

Building on success, forging new ground:  
The question of sustainability

by Donald J. Waters

## Abstract

Building on success, forging new ground: The question of sustainability  
by Donald J. Waters

This paper focuses on three factors that contribute to the sustainability of digital scholarly resources. First, the development of such resources depends on a clear definition of the audience and the needs of users. Second, the resource must be designed to take advantage of economies of scale. Third, to create an enduring resource, careful attention is needed to the design of the organization that will manage the resource over time.

## Contents

[Introduction](#)

[The sustainability question](#)

[Conclusion](#)

---



---

## Introduction

In 1992 the great religious historian Jaroslav Pelikan published a very useful book entitled *The Idea of the University: A Reexamination*. Originally delivered as a series of lectures at Yale University, it is a meditation on and attempt to update John Henry Newman's classic work on higher education. In his *Reexamination*, Pelikan identified four core and enduring functions of higher education: research, teaching, the dissemination of knowledge through publication, and the preservation of, and access to, the scholarly record in libraries and archives (Pelikan, 1992). The latter two functions — dissemination and preservation and access — refer to the life cycle of scholarly resources that are produced and used in teaching and research and are the objects of scholarly communications.

The Andrew W. Mellon Foundation has provided long-standing support for scholarly communications. The interest can be traced back to its predecessor foundations, which date back to the 1940s: the Bollingen and Old Dominion foundations, which were associated with Andrew's son, Paul; and to the Avalon Foundation, which had been established by Paul's sister, Ailsa. In 1969, Paul and Ailsa established the Mellon Foundation in honor of their father by merging the Old Dominion and the Avalon Foundations. The earliest actions of the new Mellon Foundation included providing support for the formative activities of modern library access, namely, the development of the OCLC regional networks, as well as the Research Libraries Group (RLG) and its Research Libraries Information Network (RLIN).

Throughout its history of support for scholarly communications, the Foundation has been particularly interested in the applications of technology, especially for the development of various kinds of scholarly resources. The interest in technology, of course, has never been for its own sake. Rather the primary objective of Mellon's scholarly communications program is to promote the cost-effective creation, dissemination, accessibility, and preservation of high-quality materials that are essential for the advancement of humanistic studies broadly defined, and which are designed to persist through time to support such studies. In this paper, I focus on some of the Foundation's recent experience in supporting the creation of scholarly resources, and highlight the features that contribute to sustainability.



## **The sustainability question**

The topic of sustainability is a large one (see, for example, Bowen, 2000; Council on Library and Information Resources, 2001; Lesk, 2002; Smith 2003a,b). At one level, it refers simply to the source of funds for financing the creation of and enduring access to primary and secondary sources of scholarly materials. Anyone with a new or ongoing project who applies for funding from sources like the Institute for Museum and Library Services (IMLS) or the Mellon Foundation must confront the sustainability question in a rather bald and crude form, at least in the initial stages of contact, when they must answer: "why do you need funding from us and, if you get it, what is your plan for funding after the grant ends?" Financial options other than seeking funds from government and philanthropic sources may include reallocating existing finances in an institution so that scholarly products can be brought under a standing budget, say, of the library. They may also include complex efforts to diversify the base of financial support, possibly by charging fees to users of the resources.

However, good economic thinking about scholarly resources is not limited to the means of financing. For example, one of the most demanding challenges facing creators of useful and sustainable scholarly resources is the need to respect and protect intellectual property rights, while also taking advantage of the power of digital technologies to advance knowledge and education by linking and providing access to materials in new and unique ways (see, for example, Lessig, 2001; Lessig, 2004). In addition, there are a

variety of other critically important factors that contribute to sustainability. Here I concentrate on three of them. First, there needs to be a very tight focus on the definition and needs of users in the development of a content resource. Second, designing the resource to scale is essential. Third, to create an enduring resource, careful attention is needed to the design of the organization that will manage the resource over time.

## **Focus on users**

Following a series of systematic studies in the early 1990s of trends in scholarly communications (see Cummings *et al.*, 1992; Bergman, 1996; Guthrie, 1996), the Foundation decided in 1994 to sponsor a series of working experiments in the creation of scholarly resources using digital technologies. Most of these projects involved the digitization of primary and secondary textual source materials. [JSTOR](#) was the stellar success of these experiments (see Ekman and Quandt, 1999; Schonfeld, 2003).

