



DESIGNING DIGITAL INFRASTRUCTURE: Four Considerations for Scholarly Publishing Projects

ALI KENNER
Drexel University

We all want it—a website, a comment feed, a place for people to connect, and now, social media buttons, too—but how do we get there? Miles stand between a vision for digital infrastructure (i.e., the many scales, materials, and dynamics that produce the digital tools that we interface with, such as websites) and a functioning platform; the majority of us have limited knowledge of what exists behind interfaces used every day, publishing platforms included. Yet our scholarship increasingly becomes digital—produced, circulated, and discussed in electronic and online formats. *Cultural Anthropology* (CA) partakes in this broader socio-technical transition; for more than eight years now, the journal has been incrementally moving to a digital format, and in experimental ways (Fortun 2003). Far from going open access (OA) overnight, the Society for Cultural Anthropology has been building digital infrastructure around CA since 2007. While other articles in this special collection stay close to the core debates and dynamics of OA, this essay considers issues, relationships, and materials that have been made, in my view, peripheral in our OA discussion, albeit perhaps for good reason. The infrastructure described is not specific to OA, but it makes open access possible. Thus, by tracing the long-term socio-technical work that made it possible for CA to go gold OA earlier this year,¹ this essay works to make visible some behind-the-scenes details that should be considered by organizations thinking about going OA.

As we move discussions around publishing forward and adopt OA models, social scientists need to consider how digital infrastructure opens and closes possibilities for scholarly production and engagement. We need to learn digital infrastructure, much like other forms of infrastructure that shape our lives and communities. This means attending to pathways and structures that connect communities and materials. In the context of scholarly publishing, for example, how publication bundles give access to members of some organizations and not others; how metadata attached to a particular webpage—one of CA’s article supplements, for example—will allow connections between themes, theories, and relevant citations, both within the site and beyond it; how the robustness of a site’s search engine can draw in or frustrate users; or how information systems privilege and prioritize certain kinds of information over others, thus shaping knowledge paradigms (Bowker 2000). For most of us, our relationship to digital infrastructure is defined by consumption, even as these systems provide context for our work and shape the circulation of our scholarship. Our production in digital formats might best be characterized as passive, rather than as constitutive. Yet the increasing use of digital systems comes with new labor roles, forms, and conditions. Editorial workflows and tasks have shifted, sometimes requiring a different kind of technical skill set, executed in a more open-ended time frame. Web developers, IT specialists, and computer scientists also become part of the mix as the context and form of publishing is informed in a time of big data. These modes of production are often absent from conversations on scholarly publishing and its future. Attention to changes in publishing infrastructure—which, like most infrastructure, is often rendered invisible—is needed, not only because it allows us to make sense of socio-technical transitions at various scales and for differently invested communities but also because we need more informed participants; users who can question the system in ways that make it more robust and usable. Or as Susan Leigh Star (1999, 379) writes, “Study an information system and neglect its standards, wires, and settings, and you miss equally essential aspects of aesthetics, justice, and change.”

Thus, this essay aims to describe CA’s digital platforms, the work involved in creating them, and how they support the journal’s activities. These introductory comments are designed to provide basic information on how digital infrastructure supports CA’s experiments in scholarly engagement, experiments intended to (1) shift how scholars engage with CA’s archive, (2) expand the range of materials and modes of ethnographic representation beyond traditional print essays, and (3) facilitate discussion of both timely and long-standing anthropological concerns in

digital format. The narrative provides a nuts-and-bolts overview of CA's digital projects and infrastructure, information I have shared in bits and pieces in conversations, meetings, and presentations during the past four years. Think of the following as blueprints that might inform other professional societies and academic organizations as they take their work and communities online in more formal ways. Although these comments are situated within a conversation specific to OA and digital publishing, they are also relevant for other social science and humanities projects that involve digital infrastructure.

The first section describes the two digital platforms that support CA, Open Journal Systems (OJS) and Typhoon, the framework that CA Online is built on. The second section, "Digital Labors," highlights the different kinds of work practices and experts needed to initiate and sustain CA's digital infrastructure. Section three details the work of the Society for Cultural Anthropology's (SCA) social media team, and very briefly considers how circulation and community matter for scholarship in digital form. The final section underscores the need for multiple forms of expertise and the value of cross-institutional collaboration; the section documents CA's original OA project, ShareCA. My discussion of these four components is meant to demonstrate the breadth and diversity of the digital infrastructure work that CA has undertaken over the years. Although the examples described are not OA journal specific, they are designed to show that (1) OA is part of a larger trend whereby scholarly communication moves and expands in digital spaces, and that (2) the development of digital infrastructure, in a broad sense, can enable the move to open access.

PLATFORMS

In 2006, when Kim Fortun and Mike Fortun took over as editors of CA, the editorial office adopted two digital platforms to support the journal: an online review management system (called Electronic Workflow System, EWS) and a public website (hereafter referred to as CA Online to differentiate the website from the print publication) created using Drupal, an open-source content management platform.² Here, *platform* refers to websites that make digital publishing possible, everything from blogs to peer-reviewed journals. Content management systems (CMS) are the most common type of platform used; well-known examples include WordPress and Drupal, both of which are open-source projects. These platforms exist on a spectrum that starts with a simple out-of-the-box setup—you could have a very basic, generic website in an hour—and that scales up to more advanced customization and structural flexibility. Simple options allow

platform administrators to create sections, categories, and different types of content, and to place these features in relation to each other. The organizational possibilities are not infinite, however, and programming skill is needed to adapt out-of-the-box frameworks to project needs. The first version of CA Online (v.1) was built with Drupal, for example. Our current online review management system, Open Journal Systems, is another kind of open-source web-based platform, not a CMS. Knowing what platforms are available, however, and what they do, is still secondary to determining what you need from the platform. Although CA no longer uses either of these two platforms (EWS or Drupal), what we learned from the systems' limitations—technical and structural—informed decisions about next-generation platforms. The next section will discuss CA's use of online review management systems, followed by the design and development of CA Online v.1 (2006–2012) and v.2 (2012–present).

