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Digital Humanities and Visible and Invisible Infrastructures.

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PART III

BEYOND DIGITAL HUMANITIES

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Digital Humanities and Visible and Invisible Infrastructures

GIMENA DEL RIO RIANDE

What Do We Mean When We Say Infrastructure?

The concept of infrastructure is fundamental in Marxist and post-Marxist theories, as a central element that determines or transforms the development of society, weighing on relations of power and production at a superstructural level. Pragmatically considered, and given the etymology of the term, infrastructures sustain or support something: a system, an object, a process. For this reason, infrastructures are usually defined as invisible to humans, who hardly notice their presence when they break or disappear (Bilder, Lin, and Neylon, “Principles for Open Scholarly Infrastructure”; Bowker, “History of Information Infrastructures”; Corsin-Jiménez, *Reclamar las Infraestructuras*; Jackson et al., “Understanding Infrastructure”). This may sometimes silence or obscure relations of power and ideology.

As Roy and Forget observe, “Computing infrastructure is a sustained institution-wide combination of governance, people, funding processes, hardware, and software” (*MIT Schwarzman Working Group on Computing Infrastructure*, 1). Similarly, in the context of the digital humanities (DH), an infrastructure can refer to physical objects such as servers, to knowledge infrastructures—laboratories, centers, or learned societies—and even to abstract representations such as code, software, or standards. Moreover, following what Badenoch and Flickers propose in regard to digital research infrastructures, we can understand infrastructures as a set of technologies that *mediate* between researchers, research, and resources, and also between collaboration and the dissemination of results (“Europe Materializing?” 11). However, since DH is a field that defines most of its theoretical frameworks, methodologies, and practices at the intersection of humanistic (and human) research and digital technology, it is valid to ask ourselves how and to what extent that technology (or rather *technologies*) may validate or sustain DH epistemology (Bhattacharyya, “Words in a World of Scaling-up”; Liu, “Toward Critical Infrastructure Studies”) and what kind of DH research can be done, depending on the state

of advancement of the technological context. Likewise, it is worth asking about the relations between technological and social infrastructures, and how they can create fairly open or decentralized knowledge infrastructures (Shorish and Chan, “Co-creating Open Infrastructure”).

In a very different context, Alberto Corsin-Jiménez poses the question in terms of a counterexample from daily life in Peru (*Reclamar las Infraestructuras*, 5–7). In Lima, Peru’s capital city, it hardly rains and, as an answer to the absence of water and the lack of support of the Peruvian government, many companies have begun to sell water in tankers to citizens at a very high price. Left to their own devices, citizens have designed huge nets, 16 meters high by 4 meters wide, that disfigure the landscape and cause the *limeña* or thick fog to condense. The drops of water captured in the fog-catching net (*atrapanieblas*) descend by gravity into a system of pipes that collects them in a cistern. Thanks to this device, citizens obtain about 16 liters of water per day for free, generating and building their own modest yet complex infrastructures.

This example illustrates what we might define as the *right to infrastructure* or infrastructure as a right, and the significance of an infrastructure when a community takes control of it.

Digital Humanities Infrastructures

The emergence of DH since the 2000s has led to debates on diversity, equity, and hegemonies, mainly in the academies of the so-called Global North (Fiormonte, “Digital Humanities from a Global Perspective,” “Towards a Cultural Critique of Digital Humanities”; Risam, *New Digital Worlds*). However, these discussions focus on problems such as language, gender, or race monopolies, eschewing the more material or pragmatic reflections about the different contexts—not only academic or cultural but also social, economic and technological—needed to fully understand DH on a global scale (Fiormonte and del Rio Riande, “Por unas Humanidades Digitales globales”).

By way of example, we can consider one of the many reflections of Karl Marx on the objectification of knowledge in machines:

Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules etc. These are products of human industry; natural material transformed into organs of the human will over nature, or of human participation in nature. They are organs of the human brain, created by the human hand; the power of knowledge, objectified. (Marx, “Notebook VII”)

Similarly, Alan Liu¹ has repeatedly stressed the fact that DH builds a new materialism based on projects, software, or hardware, an issue to which Kirschenbaum had already drawn attention by stating that

digital humanities, which began as a term of consensus among a relatively small group of researchers, is now backed on a growing number of campuses by a level of funding, infrastructure, and administrative commitments that would have been unthinkable even a decade ago. (Kirschenbaum, “What Is Digital Humanities?” 9)

Kirschenbaum had already highlighted the invisibility of the infrastructures that, by supporting research and teaching, naturalized a definition of DH:

