and collaborative analysis of ethnographic data.

Keywords: Ethnography · Cultural heritage · Civic community archiving · Digital infrastructure

1 Introduction

Ethnographers can study ways peoples produce, use, share, and preserve knowledge, sometimes integrating digital tools into their methods. Ethnographers have used Facebook to support interactions among and engagement with the people they study to supplement face-to-face interactions, for example, considering this a type of “expanded ethnography” that is not only observant but also productive of exchanges that lend

insight into the identities, relationships and processes the ethnographer seeks to understand (Piacenti et al. 2014; Baker 2013; Beneito-Montagut 2011). In turn, ethnographers can also design digital tools and spaces for the people they study, moving from observation, analysis, and interpretation to technology development intended to scaffold and extend the knowledge practices with which they are concerned. The work described here is in the latter vein, leveraging the Platform for Experimental Collaborative Ethnography (PECE), open source software that supports collaborative preservation, curation, analysis and interpretation of qualitative data. Using PECE, the authors have built a suite of digital archives supporting different types of communities in their efforts to understand and address shared problems. The approach integrates emic and etic perspectives, working both with community members' understanding of the knowledge infrastructure they need and with ethnographic and theoretical understanding of their political, social and discursive contexts. It also depends on technical skill, creativity and criticism.

Community archives serve an array of purposes and types of communities (fan clubs, scientists in particular disciplines, and ethnic neighborhoods, for example) (Flinn 2019; Nelson 2016; SAADA 2018). We are particularly interested in *civic* community archives; civic archives, like "civic science," have expressly progressive political aims, questioning established order, contributing to inclusive knowledge production and prosperity (Fortun and Fortun 2005). Designing civic archives involves many types of analysis and poses many design challenges. Most importantly, civic community archives need to be customized to address particular power dynamics and associated social and discursive formations: they need to be designed to *push back* against business as usual (Fortun et al. 2016). Understanding the context of civic community archives is thus critical; their designs need to be "appropriate," meshing with their particular contexts rather than complying with universal standards (Fortun 2004a, b).

Our conception of civic community archives draws extensively on social, literary, psychoanalytic and pedagogical theory, recognizing the importance of many interlaced dynamics both within and in the surrounds of digital systems (Koch 2017). In our work on community archives, John Dewey's *The Public and Its Problems* is a particularly important reference. Dewey argues that democracy depends on the formation of publics with shared concern about social problems, but that powerful market and state forces often subdue the formation of these publics and, in turn, their criticisms. Publics thus need to be prompted to form, leveraging diverse modes of communication, producing signs and symbols through which people can see themselves in context. Dewey explains that as "symbols are related to one another, the important relations of a course of events are recorded and are preserved as meanings. Recollection and foresight are possible; the new medium facilitates calculation, planning, and a new kind of action which intervenes in what happens to direct its course in the interest of what is foreseen and desired (Dewey 1927: 330–331). We envision civic community archives as having the potential to prompt publics into existence in this fashion.

Our work on civic community archives also extends from work in the "literary turn" in history and cultural anthropology. Hayden White's *Metahistory* is illustrative, drawing out how the structure (not only the prose content) of historical and philosophical texts carries their meaning (1973). White describes, for example, how the structure of Ranke's and Hegel's texts are integrative and organicist (with synecdoche as the dominant trope),

have the structure of a comedy, and encode a conservative ideology. This way of thinking about texts has continued to be important in experimental ethnography (Fischer 2018; Trouillot 1995; Clifford and Marcus 1986). It has also guided the way we think about digital design and the structure of civic community archives. Digital systems, too, encode ideology and produce meaning through their structure as well as their content. As a result digital systems, like texts, constitute their readers/users as subjects. This is why we see the technical design of digital systems as so generative and significant: such design sets up users in ways at least as powerful as the content they move through.

In what follows, we describe how we have moved from ethnographic research on knowledge, memory and data systems into the design of digital research infrastructure (PECE) to support collaboration among ethnographers. This, in turn, enabled us to move into the development of civic community archives. We describe the design goals, structure and function of PECE, noting how, in many ways, PECE is deliberately out-of-joint with HCI principles (cf. Ambielli 2018). We briefly describe the research we do to support PECE development, and the analytic framework we have developed to guide the design of PECE-supported civic community archives. We then describe two civic community archives now under construction, and the double binds and design challenges they have posed. We close with a description of the process we are planning to vet and refine the community archives we are developing, extending the para-site approach developed at University of California Irvine's Center for Ethnography (Marcus 2013). We envision the parasite events planned as a form of in-process, collaborative peer review particularly suitable for scholar projects that interlace ethnography and design.

2 Memory Making as Cultural and Political Praxis

2.1 Ethnographic Studies of Thought Styles, Memory, Evidence, and Trading Zones

As ethnographers, we specialize in the study of knowledge practices, infrastructures, innovation, and politics. Our ethnographic research then guides our work in what we term design anthropology, moving from what we have learned as ethnographers to the design and development of knowledge infrastructure responsive to the challenges and aspirations of the places and people we study. In this, our ethnography “loops,” becoming a guide to collaborative and creative praxis (Fortun 2012).