Online Review Management Systems

Electronic Workflow System (EWS), *Cultural Anthropology's* first online review management system, was a proprietary platform provided by the University of California Press, at the time the publisher of AAA's portfolio (2006). Like other review management systems, which are now ubiquitous in peer-review journal production (Fenner 2009), EWS served as a portal for manuscript submissions, organized the review process, allowed us to build an extensive reviewer database, and stored editorial notes and decisions. The system was organized around a scheduler that helped editors and reviewers stay on track—perhaps you have received an automated message, “gently reminding” you that a review is due? The platform allowed multiple editors to work together, and indexed a large pool of potential reviewers according to generic and editor-crafted criteria; our files were all in one place, and time-stamped. Those who have experience editing academic journals have a sense of the need for good organization, particularly when annual submissions exceed 250 manuscripts, as they do for CA.

When AAA announced that the portfolio would be transitioning to Wiley-Blackwell (WB), *Cultural Anthropology* was informed that we would no longer have access to EWS. No more access not only meant that we wouldn't be able to use the platform but that we wouldn't have access to our submission files either. Manuscripts, reviews, editorial notes and decisions could be printed out and stored in filing cabinets, and the database could be zipped, exported, and archived, but we would no longer be able to access and use the journal files in the same way; we wouldn't be able to use the materials from EWS digitally. This was an

early lesson on the details of digital transitions and the interoperability of platforms, one that got us thinking about data management in the long term, and in greater detail: Will you be able to access and use data (i.e., manuscripts, reviews, and editorial decisions) in the same way beyond the system it was created in? In the case of EWS, the answer was no. Of course, this also meant that there was no need to migrate data from EWS to OJS; migrating data from one platform to another can be technically challenging and labor intensive. Our new online review management system would be empty—no messy or incomplete files to manage—and we could reorganize the editorial process based on lessons learned within the previous system. Despite these conveniences, the sense of (data) loss dominated the transition process.

As CA's editorial office prepared to transition the journal from the University of California Press to WB, we decided the new online review management system needed to deliver on three criteria: (1) the editorial office would have control and ownership over the platform, (2) the platform would be open source and supported by a robust development community, and (3) the system would have the capacity to assist with journal production and dissemination as well as review management (EWS only provided review management). Open Journal Systems met these criteria.

An open-source software project designed for open-access academic publishing, OJS is considered the most widely used publishing platform in the world. First released in 2001, the software was created by Public Knowledge Project (PKP), a nonprofit initiative involving a number of universities and many researchers. According to PKP, in 2013 more than 5,500 journals were using OJS to publish content, and as many as 24,000 organizations were using OJS for testing and publication development.³

Cultural Anthropology's editorial office began using OJS in September 2007, several months before we would be shut out of EWS. Transitions take time and overlap is advantageous—another lesson learned from working on CA's multiple platforms and through platform transitions over the years. It bears mentioning that these kinds of practices—how to structure a system transition and how to think about data management—are conditions that web developers are trained to think about and plan for; it's part of their expertise. Those of us who adopt open-source platforms in a DIY fashion need to learn these things through trial and error, unless, of course, you are fortunate enough to have a developer on staff (something I often recommend).

Although OJS has met the criteria of CA's editorial team, or at least the initial criteria, OJS is not always the most user-friendly platform—for authors, reviewers, editors, or administrators. User difficulty derives mostly from interface design, not the architecture of the system itself, for example, an author struggling through the online submission process or reviewers unable to figure out how to upload a review. This impacts the work of editors and site administrators, but in different ways than that of authors and reviewers. *Cultural Anthropology* has kept a running tab of user troubles over the years, hoping to identify points in the interface that seem particularly difficult. Admittedly, beyond documenting user difficulty and providing one-on-one support for each issue, without in-house technical support for OJS, *Cultural Anthropology* has done little to improve the platform's functionality. The system seems to function well enough for most users most of the time. With dedicated technical support, however, CA may have been well positioned to contribute to broader efforts to advance OJS as an open-source publishing platform.

The flexibility, openness, and ownership of digital self-publishing platforms need to be paired with expertise; in-house technical expertise wasn't required when CA used a proprietary platform whose range of possible modifications was almost nonexistent when compared with the potential of OJS. Although PKP provides extensive documentation, some technical literacy is needed to set up and customize the platform. There is a trade-off at play: organizations who adopt OJS—and perhaps any open-source platform—must recognize that the price for ownership is technical support, a component of digital infrastructure often taken for granted. Yet most of us will recall experiences of patiently waiting for technical assistance while our digital lives are put on hold. With OJS, rather than on-call technical support, there are discussion forums and FAQs to be consulted.⁴ Thus, the transition from EWS to OJS meant that CA needed to have a designated person who could provide technical support.⁵ Review management platforms make editorial workflows efficient, but some of this work is displaced (to technical staff) or requires new skill sets (from the editorial team).

Cultural Anthropology maintained OJS in house from the time it was adopted in August 2008 until August 2013. When the decision was made to convert to a gold OA publication, CA's editorial team approached Duke University Libraries to see if OJS could be housed within their system. Duke hosts several OA journals, all of which use OJS for publishing. The advantages of moving *Cultural Anthropology's* OJS installation to a university library include better technical support, more routine maintenance, better security and data management, and connection

to a suite of other OA publications within the same institution. We are benefiting from and (hopefully) contributing to the well-established infrastructure of the university library system, organized by its own digital infrastructure, which includes many different kinds of expertise. Since August 2013, *Cultural Anthropology*'s OJS platform has been technically maintained by Duke University Libraries. This move is an example of self-publishing made more robust through institutional partnership.

Significantly, CA has only used OJS for review management, as opposed to leveraging the platform for the entire publication process, which includes editing and dissemination. Open Journal Systems has the capacity to orchestrate journal production as well as review management. One need only look at *HAU: Journal of Ethnographic Theory* or any of the sample OJS journals highlighted by PKP to see how organizations use OJS from start (submission) to finish (dissemination). As CA continues to grow and refine its publication practices, it is likely that the editorial office will use more of OJS's publishing features.

