



TechnOzarks:

Essays in Technology, Regional Economy, and Culture

Edited

by

Thomas A. Peters

Paul L. Durham

Foreword

by

Greg Burris

Former Springfield City Manager

President and CEO of the

United Way of the Ozarks

**The Ozarks Studies Institute of
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Introducing The OSI Publications Series in Ozarks History and Culture
The Ozarks Studies Institute (OSI) of Missouri State University seeks to preserve the heritage of the Ozarks, its culture, environment, and history by fostering a comprehensive knowledge of Ozarks’ peoples, places, characteristics, and dynamics. The Institute promotes a sense of place for residents and visitors alike and serves as an educational resource by collecting existing—and discovering new—knowledge about the Ozarks and by providing access to that knowledge.

Following *Living Ozarks: The Ecology and Culture of a Natural Place* (2018), *TechnOzarks* is the second volume in the OSI series. Along with its companion journal, *OzarksWatch*, the series aims “to introduce the Ozarks to the world,” and vice versa.

What readers have said of the first volume, *Living Ozarks*:

Authors in this anthology are aware of tourism’s fantasies that overlay geology’s reality and that the Ozarks’ fragile natural landscape requires stewardship. We know that the environment shapes all creatures that live within it, including us. We must be prepared to address our presence as part of the natural—what is the cost to absorb our footprint?
—Lynn Morrow, editor, *Ozarks in Missouri History: Discoveries in an American Region*

Any discussion of sustainability in the Ozarks must involve not only the natural environment, but also elements not commonly thought of as natural resources: the history, the heritage, and the people. These are key elements that make this region unique and attractive to outsiders and tourists and give the Ozarks its unique identity. *Living Ozarks: The Ecology and Culture of a Natural Place* brings this point home in a decisive and definitive work.
—Paul W. Johns, author, *Unto These Hills: True Tales of the Ozarks*



Open(ing) Access:

On Building a Digital Commons at Missouri State University

Rachel Besara

The Ozarks region is relatively rural, with many of its institutions founded comparatively recently. (For example, the region’s Fourth District Normal School—state-funded precursor to MSU—was established in 1905.) And the terrain made travel challenging. Accordingly, access to research information, and research data, was rare. In the past, scholarly publications (particularly academic journals) were to be found almost exclusively on the shelves of colleges and universities, with only a few, mainly students and academic researchers, having complete, easy access. The general public was welcome; but the infrastructure required to hold large collections of print publications was such that, in practice, only the university community and exceptionally driven members of the public could take advantage of the scholarly literature. With the poor roads and rugged terrain (even into the 1960s, many rural roads were dirt and gravel), this meant that, historically, even fewer residents of the region were able to take advantage of published scholarship.

With the advent of the internet and online journals, one might think that the problem of access has been solved once and for all. This, unfortunately, is not (yet) the case, given concurrent changes that have taken place in scholarly publishing. Schools that once subvented scholarly journals underwent rounds of budget cuts; given rising print costs, scholarly organizations could no longer pay for their journals by membership dues alone. Commercial companies, such as Elsevier, Wiley, and Springer, bought out many of these scholarly associations’ journals, making them available in print and online. But, once in possession of these journals, the commercial companies began to charge high fees, inflating yearly far beyond the cost

of living, and putting the online literature available outside of the library behind a high paywall. With the Ozarks being a poorer region of the country, this has kept access beyond the means of many, even if they know how to find the literature and have the technical means to access and download the titles.

Despite widespread computer use/storage, raw research data for investigation have been even harder to get. The data used for scientific or other research projects remained locked on paper, available only on the hard drives of a lab or work computer or, perhaps, available in the cloud locked behind one or two accounts. While the researchers gathering data recognized the value of its information, it was not easy for them to share their work in any way other than distilled into a journal article, report, or book; and even these remained relatively difficult to access, requiring travel to a library and at least a basic knowledge of how to search for the desired information. Despite the advent of the internet, the size, complexity, and infrastructure of data sets made them difficult to distribute and to be decoded by others. This was complicated by the fact that, due to the historical limitations of data distribution, researchers rarely even considered how to manage and describe the data they produced in ways that would make them discoverable and usable by others. At best, this might happen in a limited way if, at the end of one’s career, a researcher’s papers were donated to an archive; but, most often, these items would not be able to be found or used unless the searcher already knew of the work that had been done in the past. Furthermore, the data searcher would have to be able to travel to wherever the archive was located and spend time sifting through the paper documents

or old computer files. This meant that a great deal of potential knowledge was lost.

This is changing, however, for the Ozarks and the nation. There is now a growing expectation that publicly funded research data—such as those produced by Missouri State University, the University of Arkansas, the Missouri Institute of Science and Technology, and other institutions—will be made publicly available and open to all. The infrastructure is now in place for this to be done, not just in theory but in practice. The following paragraphs will discuss the key drivers of many of these changes, as well as the role that Missouri State University is playing in opening up public access to scholarly publications and research data, here in the Ozarks and beyond.

