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## V Infrastructures and Platforms

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## 17 Infrastructural Experiments and the Politics of Open Access

Jonathan Gray

How can digital technologies make research publicly available?<sup>1</sup> Available for whom, and to what end? Many definitions and declarations of open access argue for the removal of “price and permission barriers.”<sup>2</sup> For example, the widely cited Budapest Open Access Initiative suggests that open access entails:

free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, *without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself* [emphasis added].<sup>3</sup>

Such barrier-removal talk might be taken as a sign that open access advances a “negative” conception of openness focusing on the removal of constraints, rather than more substantive “positive” conceptions of who and what open-access research is for and the conditions under which it might thrive.<sup>4</sup> A closer look suggests, perhaps unsurprisingly, that there are many ways in which open access is mobilized, advocated, and practiced in the service of a range of different kinds of social, cultural, political, and economic values and visions of the future.<sup>5</sup>

As a contribution toward the study of the digital cultures, practices, and politics of open access, this chapter explores how scholarly communication infrastructures reflect, enact, and configure different ways of making research public. Such infrastructures are not simply neutral vehicles for the dissemination and communication of research. They are both substantive objects of social and cultural research and can serve as sites of public experimentation.<sup>6</sup> Infrastructures shape who and what is assembled around research, as well as what is attended to. They play a concrete role in organizing and enabling different forms of knowledge, value, meaning, sociality, participation, and publicity around scholarly communication—including both “formal” outputs

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(e.g., books, articles) and “informal” spaces and channels within, across, and beyond research fields.<sup>7</sup>

Previous research on knowledge and information infrastructures suggests how we might study the “ways in which our social, cultural and political values are braided into the wires, coded into the applications and built into the databases which are so much a part of our daily lives.”<sup>8</sup> This includes through strategies of “infrastructural inversion” to bring the social, cultural and political background work involved in infrastructures into the foreground for analysis, critique, and intervention.<sup>9</sup> Rather than thinking of infrastructures as “thing[s] stripped from use,” it has been suggested that they can be seen in terms of “relations.”<sup>10</sup> In the case of infrastructures for open-access research, this can include ensembles of documents, software systems, metadata standards, editorial boards, and web technologies. Other scholars have suggested that for very large infrastructures that develop across multiple systems, sites and settings, it may be more appropriate to consider how they “grow” rather than just how they are “designed.”<sup>11</sup>

Infrastructures associated with open scholarly communication may also be characterized by their potential to multiply and organize relations through digital technologies in specific ways. As such, their study may be informed by recent research in fields such as science and technology studies, (new) media studies, internet studies, platform studies, digital culture, and digital sociology. Drawing on approaches from these fields, rather than focusing on how such infrastructures can bring research to “the public,” we can instead examine the sociotechnical arrangements for “making things public” and assembling different “publics.”<sup>12</sup> As well as making research available, scholarly communication infrastructures are involved in making many different types of objects and activities commensurable, comparable, and quantifiable, whether for the purposes of research assessment, performance management, resource allocation, or otherwise.<sup>13</sup>

It might be argued that established systems for publishing, organizing, and valuing scholarly work can become so ingrained as to constitute a kind of “infrastructural *a priori*,” providing conditions for recognition, legibility, and relationality. Previous studies examine how researchers respond to frictions by remaining loyal to such infrastructures or by exiting in search of alternatives.<sup>14</sup> There also remains a degree of “interpretive flexibility,” and the extent to which infrastructures shape and are shaped by users and their practices remains an open and empirical question.<sup>15</sup>

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In what follows I shall explore “infrastructural experiments,” which can be understood to make different aspects of the politics of open access and scholarly communication visible and actionable. Rather than focusing simply on optimizing systems through feedback loops or composing new improved ones that will recede into the background, such experiments may serve to facilitate collective inquiry into who and what research is for, as well as “infrastructural imagination” about how it may be organized differently.<sup>16</sup> Infrastructures may thus serve as experimental “sites and devices for intervention in the ‘composition of the world,’”<sup>17</sup> as well as “where multiple agents meet, engage, and produce new worlds.”<sup>18</sup>

Below I discuss several examples of infrastructural experiments grouped around four areas: (1) “who has access?”; (2) “what counts?”; (3) “what matters?”; and (4) “how are relations reconfigured?” They are intended to be taken as illustrative rather than exhaustive, overlapping rather than mutually exclusive.