As ethnographers, we document and analyze the “thought-styles” of different communities, including disciplinarily diverse scientific communities, environmental activists and community organizers. Our focus is on the discursive formations and narratives through which people collectively make sense of and act in their worlds (Fleck 1981 [1935]). We want to understand what is remembered, how the past is narrativized and to what effect. We observe the kinds of data that people consider useful, meaningful and persuasive. What counts as data worth collecting, what goals and ends shape its production, and what analytic perspectives guide its interpretation are some of our concerns as ethnographers of knowledge. Ethnography of knowledge includes the ethnography of data, evidence and memory.

As conceptualized by historian of science and molecular biologist Ludwig Fleck, “thought styles” are far from monolithic or homogeneous; indeed, their ability to generate

shared perceptions as well as new thinking and creative solutions depends on different members of a scientific “thought collective” belonging to multiple thought collectives, and on the mixing of the different abilities, insights, and interests of a more “esoteric” circle of experts and professionals with those of a more “exoteric” circle of people with more “generalized” knowledge, including lay persons. Extending from this, we also study how people, ideas, data and memories circulate, and how such circulation drives cultural and social change. In this, we often focus our observations on what historian of science Galison (1997) has called “trading zones,” where people with different skills and knowledge come together for collaborative work. Scientists can work across “vast global differences,” Galison demonstrates, to “hammer out a local coordination” similar to the way groups that speak different natural languages establish contact languages to enable interaction. Galison’s concept of “trading zones” has been taken up in multiple areas, to orient both scholarly analysis and practical work (Fincher and Petre 2004; Gorman 2002; Gorman et al. 2009). In our research, we approach digital systems as trading zones, analysing who they bring together and who they exclude, what is foregrounded and what is occluded or missing. We also analyze the political effects of digital systems and data infrastructure, drawing out connections to social vulnerability, inequality and multiple forms of injustice.

2.2 From Ethnography to Design and Capacity Building

As described above, our ethnographic research has examined how data infrastructure subtends both social vulnerability and capacity to recognize and address such vulnerability. Stemming from this, we have become increasingly invested in understanding and helping build what we have come to think of as public knowledge infrastructure and “data capacity” (including technical infrastructure, public data resources, analytic and visualization capabilities, and supporting educational programs and fields of expertise).¹ Data capacity powerfully shapes how societies anticipate, characterize, and deal with collective problems. Given the tangles of problems contemporary societies face – and need to work on together – building public data capacity with both local relevance and global scope is a high priority. This will be far from straightforward, depending on inventive project designs linking researchers across disciplines, generations, and geographies; linking research to education at all levels; and building new connections between universities, civil society organizations (including cultural institutions), governments, international organizations and businesses. These have become key long-term aims of our work.

Over the last two years, we’ve developed multiple projects that experiment with ways to build data capacity and public knowledge infrastructure. As previously noted, this work extends from and is guided by what we have learned through ethnographic research: our work in design anthropology translates our findings as ethnographers of knowledge. All of our digital design projects “loop” in this way (Fortun 2012), carrying forward what we have learned in other ethnographic projects.

¹ We recognize that “capacity” has become a widely circulated developmental “buzzword” (Cornwall 2007) which carries negative valences amongst many communities who have been frequent subjects of development interventions. We use it to signal the continued importance of building up individual and collective abilities to work together on a tangle of late industrial issues.

Here we describe our work to develop civic community archives, which builds on earlier work to develop digital research infrastructure (PECE) for collaborative ethnography. We first developed PECE for our own research, but always with an eye toward making it more widely usable; it is now freely available (and customizable) as a GitHub download (<https://pece-project.github.io/drupal-pece/>).

3 The Platform for Experimental Collaborative Ethnography

3.1 PECE Software and Research

PECE is open source (Drupal-based) software supporting virtual research environments for cultural anthropologists, historians, cultural heritage scholars, and other researchers working with diverse data (including extensive unstructured data), largely through interpretive methods. Various, thematically-focused PECE instances provide space to archive and curate data, facilitate collaborative analysis of data, and enable diverse modes of visualization, scholarly communication, and peer review.

In the last decade, PECE software has become widely used, with customizable digital infrastructure supporting the workflows, data types and interpretive modalities in what we call the “empirical humanities.” There are now many instances of PECE supporting diverse research communities. (An instance is a distinct copy of the software, with distinct content.) Work on the following instances of PECE informs on-going software development:

<https://theasthmafiles.org/> | <http://housingenergy.info/> | <https://disaster-sts-net-work.org/> | <http://centerforethnography.org/> | <https://stsinfrastructures.org/> | <https://www.researchdatashare.org/> | <https://worldpece.org/> |

The worldpece.org instance of PECE houses research supporting PECE development examining, for example, data management and peer review practices in different disciplines, and the theoretical underpinnings of diverse digital humanities projects (Fortun et al. 2020; Poirier et al. 2019; Fortun et al. 2017). An important thread of PECE research especially relevant to the development of civic community archives examines how data infrastructure projects – like California’s Cradle-to Career Data System – can be designed to meet the needs of diverse stakeholders. Another thread of PECE research examines how community archives can be designed to support community memory, knowledge production and strategies for dealing with problems like climate change (Almeida and Hoyer 2019; Buchanan and Bastian 2015; Caswell 2017; Caswell et al. 2016). PECE development has also been guided by the PECE Design Group’s engagement with the Research Data Alliance, where we have served as co-chairs of the Digital Practices in History and Ethnography Interest Group since 2013.