Whatever else it might be then, the digital humanities these days have to do with a scholarship (and a pedagogy) that is publicly visible in ways to which we are generally unaccustomed, a scholarship and pedagogy that are bound up with infrastructure in ways that are deeper and more explicit than we are generally accustomed to, a scholarship and pedagogy that are collaborative and depend on networks of people and that live an active 24/7 life online. (Kirschenbaum, “What Is Digital Humanities?” 9)

From my perspective, the debates on how DH is supported by technological infrastructures (and itself becomes a technological infrastructure) have been rigorous though too descriptive, showing almost no interest in issues such as the geopolitics of knowledge as a factor in the emergence of web infrastructures. Most of this literature describes DH infrastructure from European projects or consortia. To give just a few examples, Tasovac, Rudan, and Rudan (“Developing Morpho-SLaWS”) offer an approach on how the “infrastructural turn” in DH has had practical consequences in the way tools and resources are built. More recently, Benardou et al. (“Introduction”) have argued that in the last twenty years, the DH field has witnessed the successful establishment of research infrastructures. They recall how already by 2014, following Karen Knorr-Cetina in 2001 (“Objectual Practice”), Erik Champion (“Researchers as Infrastructure”) had anticipated the emergence of DH infrastructures as dynamic ecosystems. These works could give anyone the impression that technology is always one and identical, that its users speak the same language, that institutions are run in the same way globally, and that we all have the same degree of digital literacy.

The importance of digital research infrastructures was anticipated in many respects by two North American texts, the Atkins Report on Cyber Infrastructure for Research (Atkins et al., *Revolutionizing Science and Engineering*) and the American Council Report of Learned Societies (ACLS, *Our Cultural Commonwealth*). However, beyond projects such as Bamboo, “a humanities cyberinfrastructure, particularly for working with textual corpora” (Dombrowski, “What Ever Happened to Project Bamboo?” 331), that Quinn Dombrowski turned into a motto learned from failure, or the deliverables from the Canadian project INKE (<https://>

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inke.ca/), discussions around DH infrastructures have not drawn the attention of many North American scholars.

It was in Europe, around 2006, through long-term programs such as the European Strategy Forum on Research Infrastructures (ESFRI)—“a strategic instrument to develop the scientific integration of Europe and to strengthen its international outreach” (Blümm and Schmunk, “Digital Research Infrastructures”)—that the humanities set this agenda on technology, creating CLARIN, the infrastructure for linguistic resources and technology (www.clarin.eu); DARIAH, the digital research infrastructure for the arts and humanities (www.dariah.eu), and ARIADNE, the advanced research infrastructure for archeology (<https://ariadne-infrastructure.eu/>). These consortia share some common goals in their roadmaps, such as an improved understanding of the complex nature of datasets and research done with digital tools, methods and practices of collaborative work in the humanities, and the belief that “the design, development, and deployment of resources to support research and education requires a deep understanding of how computing is used within the disciplines” (Roy and Forget, *MIT Schwarzman Working Group on Computing Infrastructure*, 1).

It must be stressed that only very few projects and initiatives, such as Open Context (<https://opencontext.org/>), Perseus Digital Library (<http://www.perseus.tufts.edu/hopper/>), the Digital Humanities Data Curation Institute (<http://www.dhcuration.org/>), and, in the last two years, DARIAH have reflected on the advantages of openness, not only in terms of data, resources, and budgets, but as a standard element that promotes “findability, accessibility, interoperability and reuse” or the so-called FAIR data principles with a focus on the digital humanities.² Also, little attention has been paid to important conversations such as Scholarly Commons (<https://www.force11.org/scholarly-commons/principles>), a set of principles, practical guidance, and actions to make research open and participatory for anyone anywhere, fostering the inclusivity of diverse perspectives from around the globe.

One crucial question we should ask ourselves is not what these infrastructures seek to do, but who is a part of them and who benefits from them. This question could be itemized as follows:

- (1) Can different research traditions be standardized across different European countries?
- (2) How much do digital humanists know about these infrastructures today?
Are they expected to be only users or consumers? What about data governance?
- (3) How are these efforts addressing the representation of the different European languages? The DARIAH website, for example, is offered only in English, although some infrastructure projects, such as OpenMethods (<https://openmethods.dariah.eu/>), are slowly starting a debate on the

processes of openness in research, from the technological to the linguistic (del Rio and Tóth-Czifra, “El metablog Open Methods”).

- (4) How do these efforts differ from North and South American approaches to (cyber)infrastructures? Is there the possibility of a dialogue among them?

These questions also relate to an article from 2017 by an expert in open research infrastructures, Cameron Neylon (“Sustaining Scholarly Infrastructures”). This Australian advocate for open access states that infrastructures should be sustained by the academic community they represent. He illustrates his thesis with some issues about sustainability with regard not only to finance but to political economy, taking into consideration that the principle of governance essentially inside operates within a community.