A key value of libraries is making information as available as possible to the communities they serve and to the public at large. Within the last thirty years, with the rise of the internet, there has been a much stronger push to make information openly available, openly accessible, to all. To understand why this did not become standard practice when the infrastructure first allowed it, the traditional cycle in disseminating scholarly information needs briefly to be discussed. Traditionally, a scholar or researcher at a university would do research, which would be distilled into a paper. This paper would then be sent to a publisher, often sponsored by a scholarly or professional association, whose editor would review the paper, send it to other experts in the field for evaluation and improvement (all on a voluntary basis); and then, if the paper was deemed worthy, it would be published. The scholarly or professional organization was most often run at relatively low profit margin, and, to limit liability, the standard practice was for authors to sign over the copyright to their work for free in exchange for publication. The publication would then be sold at reasonable cost (to encourage the widest dissemination), most often to academic libraries which, in turn, would make it widely discoverable and accessible, enabling

further creation of new knowledge. The performance of an academic researcher and, often, one's continued employment would be determined by the number and quality of publications produced (and by the reputation of the presses/journals one's work was published in), all of which would be decided by this process.

But when commercial, for-profit presses bought out the scholarly presses, the price of journals began to increase. Libraries and universities had no choice but to pay the hyper-inflating prices in order to stay competitive by making sure their students, instructors, and researchers had access to up-to-date information.

Not surprisingly, many university faculty and librarians found this new model problematic. They answered by joining the open access movement. Participants in the open access movement would do what they could to make the publications from their research as widely accessible as possible. For example, a mathematician might post a preprint version of a paper in a discipline-based repository, such as arXiv (Cornell, 2019), in order to make that paper widely available. While this is laudable, many publishing companies would try to suppress practices of this type, being detrimental to their business model. Or, an author might publish in an open access journal—for example, one supported by the Public Library of Science (Public, 2019)—which doesn't charge readers to access its content. Unfortunately, since these will be relatively new venues, they might not have earned the same reputation as established journals. These challenges were (and still are) compounded by the performance review model for faculty, which remains bound to the review/publication/press reputation cycle; and, since an increasing number of established journals has been bought out by commercial publishers, a university's faculty—its junior faculty, especially—remain under significant pressure to conform to the model of the major commercial publishers.

A major breakthrough occurred in 2013, when the White House Office of Science and Technology



Typing at the keyboard: computing in Meyer Library.
MSU Photographic Services.

established guidelines that federally funded science be made publicly available (Holdren, 2013). This does not just cover the traditional journal publication that sums up a phase of a project; it covers the gathered data that are analyzed to form the conclusions as well. Failure to comply will lead to denial of future public funding. This created a challenge for all publishers of scientific research. If what they were publishing was required to be publicly accessible, how could they profit? Who would buy publicly available information? This has led to a scramble for different business models, and the outcome from that standpoint is still unclear. Many of the publishers are now trying to get payment in advance of publication through author page fees, where an author has to pay the publisher a set fee per page published, rather than charging the university through library subscription fees after publication.

Missouri State University, through its Libraries, has addressed this issue and contributes to the university's Public Affairs mission by building a digital commons, called BearWorks. Established in 2016 (Peters, 2017), BearWorks creates “a record of pub-

lication, research, and scholarship at Missouri State University” (Missouri, 2019). While this started with the gathering and entering of past research in theses and dissertations, BearWorks also provides the university with an avenue to meet the requirements for public access of federally funded research. Authors can deposit their articles and research data in BearWorks, where anyone in the world can access them for free—unlike the licensing terms restricting so many of the resources to which the Libraries now subscribe, since these allow the public access only if one is within Meyer Library. This means that someone living in Shannon County can access the same resource as a student living in the Blair-Shannon House on the MSU campus, and this is something that was not possible before. It is as simple as the author checking and working with the publisher to ensure that a copy of the research article or other work can be placed in BearWorks.

The challenges facing the deposit of research data are more substantial than those facing standard research outputs, such as journal publications. But these challenges lead to the current cutting edge of the open access movement. From the beginning of a research project, the data involved must be gathered, recorded, documented, and described in such a way that others can use it. While this is an achievable goal, it poses greater difficulty because researchers, in many cases, have not had to document their data for future use by others. In situations involving the use of human subjects in research, the way forward becomes even more challenging: What are the ethics of sharing human subject data long-term with the public? How does it change the practices going forward? Many of the social science fields are just beginning to tackle these issues, which biology and medicine have been struggling with over the last five years.

BearWorks allows MSU to provide ethical, sustainable leadership in accessing new knowledge, in

the form of publications or data created by its faculty and students. It opens up access to new perspectives to the larger community. It allows for feedback and interaction from the community to the researchers and opens up possibilities for new types of collaboration between the university and the community. For example, new approaches to community-based science are now possible because the community can see and can contribute to data-gathering in MSU-led research. This could lower the barriers to undertaking “citizen science” movement projects, where scientists, data managers, and citizens collaborate to uncover new knowledge across the traditional boundaries dividing the university from the broader community. These initiatives could lead to a far greater understanding of the Ozarks region’s environment, cultures, and ecologies. The impact of BearWorks as a digital commons of open Ozarks data has yet to be measured, but the potential is enormous.

Works Cited

Cornell. (n.d.). *ArXiv*. Retrieved from <<https://arxiv.org/>>.

Holdren, J. (2013, February 22). Increasing access to the results of federally funded scientific research. Retrieved from <https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf>.

Peters, T. A. (2017, June 1). *Bearworks Institutional Repository*. Retrieved from <<https://libnotes.missouristate.edu/2017/06/bearworks-institutional-repository/>>.

Public Library of Science. (n.d.). *PLoS*. Retrieved from <<http://www.plos.org/>>.

Missouri State University. (n.d.). *BearWorks*. Retrieved from <<https://bearworks.missouristate.edu/>>.