The worldpece.org instance of PECE also houses tutorials supporting PECE platform administration, project design and use (which are used in workshops like this one for Learning PECE). The PECE user community has included students (as young as middle school through dissertation research) and researchers in multiple counties.

3.2 PECE Architecture and Functionality

PECE is usefully thought of as a triptych, providing shared digital space for archiving, collaborative analysis, and creative expression. Integrating these functions into one platform makes PECE unique, and also imposed a number of design demands which we elaborate below. Overarching all of these was a commitment to build not simply a Drupal-based website that combined these three features, but a Drupal distribution that enables anyone or any organization to download the source code from GitHub and install a new instance of the platform with all of the innovations we have developed, which they can then tailor to their own projects. Every design decision we made, therefore, was done with these larger communities in mind, knowing that both the features and the drawbacks of our platform would carry over to future users.

In the first space of the triptych, for example, users archive and curate data “artifacts,” primarily documents, images, audio and video recordings. Because our collaborative ethnographic projects include researchers from many different parts of the world, using technologies of varying kinds and quality, we decided not to build in standards (of recording quality, for example) that many archives require. We also designed all interfaces so that they could render on mobile devices, allowing users to upload photos or recordings directly from a mobile phone while in the field, wherever that might be. And because we wanted to create open archives which anyone could access and to which anyone could contribute, we had to allow (unlike many if not most archives in libraries and institutions) for ongoing registration of new users; spam control and a site administrator always on call became required features.

PECE employs a modified version of Dublin Core metadata for its content. Content in many digital humanities projects is often drawn from materials already catalogued by libraries; because ethnographers and community groups are constantly producing new data, they have to provide this kind of metadata themselves. One effect of this is that PECE as yet does not allow for batch uploads (of a large number of photographs, for example), and requires users to enter metadata, including licensing information, to each artifact. Every user takes some curatorial responsibility. PECE can also assign Archival Research Keys ARKs) as needed, a persistent identifier that makes data always findable while crediting a contributor.

By design, PECE encourages open data sharing when appropriate, partly by allowing researchers to archive data in a way that makes it easy to open access to the data at different points in the research process. But since most ethnographers also produce and work with sensitive materials, content uploaded to a PECE instance can be designated “private” (accessible only to one or more people listed as contributors), as fully public, or as restricted to either a select group or to all registered users of a platform. This allows users to comply with ethics review requirements while still digitally archiving data in a manner ready for sharing when appropriate, and also to change these permissions at any time, opening up previously private material or taking material out of public circulation

while still preserving it. Users can also set an expiration date for data content, after which the data content is removed from the platform. Researchers can remove their data from a PECE instance at any time.

PECE as TRIPTYCH		
ARCHIVING	ANALYZING	COMMUNICATION
bibliographies pdfs word documents images audio & video recordings web urls	data sets news articles maps policies government reports organizations scientific studies	text artifacts timelines photo essays collage essays video audio virtual tours

A PECE design innovation is the support it provides for collaborative analysis (the second space of the triptych), by people both within and across different communities. Platforms similar to PECE like Omeka (<https://omeka.org/>) and Mukurtu (<https://mukurtu.org/>) excel at exhibiting their archived materials (Mukurtu’s “Traditional Knowledge License” also adds nuanced protections to its cultural heritage content), but like almost all archival content, their primary and even exclusive function is to preserve. Data remains inviolate, true to its original form and intent. PECE analytic structures keep archives “feverish” (Derrida 1998) and alive, adding new kinds of metadata in the form of open-ended interpretations to every data object. Data is in effect constantly re-made through the accrual of interpretations that activate new meanings in the initial artifact. PECE analytic structures supporting this can be co-produced with community members, archived and made accessible across communities. This can result in a lively, generative space for both local and trans-local community knowledge production.

3.3 PECE Projects

PECE instances are thematically focused and are designed to host multiple projects that can build on and borrow from each other. The Disaster-STs Network instance of PECE (<https://disaster-sts-network.org/>), for example, includes kindred projects such as the Quotidian Anthropocene project and the Beyond Environmental Injustice project (which includes case studies of environmental injustice in over 20 California counties, produced by undergraduate students at UC Irvine).

Visualizing Toxic Subjects (<http://centerforethnography.org/content/visualizing-toxic-subjects-project-page/essay>) is a collaborative project (on the UC Irvine Center for Ethnography instance) in which participants collect, narrate, share and analyze ethnographic visualizations, reinventing the use of visual materials in the conduct and

expression of ethnography. Participants built digital photo essays and a gallery exhibit of images that convey toxicity in its many forms and guises – environmental, political, media, and others. The project began fall 2018, moved through multiple phases of digital collaboration, then to a gallery show in May 2019.

