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Research Libraries, Emerging Technologies—and a Pandemic

Last October, the Association of Research Libraries (ARL), the Coalition for Networked Information (CNI), and EDUCAUSE partnered to explore how research libraries can leverage emerging technologies to meaningfully and productively support research and learning, given ongoing evolutions of digital tools and data collections. Even while we were working on the slippery task of identifying and predicting technologies and processes that could have big impacts on research library objectives, we did not anticipate that a pandemic with world-stopping power might be a scenario we should consider.

Pandemic Advice

Not long after the novel coronavirus reached US shores in late January 2020, my library, like most others in North America, closed, and staff dispersed to work remotely. We focused on doing as much of our work from home as possible and on providing support for students and faculty who had to suddenly shift the context for learning to an online model. With most labs closed, we grounded ourselves in whatever support for research continuity we could engineer. We now know enough about the virus to say that the next few years are uncharted and uncertain, and this uncertainty compounds financial and other strains on research libraries.

In the early days of the pandemic, I read some expert advice that stuck with me: people should prepare for pandemics by, among other things, ensuring that the essential functions of society are maintained. In a worst-case scenario, research libraries' functions that are not maintained could be difficult to restore when we've returned to some form of normalcy in the future. So the question is: Given what we've learned about promising emerging technologies, what approaches should research libraries take to maintain the most essential and valuable aspects of their work?

Five Findings to Steer By

By March/April 2020, the ARL-CNI-EDUCAUSE team had drafted two reports addressing our inquiry: a landscape of emerging technologies in research libraries; and a synthesis of interviews with experts on emerging technologies for research and learning.¹ We conducted workshops to help develop visions of achievable and desirable futures for research libraries, reporting the results in August 2020.² Of these findings, five are most helpful in our current

circumstances: technological adoption; openness; collaboration; data and data infrastructure; and digital fluencies.

Technological Adoption

A guiding insight from the ARL-CNI-EDUCAUSE project is that technologies are adopted in social contexts that shape how they are used, for what, and by whom. The current circumstances are far different from the usual context for technological adoption, presenting both risks and benefits.

One potential benefit is that with so many people trying new tools (or new-to-them tools) at the same time, we have the ability to accrue feedback about what works and what does not, even if not via a controlled experiment. One risk is that nontechnical factors will give less beneficial technologies a boost just because they were what was available at a crucial moment. For example, in the rush to find a tool that helps solve a problem for online teaching,

instructors may overlook important factors like data ownership, jeopardizing the ability of faculty and students to control their data.

Instructors are under new pressures in the labor-intensive process of designing and implementing effective online courses; shortcuts and burnout are two likely impacts. With labs closed and field sites off-limits, researchers will emphasize other phases in their research process, potentially seeking new sources of data and methods for analyzing that data.

Much of what research libraries already do, and hope to do, is ready-made for access over networks. But we should also anticipate technological trade-offs. Remote work and online learning can provide the flexibility required for important social activities to continue, but this does not equate with efficiency

or productivity gains. Expectations should match the circumstances: technologies can allow us to do things better, faster, or elsewhere—but not necessarily all at once. We should not fall into the trap of believing that the best technologies are the ones that make it to the market.

Openness

Openness is a value and set of practices that evolved, in the digital age, from the traditional research library purpose of collecting and sharing scholarly outputs. It thus guides an array of research library activities including building digital collections and negotiating licensing terms for purchased digital content for new scholarly methods, such as text analysis and data mining. Openness is the

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ideal that motivates our open-access efforts and drives research libraries to partner in building data infrastructures and standards that support interoperability and data sharing. This value serves research libraries well as we prioritize work that supports distance learning and off-site research. Nurturing this value in times of trouble will ensure that our hard work done under duress is still available to our constituents in calmer times ahead of us.

Collaboration

One finding across all aspects of our inquiry was the importance of collaboration to achieving research library objectives. Furthermore, our team learned that research libraries have earned credibility as capable partners for projects that advance or adopt emerging technologies.