Many of the other Mellon-sponsored projects proved much less successful, although there was much learned from each of them. With a few notable exceptions, such as the [early American fiction project](#) at the University of Virginia and the [Making of America](#) project at the University of Michigan and Cornell University, libraries, museums, and archives that the Foundation funded tended to focus on the treasures in their collections, not on scholarly needs. They took a field of dreams — "build it and he will come" — approach, digitizing materials in hopes that having them accessible online would create an audience that, in turn, could justify continued, ongoing investment in the online materials. Lacking scholarly leadership and often adding little or no intellectual value in the form of coherence or other qualities, few of these projects attracted the promised audience or the sources of ongoing funding that an audience would be expected to bring. In the worst cases, the digitized materials simply disappeared from the Web when Mellon funding ended.

What did we learn from this early experience? A huge recurring mistake in digitizing projects is that far too little is spent engaging users up front in the design and development of content. One of our grantees — a major publisher — recently reported that, for the development of a new collection of digital monographs, it had assumed, not unreasonably, that users would want the monographs tightly connected to an existing set of reference materials. After a series of focus groups and other market research, the publisher was surprised to learn that such links had relatively little value to the targeted scholarly audience, who instead were most concerned with maximizing the breadth and depth of the planned monographic collection. Linking within the collection and to related materials elsewhere was important, but could come later. The savings that resulted from this finding were enormous.

To help catch and prevent fundamental miscalculations such as the one that almost derailed the monograph collection project, the Mellon Foundation provides funding for content resources only in a measured, step-by-step fashion. Projects begin with planning and prototyping activities to ensure feasibility and demand, and to allow initial hypotheses to be tested and discarded if necessary. Moreover, because the projects that

the Foundation funds are specifically targeted to higher education audiences, leading scholars must be involved from the outset in project design and implementation. It is the job of these scholars to help define selection criteria that result in digital collections that not only are coherent from a disciplinary perspective, but also promise to fuel scholarly activity that could not reasonably be pursued without reliance on the digital medium.

## Designing to scale

[ARTstor](#) has emerged as the Foundation began applying these more stringent criteria of scholarly involvement. One of its charter collections is the [Mellon International Dunhuang Archive](#). Professor Sarah Fraser, an art historian at Northwestern University, has led the development of this digital archive. The archive is a collection of very high-resolution digitized wall paintings from Buddhist worship caves located in northwest China that are being reunited digitally with hundreds of paintings and thousands of texts that were once also located in Dunhuang, but were removed and are now dispersed in museums and libraries around the world. ARTstor will make it possible for scholars and students to study this material together online at a level of detail and a degree of coherence that otherwise has been simply impossible. But the development of the Dunhuang archive, and of ARTstor more broadly, not only illustrates the importance of scholarly involvement, it also highlights the second point that I want to emphasize, namely, that designing resources to take advantage of the economies of scale inherent in the digital environment is critical to sustainability.

One of the persisting problems with digitizing projects in libraries, and particularly those in the humanities, is that they rarely build on, enhance, or otherwise connect with work across institutions. Even though many projects are individually quite powerful in their intellectual reach and rigor, and some do reach across institutions, it is hard to look at them collectively and see more than a disconnected jumble. And I fear that this is a problem that cannot be addressed simply by building collection registries that will make it possible for users to build ad hoc connections as the need arises (Shreeves and Cole, 2003; Knutson *et al.*, 2003). Nor can it be fully addressed by composing objects in these collections at "recombinant" levels of granularity that would allow different parts to be readily combined and reused with different materials in different instructional or research contexts (Dempsey, 2004; Seaman 2003). And where are the long-awaited means of federating distributed collections that do not require some form of expensive lockstep investment in common software platforms (Tennant, 2003; Brogan 2003)? I doubt that we should hold our breath.

There is as yet on the horizon no real substitute for the vision, discipline, and commitment needed to build digital collections at a scale and level of generality that will attract a broad audience of users and have such an impact on scholarship that their disappearance is not an option. I will never forget the moment when Professor Fraser realized the truth of this statement. She had just completed her initial presentation to Foundation staff for the Dunhuang project as she had originally conceived it. She had wanted to undertake high-resolution photography of just two walls in two of the caves in Dunhuang to support her research on the compositions represented on these walls.