At various points in recent years, CA's editorial team considered whether OJS continued to be the best review management system for the journal, but despite its limitations and skill requirements, the answer has always been yes.⁶

CA Online and Content Management Systems

Cultural Anthropology's public website, CA Online, is built on a completely different software platform. Until CA went open access, OJS and CA Online were not connected beyond links that pointed users to the other site—visitors to CA Online were directed to OJS to submit manuscripts, and OJS users could find their way to CA Online through the site's submission instructions. There was little need to link the two before CA went open access; OJS was used to manage peer review, CA Online handled presentation. Wiley-Blackwell coordinated the various stages of journal production in between. Wiley-Blackwell also managed the dissemination of quarterly issues by hosting published issues on its website. Now that CA is self-publishing, however, OJS and Typhoon (the open-source platform built for CA Online v.2) have become integrated beyond these referential links. Journal articles are hosted on OJS, but they can only be accessed through CA Online (or AnthroSource or WB's website, depending on your access point). *Cultural Anthropology* Online v.2 complements OJS by providing a better user interface, more content options, and HTML5 standards (HTML is one of the primary languages that structure and provide Internet content; HTML5 is the fifth revision of the language). A logical follow-up question, however, is, why

have CA Online at all? Why not use OJS for the entire operation? The short answer is that OJS, as a platform, is designed to manage and deliver peer-review journals in relatively traditional form. It is not designed to support experiments in other formats and forms of scholarly communication, an aim that has always been central to CA's vision.

Cultural Anthropology Online v.1 launched in 2007 with Kim Fortun and Mike Fortun's first issue as editors. The site was designed to provide the journal with a web presence in three ways: with expanded information about the review process; by providing supplemental resources for published articles (a practice found in other science disciplines); and through a well-designed archive that thematically indexed previously published articles. Casey O'Donnell, at the time a PhD candidate and the Fortuns' first editorial assistant, built the site using Drupal, a common open-source content management system. By the time CA Online v.2 launched in 2012, the legacy site had more than seven hundred pages of content. Yet many anthropologists, it seems, are unaware of this disciplinary resource.

At the outset and throughout the Fortuns' editorship, CA Online was organized around three sections: a section with basic information about the journal; an indexical section, which provided lists of CA articles by theme and geographical areas; and an article supplemental archive, which came to be the largest section of the site.

Providing detailed information about the journal's vision and review process was foundational; more than an "About" section, which could easily be provided through Wiley and the AAA's website, the journal's info section had a pedagogical edge. It was designed to help authors, reviewers, and readers think about CA's vision, as well as how to engage with texts. It also provided basic information about copyright, permissions, and reprints, a move intended to increase publishing literacy among CA's readers. What have come to be known as CA's supplemental pages, and the theme and area indexes, however, are what set CA Online apart from other social science and humanities publications.

The vision for CA's supplemental pages came from work in the digital humanities, as well as from publications in the physical sciences, which also make supplement material available with published articles. In the physical sciences, supplement material often comes in the form of data sets, represented visually. Such content is outside the scope of what is published in peer-reviewed articles, but still valuable for readers trying to make sense of arguments and study design. *Cultural Anthropology's* supplemental pages work from the same logic, but they follow from work undertaken in the digital humanities. These pages include author

Home

Guidelines for Submitting Manuscripts for Review

Submitted by Cultural Anthro... on Thu, 2006-08-10 10:53

Cultural Anthropology, the journal of the Society for Cultural Anthropology, publishes ethnographic writing informed by a wide array of theoretical perspectives, innovative in form and content, and focused on both traditional and emerging topics. It also welcomes essays concerned with theoretical issues, with ethnographic methods and research design in historical perspective, and with ways cultural analysis can address broader public audiences and interests. The following criteria are used to orient the reviews of the editors and reviewers:

1. Is the essay empirically rich?
2. Is the essay richly contextualized, describing, for example, political-economic, technoscientific, and demographic dynamics critical to its topic?
3. Does the essay use empirical material to enhance theoretical insight?
4. Are theoretical frameworks sound and clearly articulated?
5. Does the essay make a novel theoretical contribution?
6. Does the essay address topics of particular timely relevance?
7. Does the essay illustrate or otherwise contribute to innovations in research design?
8. Is the essay textually innovative?
9. Does the writing meet a high standard of clarity, elegance, and/or compellingness?
10. What communities of people are likely to be engaged by this essay?

Figure 1. Guidelines for authors and reviewers during Kim Fortun and Mike Fortun's editorship, 2007. <https://wayback.archive-it.org/org-419/20140303213133/http://classic.culanth.org/?q=node/1>.

bios, editorial footnotes (links to conceptually or empirically relevant CA articles), discussion questions, images and videos, website links, and when possible, author interviews. Together, CA (the journal) and CA Online go beyond what other peer-reviewed publications do. *Cultural Anthropology Online's* aim is part pedagogical, part ethnographic, and partly aimed toward a public anthropology. It is designed as a publicly accessible archive of ethnographic materials that helps users engage with the timely and politically important work that anthropologists do. Thus CA Online leverages digital infrastructure to communicate anthropological scholarship at a time when the relevance of the discipline is questioned both within and beyond the academy.

When Anne Allison and Charlie Piot took over as CA editors in 2010, we conducted a review of CA Online and proposed to expand the site in several ways: by building a multicolumn blog, *Fieldsights*, and adding a photo-essay section. We also agreed that the site had become difficult to navigate and use. The interface design no longer accommodated the quantity of content and its expanding forms. For example, in 2009, we began to feature "Curated Collections," sets of five to six previously published articles that addressed a chosen theme. Early themes, such as security, kinships, and water, were chosen because they spoke to current debates and could be easily promoted by Wiley-Blackwell. In fact, the original structure of CA's "Curated Collections" derives from a WB marketing campaign, whereby the publisher will un-gate five articles for sixty to ninety days, similar to a free sample issue of the journal, but thematically curated.

