Creating Digital Knowledge: Library as Open Access Digital Publisher

D. Russell Bailey
Providence College, drbailey@providence.edu

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**Abstract**

Since the mid-1990s, many higher education libraries have evolved from the traditional roles of primarily (1) research resource purchasers and providers and (2) research service providers into new, enhanced, and complementary digital age roles related to digital open access knowledge creation and digital publishing, creating digital resources for open education. This article presents a brief description of open access digital knowledge creation, the library publishing landscape (particularly in Digital Humanities/DH), as well as several model higher education library approaches and example initiatives in these areas. These models and initiatives are presented as broadly adaptable and scalable to many higher education libraries throughout the world, even where variations in change-readiness; size; and fiscal, staff, and technology resources exist. The real-world examples presented here focus on three specific humanities disciplines: U.S. history, art and art history, and Latin American literature and art. These examples invite readers to consider how such open access knowledge creation and digital publishing are both feasible and useful in their higher education libraries.

**KEYWORDS:** Digital humanities, digital knowledge creation, digital publishing, library publishing, open access, open educational resources

**Introduction**

Since the mid-1990s, much of the work of scholars and artists in higher education and beyond has moved slowly but relentlessly into the digital universe, although the pace of movement varies significantly across disciplines. While progressively more of the activity of research, scholarship, and artistic productivity is conducted on the web/in the cloud/in the digital, the presence, use, and creation of digital collections are uneven across disciplines and favor the STEM (science, technology, engineering, mathematics) and quantitative social science disciplines. Most areas of the humanities (including history, literatures, and art history) and the arts (especially the visual arts) persist in their preference for print and the physical, emphasizing where possible firsthand interaction with the printed page and images; physical art objects; and personal, physical viewing, reading, investigating and analyzing of manuscripts and art objects as primary resources (Schonfeld and Housewright 2009 Laakso, Mikael, Patrik Welling, Helena Bukvova, Linus Nyman, Bo-Christer Björk, and Turid Hedlund. 2011. “The Development of Open Access Journal Publishing from 1993 to 2009.” *PLOS One* 6(6):e20961. doi:10.1371/journal.pone.0020961, 19).

Since the rise of the World Wide Web over two decades ago, scholars, academicians, artists, and academic librarians have enjoyed progressively greater, more robust, and more effective access to digital scholarly research resources. More robust and more effective access came earlier to academicians, scholars, and artists in the developed world, where funding has been provided for the requisite infrastructure and for fiscal resources to purchase proprietary access to digital collections and tools. Over the last fifteen years, open access (OA movement or initiative),
philosophy promoting equal and open access to scholarly research resources, has grown and evolved to provide more and more equitable access for academicians, scholars, and artists beyond those in the developed, fiscally more endowed areas and institutions (Laakso et al. 2011 Laakso, Mikael, Patrik Welling, Helena Bukvova, Linus Nyman, Bo-Christer Björk, and Turid Hedlund. 2011. “The Development of Open Access Journal Publishing from 1993 to 2009.” PLOS One 6(6):e20961. doi:10.1371/journal.pone.0020961, 1–4).

Changing library roles


Providence College's Digital Publishing Services (DPS) was launched in 2006; over ten years, it has evolved into a vibrant, model knowledge creation and digital publishing unit with 7.5 full-time-equivalent staff consisting of faculty, non-faculty professionals, support staff, and graduate/undergraduate student assistants. DPS provides a full array of digital publishing resources and services for faculty and students, including publication options (web and digital print on demand), desktop publishing, copyright advisement, scanning/digitization, media creation, graphic design, text processing (OCR/optical character recognition) and encoding (TEI/text encoding initiative), data modeling, programming, metadata consultation, and publishing platform research and development. Technology resources include high-end iMacs

Digital knowledge creation and digital humanities

Since the late 1990s, the field of digital knowledge creation in the humanities and its most sophisticated iteration, digital humanities, have emerged, although often as subdisciplines of the humanities and the arts rather than as stand-alone disciplines (see Modern Language Association [MLA] 2012 and American Historical Association [AHA] 2015 guidelines for digital scholarship). There are very few graduate programs focused on digital humanities (DH), e.g., King’s College London. While volumes have been written on digital knowledge creation and DH (Bartscherer and Coover 2011 Bartscherer, Thomas, and Roderick Coover, eds. 2011. Switching Codes: Thinking through Digital Technology in the Humanities and the Arts. Chicago: University of Chicago Press, ; Deegan and McCarty 2012 Deegan, Marilyn, and Willard McCarty, eds. 2012. Collaborative Research in the Digital Humanities. Aldershot, UK: Ashgate, ; Hirsch 2012 Hirsch, Brett D., ed. 2012. Digital Humanities Pedagogy: Practices, Principles and Politics. Cambridge, UK: Open Book Publishers, ; Jones 2014 Jones, Steven E. 2014. The Emergence of the Digital Humanities. New York: Routledge, ; Schnapp et al. 2012 Schnapp, Jeffrey, Johanna Drucker, Anne Burdick, Peter Lunenfeld, and Todd Presner. 2012. Digital Humanities. Cambridge, MA: The MIT Press, ), for the purposes here DH is broadly defined to include three taxonomic, epistemological, and technological stages: (1) digitized history, literature, art, and art history; (2) digitally enabled or facilitated history, literature, art, and art history; and (3) digital humanities proper (emphasizing digital media resources, services, tools, and methodologies, especially TEI XML/extendable markup language). These three categories are of progressively greater technological and epistemological complexity and sophistication.