William Bowen, president of the Foundation, acknowledged that what she wanted to accomplish for herself was fine, but if she were given access to these caves and if she wanted the Foundation to help support her, she had an obligation to think bigger and consider the unique opportunity she had to create a resource that could shape a sub-field of art history, not just complete her own work. Four years later, her book has been published (Fraser, 2004); the art works in 40 caves at Dunhuang have been digitized; related texts and artworks are being digitized at the British Library, the British Museum, the Guimet Museum, and the Bibliothèque nationale de France; and the Mellon International Dunhuang Archive will be released in July as one of the charter collections of ARTstor.

The tendency toward fragmentation may be changing in some other disciplines besides art history, if recent funding patterns at the Foundation are any indication. Archaeology and musicology, for example, seem to be particularly hot fields, with leading scholars engaging colleagues around the world in building digital resources and conducting research based on such resources. In archaeology and related fields, Bruce Zuckerman at the University of Southern California is assembling a database of images of ancient Near East inscriptions that can serve as necessary evidence to rejuvenate the study of early writing systems; Bernie Frischer at the University of California at Los Angeles has built a team of scholars and technicians to reconstruct virtually the Roman Forum and other cultural sites as a way of examining archaeological theories that are otherwise impossible to test; Fraser Neiman at Monticello is leading an effort to amass and analyze data related to plantation archaeology; and, Steve Plog at the University of Virginia is engaged in a similar effort for the archaeology of Indian sites at Chaco Canyon (Waters, 2003). In musicology, Steve Downie at the University of Illinois has worked with colleagues around the world to create a testbed that will galvanize and propel forward the study of music information retrieval; at the University of Michigan and Indiana University, leading scholars are creating a digital archive of ethnomusicological videos; and, John Rink, a musicologist at the Royal Holloway in the United Kingdom, is working with colleagues to create a variorum edition of Chopin's first edition scores, which the composer published simultaneously with just slight variations in three European cities to secure his copyrights.

## **Organizational design**

Finally, organizational design is a hugely fertile and often neglected area for further development in building sustainable scholarly resources. Electronic resources present particularly challenging issues in organization and governance. On the one hand, with investment in technology, barriers to entry for the creation and management of digital resources can be lower than they are when the storage of physical items requires large capital investments in print runs and buildings; however, small institutions that want to develop or provide electronic resources often lack staff with the sophisticated cataloging and other technical skills that are necessary. In addition, the huge economies of scale that are possible with digital databases are difficult to manage over current institutional boundaries. Much as they might like in principle to do so, few academic institutions, large or small, are actually endowed with the mission, leadership, accountability, support

structures, and other organizational apparatus to serve up collections to scholars worldwide.


Given these requirements, current organizations need to be reshaped or new types of organizations need to be developed, which can be entrusted to serve the academic community by taking on the business of creating and maintaining crucial digital resources. JSTOR and ARTstor are two examples of new organizations that are likely increasingly to populate the digital landscape. The existence of these community-based organizations that hold and maintain digital resources will make it possible for libraries, museums, and archives to streamline their traditional storage and processing operations and, by these transformations, to achieve potentially significant savings (see Schonfeld *et al.*, 2004). Discipline will be required to achieve those changes, but some of them are already well underway, as an increasing number of libraries cancel print versions of JSTOR and other journals that are electronically available, and move back issues to high density shelving facilities.

As the organizational ecology changes in these ways, additional kinds of structures will be needed to support the emerging organizations. To help the community begin to understand this new ecology in very practical terms, the Mellon Foundation joined last year with the Hewlett and Niarchos Foundations and created Ithaka Harbors, Inc. Ithaka became independent in January 2004 and is designed specifically to incubate new projects that integrate with and support JSTOR and ARTstor. One of the projects that Ithaka is incubating is E-Archive, which is tackling the thorny problem of preserving electronic scholarly journals. Ithaka's job with E-Archive and other incubated projects is to make certain that they stick to mission, avoid fragmentation, expose them to the discipline of board management, and achieve sustainability in all senses of the word. And for organizations that have achieved a level of sustainability, Ithaka's job will be to provide common support services that are needed by all small organizations but are very difficult for any one of them to afford, such as technology support, accounting, and benefits and other human resources services. Ithaka, which is headed by Kevin Guthrie, the former president of JSTOR, will not be able to take on all problems, but will undoubtedly develop models that those involved in scholarly communications will want to consider carefully, as they try to organize sustainable digital resources of various kinds.