STS Infrastructures is another instance of PECE, established to provide a digital archive, collaboration, and publishing space for Science and Technology Studies (STS), an international research community focused on the social dimensions of science and technology. “STS Across Borders,” a special exhibit for the 2018 annual meetings of the Society for Social Studies of Science (4S), was the first major project run on the platform. “Innovating STS” was a special exhibit for the 2019 annual 4S meeting. STS Infrastructures now hosts an array of projects, including the Transnational STS Working Group, annual workshop materials for the student section of 4S, and oral histories of STS researchers.

3.4 PECE, Writing Culture, and HCI

PECE was first developed to support the practical needs of collaborative ethnographic projects involving geographically distributed researchers working in the so-called “literary turn” of cultural anthropology that began in the mid-1980s. A central feature of the “literary turn,” sometimes also called the “postmodern turn,” is a shift from a representational “thought style” in which faithful reproduction and observer neutrality were essential terms, to a style in which the performative effects of language, genre, and form became central concerns and objects of analysis in themselves (Marcus and Fischer 1986; Clifford and Marcus 1986).

Mauthner and Gardos (2015) describe a parallel shift in archival theory and practice, as these moved from treating “records and artifacts as representations of reality” to foregrounding how archived data and the memories they embody are “made and remade through multiple practices including data generation, data curation, and data analysis.” So although the design and development of PECE was not informed at first by work in HCI or archival sciences, we have since learned much from their research and principles, though aware that, in many ways, we have designed against the HCI or archival grain. Efficient information retrieval is rarely a main goal, for example, nor a match between the systems we are building and “the real world.” In most cases, our archives are built to be assertively counter-hegemonic. Our archives are also, often, “rogue” – building from Abigail deKosnik explication of rogue archives as “largely run by people that do not have training or expertise in library and information studies,” as “nominally barrier-less to access,” housing “content that has never been, and would never likely be, contained in a traditional memory institution, are “identity- and culture-generating,” and become “intertextual sites of...community performance, inspiration, [and] reaffirmation” (Watson 2020; De Kosnik 2016).

Many of the design principles that guided our development of PECE were also informed by concepts, theories, and practices of feminist anthropology and feminist science and technology studies (STS). It was only later that we came to appreciate that this scholarship also contributed to feminist approaches in HCI. Bardzell (CHI 2010: 1307) has shown how feminist HCI research and design works to advance many of the same values and goals as we have in developing PECE: valuing pluralism in epistemology and interpretation over universalism; encouraging and incorporating both participatory methods and the participation of marginalized voices; and ensuring that digital technologies like PECE are “self-disclosing,” always foregrounding how software and interface design create a certain kind of user-subject, and thus should introduce a “critical distance between users and interactions”.

Kindred perspectives have been developed in critical heritage studies. Archivist and scholar Leisa Gibbons, for example, has developed the Mediated Recordkeeping Model (MRkM) as “a tool that can be used to map multiple, simultaneous realities from different points of view,” building community capacity to co-create cultural heritage materials and archives (Gibbons 2018: 905). This is highly resonant with the aspirations of PECE and many PECE projects and archives.

4 Designing PECE-Supported Civic Archives

In this section we share an analytic framework that we’ve developed to guide the design of civic community archives, drawing on both cultural theory and our experience designing archives for different kinds of communities, with different purposes, within larger ethnographic projects. We’ll question how to characterize “the community” in community archive projects, and the stakeholders in such projects. We’ll ask what should be recollected in community archives and for what purposes. We’ll also ask how, by design, community archives can connect diverse users, analog and digital components (including human and technological), and complicated pasts to creative futures.

In moving to construct archives expressly designed for publics beyond our own research groups, we have developed a new set of shared questions that help us envision the purposes, form, functions, risks and potential of these archives. Questions we ask (technically supported by a PECE Analytic Structure) include:

PECE ANALYTIC
DESIGNING CIVIC COMMUNITY ARCHIVES

This World PECE Analytic was developed to guide collaborative conceptualization and design of PECE-supported civic community archives. The questions will be added to worldpece.org as a PECE analytic structure that poses questions that can be addressed across different civic community archiving projects.

1. What was the original purpose of this archive and how has its purpose shifted over time? What social discursive ecologies are the archive situated within?
2. What is the archive designed to remember?
3. What exclusions, inequalities and injustices (procedural, media, economic, imperial, etc.) is this archive designed against?
4. Who are the stakeholders in this archive? What differences of interests and perspective are likely to be in play? What publics/networks/communities does or could the archive interface with?
5. Who are likely and hoped for users of this archive?
6. Does this archive aspire to *create* a public (following John Dewey's arguments about the need to provoke publics into existence)?
7. What types of data does the archive include and why? How is data presented and how are users encouraged to interact with the data?
8. What practices and tasks are the archive designed to support? Are workflows meant to be linear and efficient or exploratory and experiential?
9. What forms of participation (Kelty) does this archive aspire to -- and actually -- support? Where in the archive's architecture and workflows is participation supported and encouraged?
10. How does this archive connect users? What kinds of collaboration does this archive support and encourage?
11. How does this archive leverage the various genre forms PECE supports?
12. What are the affects of engaging with this archive?
13. How is the archive enabled, or constrained, by PECE's design logics?
14. How is the archive discoverable and accessible? If there are restricted spaces, how do users gain entry?
15. How has this archive been connected to events and practices beyond the digital domain?
16. Where is this (PECE-supported) archive hosted and what technical services and infrastructure does it depend on? What software and other technologies beyond PECE does it incorporate or interface with?
17. What labor (voluntary and paid) and financial support does this archive depend on?