nonscholarly collections, especially those promulgated in social media). These include those files, texts, objects, indices, catalogs, images, etc., that have been transformed (remediated) from print to digital; they have perhaps also been rendered more effectively searchable (key word or phrase) as a result of OCR processing.

Digitally enabled or facilitated history, literature, art, and art history are generally more dynamic, interactive, and intuitive, where new software or hardware has a transformative impact (e.g., zooming/resizing of images and dynamic linking to artists', authors', or historical figures' biographical, demographic data and various versions of the historical, literary, or artistic item, etc.). In some cases, the history, literature, art, and art history are presented in multiple media, often simultaneously (e.g., author or professional reader presenting the text or commentary orally, reenacting historical scenes, pertinent cultural phenomena rendered in related and complementary music and dance, etc.).

Digital humanities proper, at higher and more complex levels, incorporates, above all, enhancing/“marking up” with XML/TEI, creating digital semantic tags/hooks (e.g., personal name, date, location/geotag, keyword or keyphrase), which can then be manipulated, connected, integrated, transmutated, or permuted to bring multifaceted dynamism, connectedness, and interconnectedness to bits of data (microdata to macrodata), e.g., words/phrases, multimedia, sounds, shapes, colors, geolocations, or textual proximities (Bailey 2014 Bailey, Donald Russell. 2014. “Creating Digital History—Case Study: The Dorr Rebellion Project.” Infotheca, Journal for Digital Humanities 14(2):37–48. 41–43). These semantic tags/hooks enable searches to connect more and more varied content characteristics and criteria based on the specified, sophisticated query.

Creating digital knowledge: Common elements for more successful initiatives

Before looking more closely at three examples of initiatives, it might be helpful and important to briefly present some basic elements common to successful initiatives. While not of consistent importance to the same degree in all initiatives, these are worth early consideration.

It is critical that the content of the initiative—subject matter, discipline, intellectual knowledge—be of vetted quality, usefulness, and importance to the participants (the creators, producers) and to a scholarly, academic community (the consumers). This element will help ensure requisite commitment from participants and contribute energy and enthusiasm sufficient to pursue the initiative beyond early excitement and to present a usable product—research knowledge—to the open access community. A second, related element is clarity of “who” the audience is—general researchers, undergraduate or graduate university students, faculty, and specialists.

It is also critical that the initiative leaders are realistic as to required and available resources—personnel expertise; technological capacity for processing, storage, and access; access to basic fiscal resources, to the need for sometimes unexpected resources (scanning capacity, OCR/optical character recognition tools) and to ensure acceptable sustainability of the initiative (i.e., continue subscription to an open access IR tool such as Digital Commons or Islandora).
Final elements of high importance are the shared sense of collaborative teamwork, a commodity for such initiatives, an advantageous and beneficial sense of commonality, shared values, and adaptability. True collaborative teamwork both avoids and resolves troublesome issues, which are common in such initiatives. For instance, the three model initiatives described in the following all emanated in part from a culture of collaboration developed and nurtured within the library, a culture of collaboration that, through persistent and careful outreach to faculty and students, had planted seeds (small initiatives, incremental steps) and enjoyed small team successes (recognizing champions and incremental, incidental team building among faculty, students, and digital librarians) over several years. When the foci for each of these three model initiatives were formally broached and brought to the planning table, it was with a presumed sense of mutual benefit and high potential that the initiatives were discussed, planned, and implemented.

Example I: Creating digital history—the Dorr Rebellion project

The Dorr Rebellion of 1842, the focus of the initiative, is considered by scholars of U.S. history to be a series of major political, social, and constitutional events (see Bailey 2014 Bailey, Donald Russell. 2014. “Creating Digital History—Case Study: The Dorr Rebellion Project.” Infotheca, Journal for Digital Humanities 14(2):37–48. for a full case study and select digital resources) that are useful and important for the academic and scholarly communities. A Providence College faculty member was completing the first major monograph on the topic and was eager to contribute time, energy, and intellectual capital to a multifaceted project that would increase the quality, accessibility, and usability of pertinent research resources. This initiative would enrich the field of teaching, learning, and research on the Dorr Rebellion, on this period in U.S. history, and on the next century of U.S. political, social, and constitutional debate.