Another alternative forum for scholarship, called “Hot Spots,” was launched on our site in the summer of 2011; a second of the same genre but with a different analytic focus launched in 2012, called “Theorizing the Contemporary.” These two sections featured editor-reviewed collections of twelve to twenty-four short essays organized around a timely theme. In the case of “Hot Spots,” forum topics addressed events geographically situated; our first “Hot Spot” forum documented Japan’s earthquake-tsunami-nuclear disaster. Subsequent forums addressed the financial crisis in Greece, revolution in Egypt, and self-immolations in Tibet. As we experimented with different forms of scholarly engagement—short, bloglike essays, commentaries, and author interviews—CA did not adapt Drupal in parallel to meet our expanding needs. Our data was growing and changing; our data model (our digital platform) was not.

The website redesign project began by thinking about three issues. First, we made the decision to move CA Online from Drupal to a different open-source CMS framework called Ruby on Rails. Second, we considered the organization of the site—what would it include, and how would we balance using the same website for the SCA, *Cultural Anthropology*, and our new blog, *Fieldsights*? And finally, how would the site contribute to the broader field of digital scholarship through advancements in interface, metadata, and the continued development of a disciplinary archive?

After considering *Cultural Anthropology*’s and the SCA’s vision for CA Online, and the state of v.1, the decision was made to retire the Drupal platform and migrate the existing site to a new platform built using Ruby on Rails. Unlike Drupal, an out-of-the-box CMS, Ruby on Rails is an open-source framework, with applications and language used to build platforms like Drupal. If Drupal resembled a mobile home structure, Ruby on Rails is closer to the modular home catalog. Whereas Drupal could be set up, left alone, and updated periodically, CA needed to actually build a platform using Ruby on Rails. Once created, however, it too could be left alone, maintained mostly by periodic updates.

To move the redesign project forward, we formed a committee comprising SCA board members, CA editorial interns, our developer CJ Bryan. The committee would oversee the development of the new website—everything from the look of the interface and its functions, to what content would be available and who could add/edit it, to how CA Online would borrow and build from existing systems, such as Dublin Core (a standard for metadata terms used to describe web resources) and HTML 5. The project took more than two years—from the time the committee was formed to the launch of CA Online v.2.

Digital platforms are ecosystems that support certain forms of work, play, and interaction while making others impossible. Platforms, software, and other material components should be selected after identifying not what features they can provide, but after and alongside discussion of how digital infrastructure can support, extend, and/or improve an organization's mission and work. It does not make sense to have a blog that no one reads or social media buttons that don't get used. Think about how the platform can mirror the practices of the current user base (member and non-member audiences); digitize the familiar first. Get feedback from users. Make design and development iterative and incremental. Many of us could quickly come up with a list of vacant and/or outdated websites, both ones designed well and ones not. The ghost-town effect is a symptom of infrastructure development that lacks systems thinking (Larkin 2013), design that overlooked socio-technical intra-action (Barad 2007) or mismatched organizational culture, community practices, and the platform's data model with site features.

In relation to OA journals specifically, OJS seems to be the best platform for publishing projects to date, yet many OJS users could suggest possible system improvements. If organizations are to adopt OJS, consider how your project might support the further development of OJS through PKP's projects or the work of other groups, such as libraries that are building infrastructure around OJS. If your organization opts to go with another platform or to customize extensively, as CA has, carefully consider how your software, data models, and content fit with other systems and trends in digital publishing, and what kinds of sociality and institutions this supports.

DIGITAL LABORS

Two modes of labor are needed to sustain the digital infrastructure that supports *Cultural Anthropology*: technical support (i.e., a web developer) and content managers/editors. The need for a developer and content manager will vary according to a number of factors—what kind of maintenance is needed, and how often; if a site feature breaks, and whether it's a technical or textual issue; and when organizational events demand different features and forms of content. Those who filled these roles for CA in the past were often needed at specific moments, rather than consistently. As CA Online expanded, however, the amount of time required for content management also increased. The need for a web developer, on the other hand, has less to do with increase in content and traffic than with augmenting and/or maintaining the platform's technical features. These labor

dynamics have been recognized and supported by the SCA throughout the years; appropriate support for digital labor is how CA Online has been sustained and expanded. Existing support for digital labor has also made CA's relatively seamless OA publishing transition possible.

Cultural Anthropology Online—a CMS platform—can be used by anyone familiar with e-mail clients or word processors; the logics and interfaces share the same structure and features as everyday communication technologies. Yet the initial design of a CMS platform and future troubleshooting typically require technical skill sets (as described in the above section, in relation to the development of OJS, Drupal, and Typhoon). Although the need for technical support does decrease after the platform is established and the site has been launched, routine upkeep is needed. One only need go a month or two without updating personal computer software, managing e-mail, and closing down applications to get a sense of the importance of caring for information systems. The difference here is that, while personal computer software, e-mail, and applications are designed for everyday users with little technical expertise—updates are automatic, one only need click a button and restart the system—digital platforms require skilled labor for maintenance. Kevin Fodness, CA's former editorial assistant under the Fortuns, continued to contract with CA for an additional three years to run software updates and back up our database, as well as to troubleshoot when an issue emerged that our editorial team could not solve. Our conversations about scholarly publishing and the digital infrastructure necessary for its future require that we value the skilled labor of those who design, create, and maintain these platforms. If we have digital platforms, we must have technical support. Professional societies that believe they can have a digital presence—whether an OA journal or a website—without appropriate technical support are ill prepared to take on any such projects. It signals a lack of knowledge and a devaluing of the labor of digital infrastructuring.