5 PECE Civic Archives in Construction

Currently, there are many PECE-supported civic community archives in development. One archive (being built on <http://theasthmafiles.org>) is designed to support a neighborhood organization that is running a community air monitoring system. One purpose of

this archive is to preserve, interpret, and share a growing body of evidence that the neighborhood is subject to severe, disproportionate pollution. Another purpose is to convey how the organization has come to focus on environmental injustice after working for many years on other problems; while environmental injustice in their neighborhood isn't new, its emergence as a *public* problem (in John Dewey's sense) is. PECE timelines and photo essays will be used to convey this history, allowing the neighborhood organization to share their development with neighborhood residents, city planners and funders.

Another PECE-supported community archive project (built on <http://disaster-sts-network.org/>) is designed to support a transnational, interdisciplinary community of experts working to address radiation health hazards, working across problem areas (uranium mining, bomb test sites, nuclear power plants and nuclear medicine) usually dealt with separately. This archive will, in part, be a portal to other archives (with oral histories, virtual tours of nuclear power plants, government documents obtained through freedom-of-information requests, etc.), providing space for collaborative analysis and interpretation of material in these archives. In this archive, links to items in other archives will be added as PECE artifacts that are then annotated with analytic structures developed specifically for the project. The "community" in this archive isn't local but needs to think in concert about many different localities around the world dealing with radiation hazards.

Each PECE-supported civic community archive has a particular purpose, delineated through ethnographic research. These archives preserve different kinds of data, and use PECE affordances in different ways. Their users are very diverse, and can't be addressed in universalist terms. A key challenge ahead is to learn how to learn across these diverse civic archiving projects, not looking for standard protocols but for creative insight into ways digital archives work (and often fail) as trading zones and animators of civic action. We provide more extensive description of two additional civic community archives below.

5.1 Research Data Share (Nairobi, Kenya)

Research Data Share is a digital workspace and archive established to support a community of practitioners concerned about the kinds of data (especially qualitative data) and data practices needed to (re)animate critical civic engagement in Nairobi. By drawing people into the practical work of building an archive (and deciding what should be preserved and shared), it seeks to recollect the vibrancy of Nairobi's public sphere in the 1960s and 1970s, when there was active and creative visioning of an Africa for and by Africans. In 1972, for example, the trio of Ngugi wa Thiong'o, Henry Owuor Anyumba and Taban lo Liyong famously proposed abolishing the English Department at the University of Nairobi to make space for literary forms and aesthetics rooted in Kenya rather than outside (Musila 2019; Gikandi and Mwangi 2007). Paradoxically, the civic vibrancy of the earlier period has now been largely eclipsed, despite both putatively democratic governance and Nairobi's recent rise as "Silicon Savannah" (Stroisch 2018; Bright 2015). As a major tech hub today, Nairobi is dotted with start-up spaces and is teeming with (idealized) tech entrepreneurs. It also produces large quantities of qualitative data, much of it for commercial purposes (to guide development of app-based banking services, for example, and to understand "tech culture" itself). Meanwhile, many

people (both tech entrepreneurs and people living in the city's massive, under-resourced informal settlements) feel over-researched, without reciprocal benefit. And the halls of the university are quiet. Students have become tightly focused on upwardly mobile job opportunities and there is limited visioning of what Nairobi and Kenya could become on its own terms.

Research Data Share (RDS) was established (as its own PECE instance) in late 2018 by anthropologist Angela Okune as an elicitation device for understanding the diverse "thought-styles" of Nairobi-based researchers producing and working with qualitative data. From the start, RDS was also used to share the project's own data, modeling what open data in qualitative research can look like, inviting commentary. Okune's research included engagements with different kinds of Nairobi-based organizations (of different sizes, with different histories, international connections and ambitions, sometimes commercial) that produce qualitative data about Kenyans. In some cases, there was interest in PECE simply because it provides an organizational structure for storing, re-finding and commenting on qualitative data. Others were looking to lower their research costs (by reusing other people's data rather than collecting their own). Still others were (or became) concerned about the postcoloniality of research in Kenya and with ways to reach beyond knowledge imperialism (Okune 2020).

Okune learned about these sentiments through traditional ethnographic interviews and also by working with people side-by-side in RDS. Okune also organized a public event - "Archiving Kenya's Past and Futures" - at McMillan Library, one of the oldest libraries in Kenya. This event was designed to create interest in both RDS and a gamut of questions about the kind of knowledge infrastructure needed in Kenya at this stage. The event drew in librarians, academic researchers and people in government agencies charged with catalysing research. It resulted in the formation of the Research Data KE Working Group, which has sustained the dialogue using RDS as virtual workspace.