Similarly, Shorish and Chan (“Co-creating Open Infrastructure”) affirm that any infrastructure should include social systems and practices that reflect the values of its creators and, ideally, of those who interact with it: an infrastructure is never neutral but implies struggles for power, legitimizing voices and determining who can access the information and in what manner. The authors claim that research infrastructures should be designed, built, and controlled by the communities they aim to serve, taking diversity into account in order to avoid biases in languages, research areas, methodologies, and standards, which only reinforce the idea that research can be reduced to a single set of universal practices.

An example of great interest that Shorish and Chan put forward is the Invest in Open Infrastructures project (IOI). Its preamble explains:

We imagine a world in which communities of researchers, scholars, and knowledge workers across the globe are fully enabled to share, discover, and work together. It is clear that the needs of today’s diverse scholarly communities are not being met by the existing largely uncoordinated scholarly infrastructure, which is dominated by vendor products that take ownership of the scholarly process and data. We intend to create a new open infrastructure system that will enable us to work in a more integrated, collaborative and strategic way. It will support global connections and consistency where it is appropriate, and local and contextual requirements where that is needed. (Robinson, “Schmidt Futures”)

The declaration of intent is clear, despite being abstractly stated and failing to exemplify how to achieve these goals. In addition, there is little or no representation beyond North America and Europe. Finally, a valuable contribution is Sarven Capadisi’s 2016 thesis (“Linked Research on the Decentralised Web”), where he focuses on developing a decentralized environment for scholarly research on semantic technologies.

Open access, community building, and decentralization seem to be the terms, among others, that might serve to define digital research infrastructures better and

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more comprehensively. Perhaps the DH community should look at these examples to think about its global expansion in the coming years.

And What about Infrastructures in Latin America?

Paraphrasing Juan Pablo Alperin, scientific research in Latin America can be characterized as being carried out in (1) the largest region in the world that seeks to increase the scientific visibility and quality of its publications through a decentralized model of regional online portals, such as SciELO (<https://scielo.org/en/>), RedALyC (<https://www.redalyc.org/>), and LaReferencia (<http://www.lareferencia.info/es/>); and (2) the most unequal region in the world, according to the World Economic Forum on Latin America. Although the region has low citizen digital literacy, and also very low levels of technology adoption, it is also a region where most of the research done in public institutions has, for many years, been published online in open and noncommercial terms, with few copyright restrictions.

Surprisingly or not, infrastructures of the Global North, such as the Web of Science or Scopus, are unable to take note of these characteristics of scientific production in the Latin American region. Contrary to the infrastructures for DH mentioned earlier, Latin American initiatives for scientific publication seem to opt for a more human and technologically decentralized model (Packer et al., “El modelo SciELO”) that seeks to develop local literacies and infrastructures differently in different countries. Hence if, as both Bhattacharyya (“Words in a World of Scaling-up”) and Liu (“Toward Critical Infrastructure Studies”) explain, an epistemology always underlies DH technology, several questions need urgent consideration: How can we develop a DH curriculum in a region defined by social inequality, obsolescent infrastructures, and a lack of adaptation to technological advances? Can DH in Latin America somehow be made compatible with the models of financing, sustainability, and legitimation obtainable for DH in the Global North? Would it be possible to carry out globally networked projects spanning North and South where the researchers work on the same terms, not as guests or in-kind contributors? (del Rio Riande, Brussa, and Hathcock, “Dónde está ‘lo abierto’”).

As an example that aims to shed some light on these questions, I would like to present my own experience as a DH scholar from the so-called Global South. Since 2017, I have been running a DH laboratory at the Argentinian National Scientific and Technical Research Council (CONICET) called HD CAICYT Lab (<http://hdlab.space/>): a small office whose members—Gimena del Rio Riande, Romina de León, and Nidia Hernández—have been annotating, editing, and exploring, with quantitative and macroanalytical methods and tools (Jockers, *Macroanalysis*), a corpus of travelogs from the sixteenth to the eighteenth centuries that describe the Rio de la Plata territories for the first time.

The modest size of the laboratory matches the lack of specific funding for DH in Argentina (and the region). The principal way to start a project is by collaborating in a program with foreign funding. There is a constant sense of brain drain as we run our small projects and, at the same time, look across at the big Northern ones. In our case, thanks to the funding and support of the Pelagios Network (<https://pelagios.org/>), we were able to carry out a huge part of our semantic annotation and minimal computing agenda on our own.