In addition to the technical expertise required for digital platforms, online publishing also requires content editors who are responsible for editing and formatting material. When we first established CA's website, this was a fairly simple process that only required familiarity with the content editor interface and knowledge of a few formatting work-arounds. *Cultural Anthropology's* editorial interns needed to be trained on the content editor, but after learning the basics, they could use it much like a word processor. In the first few years, CA did not consistently generate much digital content; the website seemed like a small addition to existing editorial work. What started out as one more thing on a weekly

checklist, however, turned into a significant part of the managing editor's responsibilities. *Cultural Anthropology* Online is now a digital archive with more than one thousand pages of content; as the site grows, CA Online demands more editorial time and oversight. We now publish content weekly instead of monthly or bimonthly. Links need to be updated, videos replaced, and comment feeds checked. When CA Online first launched in November 2012, we needed to manage spam on the site's comment feed daily. For two to three weeks, while we experimented with various spam solutions, the first ten to twenty minutes of each day focused on spam removal. After a few weeks, we implemented an inexpensive application called Akismet, which effectively blocks 99 percent of the spam that would otherwise appear in our comment feeds. This is an example of a technical fix realized by our current developer, Ryan Schenk. Most content management labor, however, is manual.

Of course, *Cultural Anthropology* would not have a digital presence at all if not for the work of editorial interns, who are the primary content editors for CA Online. In the early years, from the time the intern program was established in 2007 until the launch of CA Online v.2, intern work focused on creating supplemental pages for current and past articles, and on creating theme or area lists that indexed the print journal's archive. In 2009, interns began building "Curated Collections" as well. These collections featured supplemental pages for each of the articles, interviews with article authors, and guest commentary. With the launch of CA Online v. 2, intern work expanded beyond its focus on the print journal to include work on *Fieldsights*. A select group of interns now propose, coordinate, and format content for this section under the guidance of the editors. Even CA's social media team is governed by editorial interns. At base, *Cultural Anthropology* owes its digital presence to the work of our interns.

Editorial intern positions—which are structured as twelve-month long, project-based positions—are unpaid. The program functions like an apprenticeship where graduate students learn how to create or curate online content using digital platforms, conduct author interviews, and structure projects (a skill not to be underestimated). They also learn to think about the labor of editing publications and have the opportunity to engage with faculty scholars whose research informs their own graduate work. More recently, interns now have the opportunity to join CA's social media team, where they can learn how to circulate content, mount campaigns, and engage an online community through different platforms (Twitter and Facebook specifically). *Cultural Anthropology's* managing editor has always coordinated the intern program, which is an important task in itself. Yet

collectivity and collaboration define the intern program; the tone is one of project building rather than assignment. Interns, for example, propose their own projects as part of the application process. This gives students the opportunity to work on ventures that can advance their research interests while also contributing to CA's digital archive.

While CA Online is more than an OA publication, and thus has more extensive digital labor needs, digital infrastructure requires care and attention that is similar but distinct from print modes of publication. We still need to coordinate, edit, and market content, but these activities may look or work differently in digital form. Digital does not make editorial labor obsolete, although I would expect that some of the labor involved in publishing an OA journal differs a little from that of a print publication. The point is that digital forums and platforms do not produce themselves. Organizations transitioning to OA and going the self-publishing route need to keep production details in mind.

The ghost-town effect reflected by vacant and outdated websites may also signal an inability to sustain the platform or publication. This is almost always a labor problem. Before starting digital projects, OA or otherwise, think about the expertise and labor available to your organization. All too often, someone with a little bit of programming skill and experience will volunteer or be appointed to the task of setting up and sustaining our websites. While in some cases this works well and is appropriate to the platform and the organization's needs, in too many cases it leads to frustration on both sides—a web master who lacks a skill set adequate to develop the dreamed-of platform, and an organization that fails to appropriately value digital labor. Organizations need to think about websites and their platforms as infrastructure that demands financial and socio-technical resources. Before looking into (and certainly before choosing) a digital platform, organizations should identify available resources and acknowledge that limited existing resources will shape what is possible. In other words, good websites take time and money in some form or another.

The other issue relates to sustaining platforms. This implies software updates and technical troubleshooting—work that likely needs to be performed by a developer—but also sustaining a flow of digital content, material that needs to be written, edited, and uploaded. *Cultural Anthropology* Online works because of the labor of editorial interns, the managing editor, and authors who contribute content. It is a lot of work that requires a lot of coordination. Even if we all recognize the benefits of scholarship made digital, it can be difficult to get contributors or broader participation in digital forums (of course, we often face the

same challenges getting article reviewers for the print journal). Knowing that scholarship made digital is advantageous has not meant that this work is acknowledged; digital labor in support of scholarly production typically does not count, institutionally, for your academic career. As we increasingly adopt digital formats for scholarship, we need to make sure that these modes of production are valued as academic labor, formally and in institutionalized ways. New and/or existing websites can easily render the amount and kind of digital labor required invisible. More people need to acknowledge that digital infrastructure is not created or sustained with the push of a button.

CIRCULATION

Organizations spend much money and time trying to reach audiences, users, and customers; academic publishers face the same challenges, although they are able to utilize existing organizational or digital infrastructures. Perhaps you receive content alerts for journals that you read regularly? Or maybe you follow publication titles on Facebook or Twitter? As an SCA member, you might rely on a quarterly e-mail from our editorial office. All three examples employ existing, multiuse digital infrastructure—e-mail and social media. These channels are increasingly used to reach scholarly audiences, a trend supported by a more general shift toward digital consumption practices. Think about the adoption of tablets and the rise in mobile phone use, and how the adoption of these technologies impacts academic work practices. Here is a well-known narrative at this point, but one that bears repeating: broader trends in digital infrastructure and digital life shape CA's audience, how our audience learns about and consumes content. Emergent forms of digital life and associated consumption practices orient CA's social media team, a collaborative project that works to connect and cultivate online community around anthropological scholarship. I like to think of the social media team as part of a community that builds off the work initiated by the creators of *Savage Minds*, as well as off the digital anthropology initiatives spearheaded by AAA members. Thinking about how *Cultural Anthropology* circulates today also means thinking about how new forms of digital infrastructure, and in particular, social media platforms like Facebook and Twitter, might be leveraged for scholarly engagement.