### 1. Who Has Access?

The Open Access Button ([openaccessbutton.org](http://openaccessbutton.org)) started as a project to “track the impact of paywalls and help you get access to the research you need.”<sup>19</sup> It began as an advocacy device to “make this invisible problem visible” by serving to “show the global effects of research paywalls” and to “help change the system.”<sup>20</sup> While ethnographic studies on infrastructures have suggested how they may become “visible upon breakdown,”<sup>21</sup> it is arguably not the infrastructural failure of paywalls that is at issue (sure, they limit and monetize access by design) but rather their malalignment with the interests and concerns of those who come to them.<sup>22</sup> The button gathers and materializes a public without access.

The button may thus be understood as a form of “infrastructural activism,” in order to articulate access issues and to mobilize support for openness in scholarly communication. It does so by recording a variety of interactions across space and time, which can then be documented, aggregated, counted, and displayed. As the creators put it: “We wanted to change the experience of hitting a paywall, and transform it from this disempowering denial of access into an explicit call to action.”<sup>23</sup> The Open Access Button thus served as a sociotechnical device to make individual incidents of encountering paywalls experienceable and visible as cases of a broader

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systemic “paywall injustice” and being “denied access,”<sup>24</sup> as well as facilitating associated processes of commensuration and quantification of what the project calls “blocks” (“any instance [when] an individual can’t access a resource they want”). The datafication of paywall injustice means that the button can also be understood in relation to recent practices of “statactivism” and “data activism.”<sup>25</sup>

As well as making access issues collectively visible, the button invited users to document their circumstances and aspirations: “Tell your story—why were you blocked? What were you trying to do at the time?” The project uses a browser extension to draw attention to underrecognized alternatives to accessing articles, including self-archived (or “green open access”) versions in institutional repositories, subject-based archives, aggregators, and other sources. It facilitates and records requests for access to researchers, contending that “a request system for science should be open, community-owned infrastructure that’s free to use, citable, effective, safe, and just.”<sup>26</sup> To this end, the project uses GitHub to facilitate involvement in the project, including discussion, ideas, and project management, as well as software development.

There are other mechanisms offering alternative access routes to paywalled research, including through legal aggregators (e.g., Unpaywall, Koperio) as well as “pirate” sites such as Sci-Hub.<sup>27</sup> There are also other request buttons.<sup>28</sup> What is distinctive about the Open Access Button as an infrastructural experiment, though, is that it not only facilitates access and requests, but also documents and datafies access issues, assembling a public in order to challenge and problematize existing infrastructures and mobilize around alternatives.

## 2. What Counts?

There are also infrastructural experiments around what is recognized and counted as research work and research outputs, and the different forms that these can take. Many institutions and infrastructures prioritize the recognition of historically contingent, highly conventionalized forms of knowledge production such as the monograph and the peer-reviewed article.<sup>29</sup> Infrastructures can thus support and enact different social and cultural practices of recognition, legitimation, and classification, or “sorting things out.”<sup>30</sup>

For example, the Zenodo project based at CERN functions as a “catch-all repository” to support the sharing of “all research outputs” from “all fields

of research,” “all over the world.”<sup>31</sup> Notably, this includes nontraditional outputs such as: “posters, presentations, datasets, images (figures, plots, drawings, diagrams, photos), software, videos/audio and interactive materials such as lessons.” By providing digital object identifiers (DOIs) to all materials, Zenodo aims to make many different kinds of work easier to discover, cite, and institutionally recognize. It deliberately remains receptive to all kinds of digital objects and “does not impose any requirements on format, size, access restrictions or license.” At the same time, it seeks institutional recognition for these activities through its close association with the EU-funded “Open Access Infrastructure for Research in Europe” (OpenAIRE) initiative, as well as through collaborations with national funders, ministries, and institutions across Europe, the United States and Australia.

In a similar vein, the Research Ideas and Outcomes (RIO) journal publishes “all outputs of the research cycle,”<sup>32</sup> and the Figshare project carries the tagline “credit for *all* your research”<sup>33</sup> (emphasis in original), thus aspiring to surface and recognize different aspects of research work which may traditionally be overlooked. The nonprofit ORCID project that provides “persistent digital identifiers” for researchers may also be considered a site of “ontological experimentation,” insofar as its forums and discussion channels do not only resolve but also open up discussions about the articulation, definition, and conventionalization of entities and relations involved in research, including around the recording and disambiguation of names (and different cultural naming practices), what counts as an affiliation (e.g., professional associations as well as universities?), what counts as a country (e.g., Kosovo?) and what should be included as “work categories” (e.g., blog posts, field work, oceanographic cruises, policy reports, media interviews, podcasts, software, maps, sheet music, performances, infographics, teaching materials).