Work on RDS has rotated around PECE's support for open-ended annotation. In most cases, Okune uploads artifacts - her own interview recordings and data analysis, found material (news articles, social media posts) focused on issues like open access in Africa and the COVID-19 pandemic, proceedings of RDS hosted events - and invites annotation using PECE's analytic structures. All members of the groups have the permissions needed to upload artifacts but this often seems overly laborious, especially since dialogue about the artifacts often begins on a WhatsApp channel before moving to RDS. Here, PECE's design has been both catalyzing and constraining. Since PECE does not allow bulk uploads, each artifact added must be justified with commentary. This means that every artifact has an interpretive supplement from the start but this can be challenging in a fast-paced research environment like Nairobi, where "time is money".

RDS provides a space to learn about the evidence practices and data cultures in play in Nairobi's hyper-lively qualitative research domain, drawing out many factors that influence these (age; whether a researcher is Kenyan, or not; location in a private form, perspectives on multinational corporate involvement, etc.). RDS is also designed to *engender* a public (in John Dewey's sense), prompting sustained collective engagement with issues that market forces easily eclipse.

5.2 Recollecting Multinational Petrochemical Companies (Taiwan, USA, Vietnam)

The Formosa Plastics Global Archive² is designed to support a transnational network of people concerned about the operations of Formosa Plastics Corporation, a vertically-integrated Taiwanese petrochemical company. Formosa Plastics is one of the largest chemical companies in the world, with facilities in Taiwan, China, Vietnam, and the United States. Formosa has a damaging record of explosions, routine pollution, and “mafia-like” behavior with environmental activists and other critics (Democracy Now 2020; PRI 2020). Formosa Plastics also has its own museum, located on the grounds of Chang Gung Formosa Plastics University, near Taipei. Chang Gung University grew out of a hospital set up by Formosa in 1976 “to make a meaningful contribution to Taiwan’s society.” Today, the university uses “the successful management model of Formosa Plastics Corporation and its resources” to build students’ management knowledge (<https://www.cgu.edu.tw/p/404-1000-17343.php?Lang=en>).

The Formosa Plastics Museum has six floors, with exhibits celebrating the founder and spirit of the Formosa Plastics Group (complete with dioramas and wax figures) and a miniature replica of Formosa’s 6th Sixth Naphtha Cracking Plant. The fifth floor has an Earth Conservation Theatre. The sixth floor conveys how Formosa has given back to society through investment in education, hospitals, and cultural heritage projects.

Formosa Plastics continues to expand, extending production capacity at existing sites and with plans for a new multi-billion dollar chemical manufacturing complex in St. James Parish, Louisiana, an area already known as “Cancer Alley.” Lawsuits have been filed and activists have been mobilized to challenge approval of the project by Louisiana’s Department of Environmental Quality. Arguments against approval refer to Formosa Plastics’ long history of misconduct, to the area’s already exceptionally high pollution burden, and to the history and present challenges of nearby African American communities. They also note massive local property tax exemptions, approved by the Louisiana Board of Commerce. Formosa Plastics and Louisiana state agencies continue to insist that the new complex will bring jobs and other economic benefits (Mosbrucker 2020).

Opposition to Formosa Plastics has, in some cases, been successful. In 2019, for example, a lawsuit filed by people living near Formosa’s facility in Port Comfort, Texas resulted in a US \$50 million settlement. The lead plaintiff, former shrimp boat captain Diane Wilson, has been watching and resisting Formosa since the early 1990s. The records Wilson has kept (including leaked company audits, interviews with workers, and years of news clippings) fill a large barn. In recent years, traveling by kayak, Wilson and others have been on nurdle patrol, tracking Formosa’s plastic pollution discharge to local waterways. The recent legal settlement included funds to support this work to assess compliance with a court order for “zero discharge.” Weekly water monitoring reports produced by Wilson and collaborators include photographs and textual descriptions of plastic pellet pollution at water discharge outlets from the Formosa plant. Wilson also donates plastic pellets to the citizen science initiative Nurdle Patrol at the University of Texas at Austin.

² The archive name remains preliminary and may be changed for strategic or legal reasons.

The PECE-supported Formosa Plastics Archive (at disaster-sts-network.org) grew out of ethnographic research to understand the data infrastructure available and used (by activists, scientists, government regulators and corporations) to characterize environmental health hazards, especially in highly polluted communities, many situated on the fencelines of high risk industrial facilities. This has been an important focus of ethnographic research at least since the 1980s, when the Union Carbide chemical plant disaster in Bhopal, India provoked environmental “right-to-know” legislation around the world (Fortun 2004). Since then, it has become clear that environmental politics always involves data politics. Political antagonism often revolves around what data is produced, used, considered credible, and dismissed. *How* data is represented and narrativized is also contested.