## Conclusion

The approaches to users, scale, and organization that I have described here have emerged recently as the Mellon Foundation has grappled with the development of scholarly resources in the digital environment. However, they also reflect a broader, traditional interest in creating sustainable systems of scholarly communications that extends back to the Avalon Foundation and especially to the Old Dominion Foundation, the two predecessor foundations mentioned earlier. The legacy is perhaps best exemplified in the story of the revival of the Bollingen Foundation, which used to reside at the present

offices of the Mellon Foundation. First established in 1942 with Paul Mellon's wife, Mary, as president, the Bollingen Foundation sponsored the publication of important texts in the fields of psychoanalysis, symbology, mythology, and related fields mainly by European authors. It was liquidated little more than a year later because of the pressures of the war. Its ambitious publishing program was absorbed by Old Dominion until late 1945, when Bollingen was spun off and established anew as an "educational foundation set up along the lines of a university press," publishing a series of scholarly books "that might not be considered good trade risks." Incubating and then spinning off an innovative solution to a system-wide scholarly communications problem that predates by more than 50 years the similar creation of JSTOR, ArtSTOR, and Ithaka by its successor foundation, the philanthropy of Old Dominion set the model and standard to which the Mellon Foundations's present scholarly communications program continues to aspire. 

## About the Author

Donald J. Waters is the Program Officer of Scholarly Communications at The Andrew W. Mellon Foundation. Before joining the Foundation, he served as the first Director of the Digital Library Federation (1997–1999), and in a variety of positions at Yale University, including Associate University Librarian (1993–1997).

E-mail: [DJW@mellon.org](mailto:DJW@mellon.org)

## Acknowledgments

I would like to thank my colleagues, Susan Lodato, associate program officer for scholarly communications at The Andrew W. Mellon Foundation, and Roger Schonfeld, Director of Research at Ithaka Harbors, Inc., for very useful comments on an earlier version of this paper.

## References

Jed I. Bergman, 1996. *Managing change in the nonprofit sector: Lessons from the evolution of five independent research libraries*. San Francisco: Jossey-Bass.

William G. Bowen, 2000. *A slight angle to the universe: The university in a digitized, commercialized age*. The Romanes Lecture for 2000, delivered before the University of Oxford on 17 October 2000. Princeton, N.J.: Princeton University Press.



Martha Brogan, 2003. "A survey of digital library aggregation services," Washington, D.C.: Digital Library Federation, Council on Library and Information Services, at <http://www.diglib.org/pubs/brogan>, accessed 24 April 2004.

Council on Library and Information Resources, 2001. *Building and sustaining digital collections: Models for libraries and museums*. Washington, D.C.: Council on Library and Information Resources, at <http://www.clir.org/pubs/reports/pub100/pub100.pdf>, accessed 24 April 2004.

Anthony M. Cummings, Marcia L. Witte, William G. Bowen, Laura O. Lazarus, and Richard H. Ekman, 1992. *University libraries and scholarly communication: A study prepared for The Andrew W. Mellon Foundation*. Washington, D.C.: Association of Research Libraries, and at <http://etext.lib.virginia.edu/reports/mellon/mellon.html/mellon.html>, accessed 24 April 2004.

Lorcan Dempsey, 2004. "The recombinant library: portals and people," *Journal of Library Administration*, volume 39, number 4, pp. 103–136, preprint at [http://www.oclc.org/research/staff/dempsey/dempsey\\_recombinant\\_library.pdf](http://www.oclc.org/research/staff/dempsey/dempsey_recombinant_library.pdf), accessed 24 April 2004.

Richard Ekman and Richard Quandt (editors), 1999. *Technology and scholarly communication*. Berkeley: University of California Press.