As interdisciplinary spaces, research libraries have the respect and the potential to bring actors from across campus into partnerships to achieve complementary goals. Interoperability is both a goal of the technologies we build and a metaphor for partnering across campus. Collaboration allows research libraries to fuse their objectives to other efforts on campus, enabling those efforts to scale up, and also allows them to learn what constituents need and what research libraries can provide—while still setting agendas for research library outcomes.

Data and Data Infrastructure

Not surprisingly, data figured heavily in all of our findings. It is the fuel for business decisions, consumer technologies, and both traditional research and emerging forms of data-intensive scholarship. As computational technologies continue to develop in every sector of society, they are powered by data, from the digital trace data that people generate through very ordinary activities, to data created through creative and social activities, to data produced through industrial activity and research. Even under pandemic conditions, research libraries will continue to have opportunities to participate in shaping infrastructures for collecting and processing data, drawing on long expertise in this area.

Research libraries can facilitate computational use of collections through digitization projects and negotiations for licenses that permit this use of subscription collections. As awareness of data visualization and analytics grows, so does a base of new users (including those working in libraries) who want to use computational tools to do new things. Many of these users are just starting to scale the learning curve. There's also immense potential for research libraries to use data-centric tools like machine learning internally as a way to enrich descriptive metadata and create text corpora.

Even when research libraries can't launch new projects, they can continue current infrastructure development with attention to FAIR (Findable, Accessible, Interoperable, Reusable) and LOUD (Linked, Open, Usable, Data) standards and other tools that promote and reward data sharing, citation, and reuse, both for research and for learning.

Digital Fluencies

Crucially related to data is the question of how we incorporate the whole ecosystem of data-powered, digital tools into learning. "Digital fluencies" relates to a host of skills that students and faculty needed even before the pandemic but that will be in even greater demand for navigating the online worlds in which students and faculty will learn and socialize to varying degrees in the months ahead.

As we learned through this project, experts and stakeholders anticipate that research libraries, drawing on their experience and professional history of protecting patrons' privacy, confidentiality, and intellectual freedom, can convene and guide discussions on the use of data collected in classrooms and through institutional operations. Building on information literacy and library research instruction, research libraries have a timely opportunity to help students learn where data comes from and how to scrutinize it, to learn how ideas, facts, and information move through digital tools and social media to be used and misused, and to learn how they can participate in furthering knowledge and expressing that knowledge in powerful new ways.

Concluding Thoughts

As a society, we are learning that pandemic time is a time of contraction and withdrawal. But important processes are happening even when organisms appear dormant. Roots are growing deeper, and energy is being stored for fast growth when conditions are right.

Research libraries may not be able to act now on all of the findings identified in the ARL-CNI-EDUCAUSE project, but they can practice the values and nurture the relationships that will allow research libraries to move quickly when opportunity arises. Importantly, because of things that research libraries have been doing for a long time, they are able to rise to the occasion and support learning and research right now, under highly stressful conditions. Conversely, by continuing to direct their efforts to this support—centering the values of openness and collaboration, keeping in mind the context for technological adoption, and anticipating the roles of data, data infrastructure, and digital fluencies—research libraries will further their own objectives over the long term. ■

Notes

1. Sarah Lippincott, *Mapping the Current Landscape of Research Library Engagement with Emerging Technologies in Research and Learning*, ed. Mary Lee Kennedy, Clifford Lynch, and Scout Calvert (Association of Research Libraries, Born-Digital, Coalition for Networked Information, and EDUCAUSE, 2020); Scout Calvert and Mary Lee Kennedy, *Emerging Technologies for Research and Learning: Interviews with Experts*, ed. Clifford Lynch and John O'Brien (Association of Research Libraries, Coalition for Networked Information, and EDUCAUSE, March 2020).
2. Scout Calvert, *Future Themes and Forecasts for Research Libraries and Emerging Technologies*, ed. Mary Lee Kennedy, Clifford Lynch, and John O'Brien (Association of Research Libraries, Coalition for Networked Information, and EDUCAUSE, 2020).

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