Awareness of ways environmental and data politics are entwined has catalyzed intensive data collection practices among environmental activists, often accumulated over decades of work. The data is heterogeneous, unstructured and usually informally organized. Often, the person who collected the data needs to be interviewed to learn about its provenance and relevance. There is an overwhelming amount of material to sort through, and many ways of thinking about what should be prioritized for sharing. Some of the material is relevant in lawsuits seeking damages or in efforts to slow Formosa Plastics’ expansions. In these cases, timing the publication of data needs to be strategic; to manage this, the Formosa Plastics Global Archive uses PECE’s capacity to preserve and work with data in digital spaces restricted to a delimited group until ready for release.

The Formosa Plastics Global Archive also includes a set of courtroom sketches drawn by sociologist Paul Jobin supporting plaintiffs in a case. These sketches powerfully recall both the dynamics of the legal case and are an inspiring example of collaboration between academic researchers and communities impacted by pollution. In working with these data, we learned that court illustrations are a recognized data type and that we can learn from on-going curation of these at places like the U.S. Library of Congress.³

Environmental data sharing has strategic importance in especially complex ways when dealing with multinational corporations. Data collected in one place can have both informational and tactical value in other places (helping people understand the special processes and hazards of ethylene oxide (EtO) production, for example, as well as ways it has been governed; news that the US has committed to massive reduction in EtO emissions suggest that much improved environmental protection is technically possible elsewhere as well). The Formosa Plastics Global Archive is designed to support data sharing of this sort. It is also designed to prompt people in different Formosa locations to see themselves as part of a shared community-of-practice. Like the Nairobi-centered PECE archive (RDS), the Formosa Plastics Global Archive is designed to *engender* a public that doesn’t yet see itself in collective terms. The archive is meant to activate not represent social relations.

Anthropologists Tim Schütz and Shan-Ya Su have taken the lead designing and developing the Formosa Plastics Global Archive, working across sites in Taiwan and the

³ See the Wikipedia entry on the courtroom sketch as a data type (https://en.wikipedia.org/wiki/Courtroom_sketch), and “Drawing Justice: The Art of Courtroom Illustrations archive at the US Library of Congress (<https://www.loc.gov/exhibitions/drawing-justice-courtroom-illustrations/about-this-exhibition/>).

United States, moving between academia, courtrooms, personal data collections (like Diane Wilson’s barn) and cultural institutions (like the Formosa Plastics Museum). They are curators, intensely attuned to the overlapping contexts in which the archive they are building will operate, working against both corporate greenwashing and the isolation of geographically distributed communities impacted by Formosa Plastics’ operations.

The Formosa Plastics Global Archive is multi-lingual, and tells many stories at once. Weaving these stories together is a challenge, narratively and technically. One strategy so far – built out under the title Sugar Plantations, Chemical Plants, Covid-19 – literally walks people to Formosa, through a virtual tour of Louisiana’s Cancer Alley, stopping at the Sunshine Bridge on the Mississippi River near the proposed site of the new Formosa Plastics complex. At the Sunshine Bridge stop, visitors are invited into the Formosa Plastics Global Archive, which opens up pathways to many other places where Formosa operates. The virtual tour makes use of many PECE functions and genres, especially the shadow-box-like PECE essay. The tour is designed to mimic physical-world walking tours, inspired especially by the “toxic tours” run by environmental activists in many settings. Rendered virtually, the tour collects diverse representations of Cancer Alley (put together over many years) that are especially powerful in tandem (helping people zoom into the deep history and complex landscape of Cancer Alley). The tour also encourages visitors to zoom out, seeing Formosa Plastics’ global reach. Efficient, goal-oriented movement through the tour and larger archive is not the design goal; users are meant to explore and experience the material, coming away transformed.

6 Double Binds and Design Challenges

Ethnographic projects are usually replete with double binds and design challenges, especially when critically engaged with the forms of their own articulation (Fortun et al. 2017). Double binds are not simply the result of competing choices or difficult decisions; a double binding situations are the product of at least two incompatible, contradictory statements or demands that can neither be avoided nor resolved (Bateson 2000, Visser 2003). In what follows, we describe a few double binds that we’ve encountered thus far in PECE-supported civic community archiving projects.

First, there are double binds in naming: names establish and represent a singular stable identity, but every identity is a multiplicity and set of relationalities, already and inevitably unstable. This double bind is particularly powerful in digital knowledge infrastructure, which runs on an ontology of stable names literally coded into the system and has no space for plural and ambivalent meaning. Even basic terms like “archives,” “data set,” “community,” and “civic” have different meanings and valences in different contexts, and to different user communities.⁴ This divergence is of course exacerbated when translating between languages. In some contexts, for example, “civic” data is understood narrowly as government data. In many contexts in the Global South, both “civic” and “capacity building” are widely perceived as owned (and tainted) by their association with development projects. In our work on civic community archives, we

⁴ In translating a description of the Quotidian Anthropocene Archive project into Turkish, for example, we were asked if “data collection” is equivalent to “data set,” with the translator oscillating between “veri seti” (data set) and “veri toplama”.

work to keep such pluralism and ambivalence in view rather than subsumed beneath the same name.