There are also infrastructural experiments in recognizing and supporting existing and emerging forms of scholarly work. For example, Publons (publons.com) provides public recognition for peer reviewing and Depsy (depsy.org) for research software development. There are also a growing variety of projects to support, credential, and legitimate evolving, hybrid, interactive, dynamic, multimodal, and collaborative research formats and outputs—from living books to collective authorship models.<sup>34</sup>

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### 3. What Matters?

Infrastructural experiments may serve to explore not only what scholarly communication is and what counts, but also what matters and what is considered valuable. Many of these serve as responses to dominant forms of quantifying, valuing, measuring, assessing, and metrifying research, such as journal impact factors, and measures such as the h-index and the i10-index. Recent work in the sociology of quantification suggests how we may attend to the reactive and performative effects of such practices, and their capacities not only to represent but also to intervene in social life.<sup>35</sup>

One prominent response to established scientometric measures is “altmetrics,” or alternative metrics, which explore other ways of measuring the value of research publications beyond metrics based on citation counts. They are positioned as a way to “expand our view of what impact looks like, but also of what’s making the impact,” partly as a response to the fact that “expressions of scholarship are becoming more diverse.”<sup>36</sup> This includes by exploring the use of web and social media data in order to look at the life of research publications outside of formal channels and referencing practices. Alternative ways of appraising value and measuring attention based on web and social media data are included in journals alongside other measures. As well as provided aggregated counts, altmetrics may look at the character of not just counts, but also the character of mentions, asking “how and why?” as well as “how many?”<sup>37</sup>

For example, ImpactStory Profiles ([profiles.impactstory.org](http://profiles.impactstory.org)) provide a range of different analytical functions and “badges” for researchers—including for achievements such as “Hot Streak” (the degree of ongoing online discussion around a publication); “Global South” (recognizing the percentage of online engagement comes from countries in the south); and “Wikitastic” (the number of Wikipedia articles which cite a researcher’s publications). The inclusion of ironic metrics such as “Rickroll” (being tweeted by a person named Richard and punning on the internet meme in which users posted a catchy Rick Astley pop song to unsuspecting victims), suggests that metrics can be arbitrary, contingent, and an area of ongoing experimentation, rather than taken at face value. Web and social media data can enable different ways of valuing and measuring research and approaching its role in society, and can not only resolve but also raise questions about what matters.

Other initiatives emphasize that measurement practices should be informed by the different societal settings in which research is accounted for.

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For example, the Leiden Manifesto argues that quantitative valuation should support qualitative assessment; that research should be considered in relation to (potentially diverse) goals of institutions, fields and researchers; that there should be processes for involving researchers in evaluation processes; and that assessment practices may be required for different fields.<sup>38</sup> It also argues for recognition of the reactive and performative effects of indicators, as well as the dangers of “misplaced concreteness” through the reification of measurements. In a similar vein, the San Francisco Declaration on Research Assessment (DORA) suggests caution in how journal-based metrics are used, arguing that they should not be taken “as a surrogate measure of the quality of individual research articles, to assess an individual scientist’s contributions, or in hiring, promotion, and funding decisions.”<sup>39</sup>

In considering how metrics are attuned to the interests of diverse actors and publics, ongoing infrastructural experiments about what matters may benefit from recent research on the social and cultural study of valuation (see, e.g., the *Valuation Studies* journal), as well as “inventive methods,” “critical analytics,” and “situational analytics.”<sup>40</sup>

#### 4. How Are Relations Reconfigured?

Following the abovementioned shift from the “general public” to attending to the material formation of specific publics,<sup>41</sup> infrastructures can also be considered as sites for experimentation in reassembling and reconfiguring relations between different actors around research. Just as it has been argued in relation to transparency initiatives, infrastructures do not only facilitate access to preexisting publics, they can also gather their own.<sup>42</sup> Research infrastructures may thus become sites of very different kinds of public involvement and material participation, opening up the processes of scholarly communication not only to nonacademic publics, but also advertisers, data flows, startups, algorithms, and activists.

For example, one recent development is the rise of the “platform” as a way of configuring and organizing relations around research.<sup>43</sup> In the emerging field of “platform studies” this has been considered both in terms of the “discursive positioning” of platforms,<sup>44</sup> as well as their material-technical and computational affordances.<sup>45</sup> Platforms are said to organize actors and relations between them to accommodate different economic models such as multisided markets (e.g., between users, publishers, advertisers). In the

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case of Facebook, this is described in terms of the “double logic” of decentralizing platform features and recentralizing platform-ready data.<sup>46</sup> Such economic models may shape (but do not determine) user practices and the forms of mediation that platforms afford.