The main goal of the Pelagios Network is to improve the links between different online resources (historical, literary, or geographical sources, such as texts or maps) to document the past. However, until we started our project, the idea of the past related only to classical Greek, Roman, and Byzantine history. The mini grants offered by this community, and the infrastructure using semantic technologies such as Linked Open Geodata for the humanities, led us to work with tools designed primarily for texts in English from the classical or European past. From our different location, we had not only to recontextualize the Pelagios infrastructure but also to “transculture” (Ortiz, *Contrapunteo cubano*) its tools from the periphery. We created annotations, conducted tutorials in Spanish, and compiled a specific gazetteer for this type of text: *Indias*, a colonial Latin American gazetteer developed in decentralized, horizontal, and equitable collaboration with Werner Stangl from the HGIS de las Indias project on eighteenth-century Latin American history (<https://www.hgis-indias.net>). This work was possible only because the Pelagios Network is an open community and Recogito, the annotation software, an open-source tool.

In addition to this, the impossibility of accessing or running basic research infrastructures such as our own servers, and the instability of the Wi-Fi connection, led us toward the minimal, open, and agnostic technologies that in recent years have been defined as Minimal Computing (<https://go-dh.github.io/mincomp/people/>). In our case, the pairs GitHub-Zenodo and GitHub pages-Jekyll became essential, as the starting and concluding points, respectively, of a workflow for a sustainable agenda of publishing and conservation, allowing a text and data repository as well as publishing tools. In other words, we are doing DH research without technological support from our institution, although in an environment of open research in line with our national laws on open access and the open science milieu in Latin America.³ We have thus found methodological and technological solutions for our situation and our goals; but the global DH scenario seems to us so unequal that we can hardly relate to the scale, interests, and tools that, for instance, a project funded by the National Endowment for the Humanities or the European Union can command. However, one lesson learned from coordinating the DH lab over the last few years was that collaboration could be carried out horizontally at grassroots level, and that—like the Peruvian cloud chasers or *atrapanieblas*—we were building our own infrastructures, and also making them visible.

The Visible and Invisible, or Rethinking DH Research

Improving conditions of production in digital environments is vital for the growth of DH on a global scale. Also, open, collaborative, and decentralized infrastructures seem to be the best tools for building community setups and knowledge without monopolies. In that sense, the ideals and decentralized technologies of Latin American initiatives for scientific publication—SciELO, RedALyC, or LaReferencia—emerge as models that could productively serve not only a Latin American DH infrastructure, but also a more equitable and sustainable global one.

The case of the HD CAICYT Lab shows how a project based on open infrastructures and workflows (corpus, data, software, repositories: del Rio Riande et al., “Hacia un currículum en Humanidades Digitales”; del Rio Riande, Brussa, and Hathcock, “Dónde está ‘lo abierto’”) does not need a million-dollar investment, and it also demonstrates how a community can decide and govern its data and infrastructure. The example asserts the right to infrastructure and, conversely, infrastructure as a rightful requirement for research (Corsin-Jiménez, *Reclamar las Infraestructuras*). But it also alerts us to the inequalities that Global South scholars may face in coming years if DH infrastructures continue to create knowledge monopolies with centers and peripheries, determining who is in, who is out of DH.

Geoffrey Rockwell made it clear long time ago: “Research infrastructure is not research, just as roads are not economic activity. I am compelled here to counter that infrastructure IS people” (“As Transparent as Infrastructure”). I believe that, perhaps unwittingly, Rockwell is glossing Marx, following the idea that it is not consciousness that determines life, but life that determines consciousness. After a point, it is not the infrastructures that determine DH, but it is the DH we conceive (whether more or less open, more or less grassroots, more or less divided by region, language, etc.) that will determine the infrastructures that we may build, and then make them invisible.

Notes

A Spanish version of this article was previously published in HD CAICYT Lab site: <http://hdlab.space/HD-infraestructuras/>.

1. See, for instance, Alan Liu, Keynote lecture at “DHU2: Digital Humanities and Critical Infrastructure Studies” conference, University of Utah, 10 February 2017, <https://www.youtube.com/watch?v=U4tf0WCXb6E>; Alan Liu, “Toward Critical Infrastructure Studies,” 2018, <https://cistudies.org/wp-content/uploads/Toward-Critical-Infrastructure-Studies.pdf>; Alan Liu, abstract for “Digital Humanities and Critical Infrastructure Studies: An Overview,” keynote lecture at “Infrastructural Interventions” conference, King’s College, London, June 2021, <https://cistudies.org/events/digital-humanities-critical-infrastructure-studies-workshop-series/infrastructural-interventions/#liu>.

2. <https://www.force11.org/fairprinciples>. See also Wilkinson et al., “The FAIR Guiding Principles.”

3. The laws on open access are the Institutional Repositories Law, 26899/13, which imposes an obligation to publish the primary sources of research funded by the state, and the Law on Access to Public Information, 27.275/16, which guarantees the right of access to public information and the active transparency of government programs.

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