Cultural Anthropology initially created social media accounts—on Facebook and Twitter—in April 2010, during the year of overlap between the Fortuns' and Allison and Piot's editorship. The social media accounts received little attention between 2010 and 2012, mostly due to time constraints, a lack of regular

content to circulate, and lack of experience with how social media platforms can be used to cultivate an audience. During this time, posts were made when a new issue launched, or when a “Curated Collection” or other content feature went live. The accounts were also used around the annual AAA meeting and the biennial SCA meeting to promote conference events. The journal’s Facebook and Twitter accounts were linked to each other, so whenever a new post went up on Facebook, it was mirrored on the Twitter account. While this linked feature was convenient—no one ever needed to log into Twitter—it was not optimal for building an audience or engaging the existing anthropology community on Twitter (itself an active and robust community). Facebook and Twitter, as social media platforms, are two distinct spaces, with different modes of communication, communities, and practices. Even today, the social media strategies differ for the two platforms: Twitter has a more dynamic space characterized by feedback loops (Hayles 1999), whereas our Facebook feed tends to be more one-sided and less participatory.

Three factors led to the creation of CA’s social media team. First, the launch of CA Online v.2. In the short term, CA wanted to expand its media outlets to drive readers to the new site; establishing a social media team was one part of this larger effort. Second, there was a general feeling that CA Online did not receive as much traffic as it should; we had an extensive archive of supplemental material, essay collections, and indexes, but the site was still relatively unknown, even within the AAA community. Thus the social media team would work to make CA’s existing digital archive more visible. Finally, CA had a core group of editorial interns who were interested in learning how to use social media platforms as scholars. In this sense, CA’s social media project is as much about learning and building skills in digital communication as it is the cultivation of a scholarly network and the promotion of CA content.

Cultural Anthropology’s social media team was constituted in November 2012, at the time of the relaunch of CA Online. The team itself comprises half a dozen editorial interns—our core group includes Neal Akatsuka, Darren Byler, Grant Jun Otsuki, Michal Ran-Rubin, Fayana Richards, and Jonah Rubin—plus the managing editor; the group meets every other week to review and coordinate a social media strategy. The team’s strategy is oriented around content in three ways. First, by identifying what new content will be launching on CA Online in the coming weeks—new *Fieldsight* posts, “Curated Collections,” podcasts, articles submitted to ShareCA, or, of course, new issues of the print journal. News about the SCA and CA is also circulated by the social media team. The second way in

which the team organizes its work is by identifying current events or stories emerging from the broader anthropology community, and then selecting content from CA's archive that speaks to or lends insight into these stories. Finally, the team participates in the circulation of content from other scholars and organizations through reposts. This component is practiced on Twitter only, not on Facebook. Social media activity is coordinated by one team member at a time; each week, one social media team member volunteers to act as the handler; he or she is responsible for CA's daily posts on both social media platforms. Without the work of the social media team, it is unlikely that news of CA's transition to OA would have had such a broad reach. In *Cultural Anthropology's* first week as an open access journal, CA Online received more than 17,500 visitors from 159 countries.

In the past fourteen months, the social media team has learned much about how online networks and media work. They have also grown CA's digital community base substantially. Since launching CA Online v.2, monthly visits to the website have grown from 1,950 in November 2012 to 25,174 in October 2013. As of March 2014, CA's Twitter following has grown to nearly 5,500 users and just over 5,000 likes on Facebook.

One thing we are learning from the social media team's work is that *Cultural Anthropology* has two different audiences—those primarily consuming the journal through traditional means and those engaging with CA content primarily through our website. One challenge has been figuring out how to balance the needs and interests of these two groups, which I suspect map across social and institutional differences in higher education: SCA members and non-SCA members; tenure-track faculty and students; U.S.-based readers and international readers. The social media team participates in the broadening and diverse digital community composed of anthropologists, social scientists, and supporting organizations; its work builds networks that make for robust infrastructure development.

Social media, of course, is not everyone's game, for a range of reasons. Yet these platforms are reaching new audiences, contributing to a growing digital community of anthropologists, and making CA content more publicly accessible. In many ways, the social media team's work directly supports OA by cultivating increased access and use of peer-reviewed scholarship, albeit in ways not yet measurable. Part of expanding access means creating new spaces, channels, and modes of engagement with scholarship. Taking down pay walls may be the first step; pushing scholarship beyond the websites where articles are hosted is the next.

COLLABORATION

Another takeaway from the project of building *Cultural Anthropology*'s digital infrastructure is the importance of collaboration, with web developers as well as with experts in other fields and organizations that support scholarly publishing.

Cultural Anthropology's success in developing a digital platform (CA Online) depended not only on the technical skills of our developers—Casey O'Donnell, Kevin Fodness, CJ Bryan, and Ryan Schenk, each of whom built parts of the digital infrastructure and sustained different components over the years—but also on their participation in decision-making and system design.⁷ Both Bryan and O'Donnell served on SCA's Website Design Committee from 2010 to 2012. Schenk, although not formally a committee member, did much to advise the committee on site design. In many regards, CA Online v.2 stands out as a digital platform collectively designed, informed by a committee whose members represented different knowledge sets and interests. Rather than hand a vision over to our designer and developer, the committee worked iteratively, conversing with and providing feedback to Bryan and Schenk through the entire process. Site testing was also conducted by committee members, as well as editorial interns, who, as content editors, represented one of our primary user groups.⁸ Thus the process of creating CA Online v.2 was likely more collaborative and collective than website projects undertaken by other types of organizations.

Beyond internal conversations with the developers hired to build CA Online, we also benefited from many conversations with librarians throughout the years. These conversations ranged from informal consultations to more material collaborations that garnered institutional support. One example can be found in the recent move to host CA's OJS platform at Duke libraries. *Cultural Anthropology*'s original open-access project, ShareCA, is another example. Led by Grant Jun Otsuki, with support from Alex Golub at the University of Hawaii and John Russell at the University of Washington, ShareCA was launched in 2012 with CA Online v.2. It leveraged the green OA publishing model—which grants article access through repositories, unlike gold OA, which refers to OA journals—as well as the efforts of a small collection of CA authors who were already self-archiving versions of their articles on their faculty webpage or on platforms like Academia.edu.