Though their economic models and material organization may differ, platforms and services such as Academia.edu, ResearchGate, Mendeley, and Google Scholar aim to organize and monetize relations in and across research communities to suit their respective business models, whether through transactional metadata, advertising, or user fees.<sup>47</sup> Researchers have raised questions about whether these forms of organization are suitable in the context of research.<sup>48</sup> As well as dedicated platforms, other kinds of social media platforms (such as Twitter) have become entangled in scholarly communication systems, leading to not only the platformization of infrastructures, but also the infrastructuralization of platforms.<sup>49</sup> This also has the consequence that the online dissemination of scholarly research may become entangled with digital advertising markets, trending algorithms, and digital cultures associated with platforms—a development that is implicitly encouraged and credentialed through altmetrics for social media shares.

A range of alternative projects have arisen in response and parallel to such platforms. ScholarlyHub ([scholarlyhub.org](http://scholarlyhub.org)) is mobilizing resources and support for a “truly open-access repository, publishing service, and scholarly social networking site,” which is “run by scholars, for scholars.” Projects such as PubPeer ([pubpeer.com](http://pubpeer.com)) and Hypothesis ([hypothes.is](http://hypothes.is)) aim to support online interaction, discussion, and annotation around research material through browser extensions and databases. The Directory of Open Access Journals ([doaj.org](http://doaj.org)), provides a “community-curated online directory” (with an API to facilitate reuse) in order to index open-access material and provide alternative search and query facilities, and has been positioned as a potential mechanism to address inequities not only in access, but also in knowledge production with respect to the Global South.<sup>50</sup>

## Conclusion

In this chapter I have explored how scholarly communication infrastructures may constitute both an object of research and a site of experimentation to explore questions of who has access, what counts, what matters, and how relations are organized. The examples suggest how infrastructural work may be

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brought into the foreground to not only enact dominant regimes of quantification, valuation, and interactivity, but also to question them and to explore alternatives. Drawing on infrastructure studies, these reflect and enact specific social and cultural practices of classification and organization. Infrastructural experiments may serve not only to optimize existing systems, but also to interrogate their operations, to better understand their specificities and limitations, and broaden involvement around them. This task will surely become even more vital as the plurality and variety of actors involved in scholarly communication increases, from platform companies to third-party analytics services, text-mining bots, citizen scientists, digital knowledge cultures, research startups, relevance algorithms, and artificial intelligence projects, along with all of their attendant imaginaries, economic models, practices, and publics.

**Notes**

1. I'm grateful to Liliana Bounegru, Geoffrey Bowker, Timothy Weil Elfenbein, Jean Christophe Plantin, and three reviewers invited by MIT Press for their careful readings and thoughtful responses to this chapter.
2. Peter Suber, *Open Access*, Essential Knowledge Series (Cambridge, MA: The MIT Press, 2012), <http://bit.ly/oa-book>; Martin Paul Eve, *Open Access and the Humanities: Contexts, Controversies and the Future* (Cambridge: Cambridge University Press, 2014), <https://doi.org/10.1017/CBO9781316161012>.
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6. Here I draw on recent research in science and technology studies that explores not only scientific experimentation in settings of laboratories and controlled environments, but also broader practices and cultures of public experimentation in society. See, for example, J. Lezaun, Noortje Marres, and M. Tironi, "Experiments in Participation," in *Handbook of Science and Technology Studies*, ed. U. Felt et al., vol. 4 (Cambridge, MA: The MIT Press, 2017), 195–222; and Noortje Marres, "Why Political Ontology Must Be Experimentalized: On Eco-Show Homes as Devices of

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29. See, for example, chapters by Fyfe; Pontille and Torny; and Mourat, Ricci, and Latour in this volume.
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43. For further discussion on this see Penny Andrews's chapter in this volume, as well as Lagoze et al., "Should I Stay or Should I Go?"; Jean-Christophe Plantin et al., "Infrastructure Studies Meet Platform Studies in the Age of Google and Facebook," *New Media & Society* 20, no. 1 (2018): 293–310, <https://doi.org/10.1177/1461444816661553>.
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46. Plantin, Lagoze, and Edwards, "Re-Integrating Scholarly Infrastructure."

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47. See the chapters by Eileen Joy and Kathleen Fitzpatrick in this volume.

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