Sarah Fraser, 2004. *Performing the visual: The practice of Buddhist wall painting in China and Central Asia, 618–960*. Stanford, Calif.: Stanford University Press.

Kevin M. Guthrie, 1996. *The New–York Historical Society: Lessons from one nonprofit's long struggle for survival*. San Francisco: Jossey–Bass.

Ellen Knutson, Carole Palmer, and Michael Twidale, 2003. "Tracking metadata use for collections," In: *DC–2003: Proceedings of the International DCMI Metadata Conference and Workshop*, Seattle, Washington, pp. 243–244, and at [http://www.siderean.com/dc2003/706\\_Poster49-color.pdf](http://www.siderean.com/dc2003/706_Poster49-color.pdf), accessed 24 April 2004.

Michael Lesk, 2002. "How to pay for digital libraries," at <http://www.lesk.com/mlesk/derek02/derek2.html>, accessed 24 April 2004.

Lawrence Lessig, 2004. *Free culture: How big media uses technology and the law to lock down culture and control creativity*. New York: Penguin Press.

Lawrence Lessig, 2001. *The future of ideas: The fate of the commons in a connected world*. New York: Random House.

William McGuire, 1982. *Bollingen: An adventure in collecting the past*. Princeton, N.J.: Princeton University Press.



Jaroslav Pelikan, 1992. *The idea of the university: A reexamination*. New Haven, Conn.: Yale University Press.

Roger Schonfeld, 2003. *JSTOR: A history*. Princeton, N.J.: Princeton University Press.

Roger Schonfeld, Donald King, Ann Okerson, and Eileen Fenton, 2004. "Library periodicals expenses: Comparison of non-subscription costs of print and electronic formats on a life-cycle basis," *D-Lib Magazine*, volume 10 (January), at <http://www.dlib.org/dlib/january04/schonfeld/01schonfeld.html>, accessed 24 April 2004.

David Seaman, 2003. "Deep sharing: A case for the federated digital library," *EDUCAUSE Review*, volume 38, number 4 (July-August), pp. 10-11, at <http://www.educause.edu/ir/library/pdf/erm0348.pdf>, accessed 24 April 2004.

Sarah L. Shreeves and Timothy W. Cole, 2003. "Developing a collection registry for IMLS NLG digital collections," In: *DC-2003: Proceedings of the International DCMI Metadata Conference and Workshop*, Seattle, Washington, p. 241-242, at [http://www.siderean.com/dc2003/705\\_Poster43.pdf](http://www.siderean.com/dc2003/705_Poster43.pdf), accessed 24 April 2004.

Abby Smith, 2003a. "Issues in sustainability: Creating value for online users," *First Monday*, volume 8, number 5 (May), at [http://www.firstmonday.org/issues/issue8\\_5/smith/](http://www.firstmonday.org/issues/issue8_5/smith/), accessed 24 April 2004.

Abby Smith, 2003b. *New-model scholarship: How will it survive?* Washington, D.C.: Council on Library and Information Resources, at <http://www.clir.org/pubs/reports/pub114/contents.html>, accessed 24 April 2004.

Roy Tennant, 2003. "The right solution: Federated search tools," *Library Journal* (15 June), at <http://www.libraryjournal.com/index.asp?layout=article&articleid=CA302427&display=Digital+LibrariesNews&industry=Digital+Libraries&industryid=%25industryid%25&verticalid=151>, accessed 24 April 2004.

Donald Waters, 2003. *Cyberinfrastructure and the Humanities*, Closing plenary address (9 December), Portland, Ore., Fall Task Force Meeting, Coalition for Network Information, at <http://www.cni.org/tfms/2003b.fall/handouts/Fall2003Handouts/H-Watersplenary.doc>, accessed 24 April 2004.

---

## Editorial history

Paper received 26 April 2004; accepted 28 April 2004.

Copyright ©2004, *First Monday*

Copyright ©2004, Donald J. Waters

Building on success, forging new ground: The question of sustainability by Donald J. Waters

*First Monday*, volume 9, number 5 (May 2004),

URL: [http://firstmonday.org/issues/issue9\\_5/waters/index.html](http://firstmonday.org/issues/issue9_5/waters/index.html)