Available through CA Online, ShareCA is a directory of links to repositories and websites where CA authors have made either the final version or a pre-proof version of their article available. The project began by building from and within the Mana'o collection in the eVols Repository at the library of the University of

Hawaii. This was initially coordinated by Alex Golub, John Russell, and Grant Jun Otsuki. Articles were collected in one of two ways: for current journal issues (from November 2012 forward), authors were notified of the option to contribute to the repository when they were asked to sign AAA's official author agreement; for past issues, authors were systematically contacted by Otsuki, editorial interns, and staff members. In some cases, authors already had a version of their manuscript posted online and it was just a matter of gaining permission to include a link to it in our repository. In other cases, where authors did not have a version posted online, an e-mail was sent explaining the project and options for contributing to the repository: to post a final PDF version on their personal or faculty webpage, or to contribute a pre-proof version to the Mana'o collection at the University of Hawaii.

In addition to hosting a directory of links to OA versions of CA articles, we also built access options into article supplemental pages. Within an article's metadata box (see [Figure 2](#)), we included a link to Wiley-Blackwell's website (which provides access to an HTML and a PDF version of the article); for articles listed in the ShareCA directory, we also included an OA button, thus allowing users to choose where they accessed articles from: the publisher's site or ShareCA.

Of course, not every effort to cultivate collaboration or community, broadly conceived, has always worked for CA. One example of failed collaboration, collectivity, or community can be found in the discussion forums from CA Online v.1. When the site was first established, we imagined the discussion forums as a space of rich conversation and engagement with theme lists, supplemental pages, and anthropologically relevant topics facilitated by guest discussants. The discussion forums (see [Figure 3](#)) never took off as intended, despite several attempts to stage or seed conversation in this section. Initially, we believed this was due to site design—the forums were buried within the site and difficult to see and access. Yet the absence of online discussion has been reproduced on CA Online v.2; commenting happens, but it is variable and seems to coalesce around content where conversation is seeded.

Despite building comment feeds into supplemental and *Fieldsights* blog pages, we continue struggling to generate discussion in these digital forums. Circling back to digital labors, it may be the case that more work is required to foster the kinds of engagement that have been a defining feature of sites like *Savage Minds*.

The need and desire for digital infrastructure—often seen as a format that can extend the reach of our work—creates opportunities for collaboration with experts from other knowledge domains. As indicated in the interview with [Kelty](#)




GET TEXT	<div style="border: 1px solid #ccc; border-radius: 10px; padding: 5px; background-color: #e0e0e0; display: inline-block; margin-bottom: 5px;">From Publisher</div> <p style="text-align: center; margin: 5px 0;">or</p> <div style="border: 1px solid #ccc; border-radius: 10px; padding: 5px; background-color: #00a08a; color: white; display: inline-block;">Open Access</div>
PUBLISHED IN	Issue 26.4, November 2011
CITE AS	Anand, Nikhil. "Pressure: The PoliTechnics of Water Supply in Mumbai." <i>Cultural Anthropology</i> 26, no. 4 (2011): 542-564.
COLLECTIONS	Infrastructure
THEMES	Cities & Urbanism Experts, Expertise, and Expert Knowledge Neoliberalism, Subjectivity, Citizenship
AREAS	South Asia
CREATED BY	Cari Merritt
SHARE	  

Figure 2. Metadata box on Nikhil Anand's article supplemental page. Image shows two options for article access. <http://culanth.org/articles/64-pressure-the-politechnics-of-water-supply-in>.

(2014), thinking about the economics of publishing and the industry of academia should go hand in hand with thinking about the broader organization of higher education. Designing and developing digital infrastructure is one place where we can cultivate relationships with partners outside our disciplinary or knowledge domains—librarians, computer scientists, and designers, for example. Bringing together people from different fields of expertise can present challenges, but ultimately, our digital projects will be more robust when informed and supported by knowledge sets and resources from other fields. The increase in open-access journal–university library partnerships (such as in the case of ShareCA and CA's move to place OJS at Duke Libraries) is a crucial step towards reconfiguring the political economy of scholarly publishing, and potentially towards shaping the future conditions of higher education. Figuring out what kinds of relationships we want to cultivate, and how these relationships can support more equitable

Forums

Login to post new content in the forum.

Forum	Topics	Posts	Last post
Discussion Commons			
<input checked="" type="checkbox"/> Perspectives on Pakistan Hosted by SCA members Veena Das (Professor of Anthropology, Johns Hopkins University) and Naveeda Khan (Assistant Professor of Anthropology, Johns Hopkins University)	1	1	6 years 14 weeks ago by Naveeda Khan
Editorial Intern Program			
<input checked="" type="checkbox"/> Program Announcements	2	2	3 years 14 weeks ago by Cultural Anthro...
<input checked="" type="checkbox"/> Current Work	1	1	4 years 11 weeks ago by Alison Kenner
Feedback			
<input checked="" type="checkbox"/> Website Feedback	1	2	3 years 43 weeks ago by Rodney Collins
Board Discussion			
This forum is for the discussion of board related issues. Access to this forum may be restricted.			
<input checked="" type="checkbox"/> Latest Discussion Items These are the most recent discussion items for board members.	0	0	n/a
Topics Discussion			
<input checked="" type="checkbox"/> Africa List Discussion	0	0	n/a
<input checked="" type="checkbox"/> Caucasus List Discussion	0	0	n/a
<input checked="" type="checkbox"/> China List Discussion	0	0	n/a
<input checked="" type="checkbox"/> Cities and Urbanism List Discussion	10	36	3 years 49 weeks ago by Rodney Collins
<input checked="" type="checkbox"/> Culture/Theory List Discussion	0	0	n/a
<input checked="" type="checkbox"/> Democracy, Elections & Voting Discussion	0	0	n/a

Figure 3. Discussion forums from CA Online v.1. <https://wayback.archive-it.org/org-419/20140303200008/http://classic.culanth.org/?q=forum>.

and open participation in academic culture, as well as more robust research practices, should be principles that guide the design of digital infrastructure.