Another double bind PECE has to negotiate is that between signal and noise, figure and ground, controlled meaning and unruly excess. One way to think about archives, and virtually all digital knowledge infrastructure, is as a machine for ordering and transmitting signals, authorized meanings extracted and isolated from a sea of noise. Archives *must* do this; only ordered, authorized objects can be findable and thus meet the first FAIR principle of data sharing (to be findable, accessible, interoperable, and reusable). We have worked hard to make PECE do this, to make its archival data meaningful, discoverable signal. But as ethnographers, we also work hard to always attend to and present what is marginalized as noise, to keep in our analytic workflows what the hegemonic system considers to be unauthorized or meaningless. PECE encourages community archivists to collect more data than they think they need, to continually put noise into the signalling system, things for which there is currently no ordered space and which do not as yet make sense. Following poet and scholar Fred Moten, we think of this as creating “fugitive spaces” in our archives: spaces on the edges of memory, where objects are both inside a system and outside it, at the limit of established sense and counter-hegemonic norms. (Wallace 2018).

PECE also works the signal-noise double bind in the way it allows researchers to publish archival data along with analytic text, most notably in the “PECE Essay.” Most archives present their contents as solitary units of cultural heritage, isolated in their curation. In the PECE Essay users can juxtapose multiple text and image artifacts along with analytic texts, including data that may seem out of place, not making sense. The limits to such juxtaposition of both authorized and fugitive elements are easy to imagine; it’s all too easy to overwhelm hard-won and carefully crafted signal with a noisy excess intended to keep it in question or open to other interpretation. There are no easy, immediate, or cost-free solutions to double binds – but we may learn something by remaining in them.

7 Deutero-Learning, Para-Sites and PECE-Supported Civic Community Archiving

Anthropologist and communication theorist Gregory Bateson conceptualized deutero-learning as learning not only how to do something (correcting for errors that would make your bicycle topple, for example) or how to re-think your approach and premises, but learning how to learn from particular operations about one’s context and its particular dynamics and complexities. In shorthand, deutero-learning is often described as “learning to learn.” It happens through repetition, comparison, reflection and abstraction.

Ethnographers can study practices, infrastructures, and capacities for deutero-learning in the communities they work with. They also need to cultivate their own capacity for deutero-learning, especially when working in an experimental vein that links ethnography to digital design in the manner we describe here. In this way they “learn to learn” how to scaffold the memory practices of diverse communities, tracking between praxis and theory and back, and between different examples of the ways ethnographic insight can be translated into digital system design. A key challenge in

this work is to understand variation between contexts, and how the design of digital systems and archives can help communities speak directly and strategically to a particular context - pushing back against very particular hegemonies. Universal standards can get in the way. At the same time, however, critical distance and continued reflection are needed; without these, it can be difficult to see what *isn't* being represented in an archive and its narratives.⁵ It also can be difficult to see when and where archives contribute to the reproduction and retrenchment of staid discourses and sign-systems rather than unsettling them and making way for alternatives. Comparative, reflective consideration of civic community archives side-by-side thus has special value, helping ethnographers learn how to learn how to design and build better digital systems, attuned to different contexts. Such deuterio-learning by ethnographers also creates valuable opportunities to build new collaborations with HCI researchers, librarians and archivists.

Going forward, we will activate this kind of comparative reflection and deuterio learning through work on “para-sites” of the sort developed by the University of California Irvine’s Center for Ethnography in the late 2000s (Marcus 2013). Para-sites are events designed by an ethnographer (or group of ethnographers) to bring together differently positioned people to reflect on a project’s findings thus far – not seeking to correct or even elaborate those findings but to characterize and strategize their discursive context. Para-sites are a way to get ethnographic projects unstuck, through creative collaboration. Para-sites are spaces for working out what late-stage ethnographic projects can and need to become, leveraging the insights they have already produced to surface and bring into relief the discursive inertia, interpretive gaps, and semiotic risks in the problem-domain they are situated in. Double binds can be identified and worked through (though never solved, of course). Phenomena of concern that can’t be articulated in available idioms are somehow drawn out, as are effaced memories. The risks of particular ways of characterizing people, problems and future possibilities are unraveled. In the parasites events we plan to hold, we will add a second layer, working also to characterize and strategize the kind of digital knowledge infrastructure and practice that can effectively move the discursive context the ethnographic project both works within and has delineated. This process can draw out a project’s discursive context, as well as possibilities for looping back into that context through digitally-infrastructure community memory and knowledge practices. The diversity that needs to be drawn into these para-sites is thus redoubled, including creative technical as well hermeneutic capacities.

The para-sites will run in a series, encouraging engagements across different projects. PECE-supported digital workspace for each para-site will scaffold interactions before, during, and after each para-site event. In turn, these digital workspaces will also function as memory archives and sources for creative recollection. This will further animate critical reflection in our civic community archiving efforts, situating us deeply within particular projects but with memory of other projects on hand. The para-sites and their archives will thus become our own community archive, enabling our own deuterio-learning, helping us move ethnography itself.

⁵ Lauren Klein, for example, has worked with an archive focused on Thomas Jefferson and the enslaved people he owned, showing how creative modes of handling and displaying data can bring archival absences and silences to the surface and into memory (Klein 2013).

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