CONCLUSION

As Brian Larkin (2013, 330) suggests, the defining of infrastructure is “a categorizing moment . . . that highlights the epistemological and political commitments involved in selecting what one sees as infrastructural.” This essay argues that more attention needs to be given to the digital infrastructure required for scholarly publishing futures, open access and otherwise. Digital infrastructure

refers to the many layers of electronics, institutions, code, paradigms, experts, networks, service providers, information systems, standards, and texts assembled to bring scholarship online. In particular, I highlight the labor of those who work on digital platforms—review management systems, public websites, and social media—because infrastructure itself is often designed to render production and resources invisible. Another essay should take up the technical decisions that need to be made in the design and development of digital infrastructure for publishing.

This essay suggests that digital infrastructure design and development should be organized around (1) platform affordances, (2) support for labor, (3) emerging circulation practices, and (4) opportunities for collaboration. But beyond that, OA discussions and other online projects need to attend to what digital infrastructure makes possible, what it prohibits, and what relations and principles it supports. Work undertaken to develop digital infrastructure for *Cultural Anthropology*, and by extension the SCA, showed that these projects take time, care, and money, and often more than imagined at the outset. It could be otherwise, I think. My hope is that lessons learned through our work at CA can help other organizations—professional societies, scholarly groups, universities, or subsets of universities—as they think about transitioning to OA or as they take other forms of academic work online. This also means thinking about the logistics and details of digital infrastructure in relation to the principles, relationships, and forms of scholarly community they support. The issue is not that we don't know how to think about infrastructure and design, but that we don't always see the multiple and varied scales of changing publishing practices—such as establishing an OA journal—as part of the large-scale infrastructural shifts now happening within the field of anthropology, in the social sciences and humanities, and in higher education itself.

ABSTRACT

As we move discussions around publishing forward and adopt open-access models, social scientists need to consider how digital infrastructure opens and closes possibilities for scholarly production and engagement. Attention to changes in publishing infrastructure—which, like most infrastructure, is often rendered invisible—is needed, not only because it allows us to make sense of socio-technical transitions at various scales and for differently invested communities, but because we need more informed participants, users who can question the system in ways that make it more robust. This essay suggests that digital infrastructure design and development should be organized around (1) platform affordances, (2) support for labor, (3) emerging circulation practices, and (4) opportunities for collaboration. By tracing the long-term socio-

technical work that made it possible for Cultural Anthropology to go open access earlier this year, this essay works to make visible some behind-the-scenes details to be considered when thinking about the future of scholarly publishing. [infrastructure; digital media; labor; circulation; publishing; collaboration]

NOTES

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1. Since 2012, CA has maintained a “green” OA repository called ShareCA through the University of Hawaii libraries. This repository, and other public ones, allowed CA authors to self-archive their articles, thus providing a means of barrier-free access. These OA options were then listed in the ShareCA directory. For a nuanced discussion of the OA spectrum, see Peter Suber’s (2004) Open Access Overview.
2. *Open source* here refers to software whose source code is publicly available for use and modification; it also implies the existence of a development community whose work improves on the original code. For more on the history and culture of open-source software, see Kelty 2008.
3. See the Public Knowledge Project website, <http://pkp.sfu.ca/ojs/ojs-usage>.
4. It should be noted that PKP does provide publishing services, which include tech support: <https://pkpservices.sfu.ca/content/journal-hosting>.
5. At the time, Casey O’Donnell served as CA’s technical support. While CA was located at Rensselaer Polytechnic Institute, during the Fortuns’ editorship, the journal was able to draw on the technical skills of Science and Technology Studies (STS) PhD students who worked as editorial assistants. After O’Donnell, the journal hired Kevin Fodness, another STS doctoral candidate, who continued to provide tech support for OJS until August 2013, at which time our system was transferred to Duke Library.
6. A recent survey by a committee formed through the AAA’s Committee on the Future of Print and Electronic Publishing (CFPEP) found the same (admittedly, I was part of this committee).
7. It bears mentioning that each of these developers came to the project with expertise specific to CA’s mission. Casey O’Donnell and Kevin Fodness from the field of STS; both engage in research that intersects with communication, media, and digital culture. CJ Bryan came to us after working on numerous open-source projects. Ryan Schenk was a software architect and developer at the Woods Hole Marine Biology Library for more than four years.
8. The identification of user needs and groups is an essential part of CMS design and administration.

REFERENCES

- Barad, Karen
2007 *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham, N.C.: Duke University Press.
- Bowker, Geoffrey C.
2000 “Biodiversity Datadiversity.” *Social Studies of Science* 30, no. 5: 643–83. <http://dx.doi.org/10.1177/030631200030005001>.
- Fenner, Mark
2009 “Editorial Manager: Interview with Richard Wynne.” *Gobbledygook, PLoS Blogs*, http://blogs.plos.org/mfenner/2009/03/25/editorial_manager_interview_with_richard_wynne.

- Fortun, Kim
 2003 "Ethnography in/of/as Open Systems." *Reviews of Anthropology* 32, no. 2: 171–90. <http://dx.doi.org/10.1080/00988150390197695>.
- Hayles, N. Katherine
 1999 *How We Become Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press.
- Kelty, Christopher
 2008 *Two Bits: The Cultural Significance of Free Software*. Durham, N.C.: Duke University Press.
 2014 "Beyond Copyright and Technology: What Open Access Can Tell Us about Precarity, Authority, Innovation, and Automation in the University Today." *Cultural Anthropology* 29, no. 2: 203–15. <http://dx.doi.org/10.14506/ca29.2.02>.
- Larkin, Brian
 2013 "The Politics and Poetics of Infrastructure." *Annual Review of Anthropology* 42:327–43. <http://dx.doi.org/10.1146/annurev-anthro-092412-155522>.
- Star, Leigh Susan
 1999 "The Ethnography of Infrastructure." *American Behavioral Scientist* 43, no. 3:377–91. <http://dx.doi.org/10.1177/00027649921955326>.
- Suber, Peter
 2004 "Open Access Overview." Earlham University website, accessed April 10, 2014. <http://legacy.earlham.edu/peters/fos/overview.htm>.