For the digital librarians, it was an opportunity to design, plan, and implement a major, truly collaborative, multifaceted, multimedia digital publishing project highlighting the four-year-old DPS department, its resources, and its capabilities. The ancillary benefit to such an initiative, as mentioned, was the resultant incremental, incidental team building among digital librarians, faculty, students, and the scholarly community.

The project was implemented over a period of nearly three years, and due to strong interest, high visibility, and successful promotion, it continues to evolve and serve to seed future, related projects. The project home (http://library.providence.edu/dps/projects/dorr/) resides in the open access Digital Commons tool and continues as the hub and landing page for all components and links. The home highlights the first major component, a 20-minute documentary written, produced, performed, filmed, and edited by the collaborative team using professional and amateur actors, historical texts and images, and DPS-owned technology resources. The documentary serves as both a hub and landing page as well as a summative scholarly resource for classes, lectures, introductory research, and points of contact for further scholarly knowledge creation and consumption.

From the project home the researcher has access to an image gallery (many images found only here), the two “competing constitutions,” numerous unique historical letters (including originals and scholarly transcriptions), lesson plans for secondary school students, bibliographic and
ancillary resources, and a general informational “about” page. Two of these sections are particularly important in the sophistication of digital humanities techniques and methods (e.g., TEI).

The constitutions and the letters are marked up using the TEI/text encoding initiative XML/extensible markup language. While this marking up is very time- and labor intensive, the high level of manipulability and searchability of these texts is incredibly enhanced. Four of the DPS staff acquired TEI encoding skills over time and applied them to the constitutional and letter texts, rendering them much more accessible to all interested and curious researchers around the world, as they, like all aspects of the project, sit entirely in a fully open access-compliant and keyword-searchable form.

One final aspect of the Dorr project is the resultant collaborative network and future initiatives seeded by the project. The collaborative network is international, including faculty, students, and digital librarians from several continents. The primary future initiative is an e-textbook of Rhode Island state history for kindergarten through postsecondary classes, and the initiative is currently a collaboration of DPS and the Rhode Island Historical Society (Rhode Island Historical Society and Providence College 2016–2017 Rhode Island Historical Society and Providence College. 2016–2017. “EnCompass: A Digital Archive of Rhode Island History.” http://library.providence.edu/encompass/).

Example II: Creating digital art and art history—the Art Journal project

The Department of Art and Art History at Providence College is a large and vibrant team of faculty and students that is central to the institution's liberal arts Core Program through classes, public performances and exhibitions, and scholarly contributions. The Art Journal is a decades-old program and organ for senior student theses and products—studio art and art history. A cooperative team of faculty, students, and staff annually prepares and brings to full-color, glossy print publication a more than one hundred-page tome of student scholarly productivity. It serves as an intense, professional internship experience for the students, as they move into professional or graduate school careers. As a print product, the Art Journal enjoyed high value in a relatively small circle of senior and junior scholars and their community, but it rarely enjoyed concomitant value in the larger art, art history, or intellectual world.

After several years of various successful teaching, learning, and research collaborations between the art/art history department and the librarians, in 2011 the faculty sponsor for the Art Journal and the head of the library's DPS began discussing plans to collaborate more grandly, to create and publish in the Digital Commons IR a digital Art Journal. Interest in retaining the print version remained strong, and the decision was taken to create a simultaneous and complementary digital Art Journal (see Bailey 2015 Bailey, Donald Russell. 2015. “Creating Digital Art History: Library, Student and Faculty Collaboration.” The International Journal of New Media, Technology, and the Arts 10(2):1–10. for full case study and select digital resources).

The digital library and art/art history department team collaborated to create a unified and integrated InDesign file of all student thesis texts, images, biographies, personal statements, and other data related to the print publication. Thus, once the InDesign file was complete and
delivered to DPS, it could be ingested into the Digital Commons IR, where a digital Art Journal identical to its print complement was available as fully open access-compliant scholarly and artistic knowledge and products (http://digitalcommons.providence.edu/art_journal/). The first of now four consecutive issues was published in 2012.

The content quality of the Art Journal is faculty-vetted senior thesis products (studio art and art history) and thus of sufficient quality to be of interest to the scholarly community beyond the contributors. The project was collaborative in that faculty, students, staff, and digital librarians built on existing collegial relationships to enhance the visibility and value of their scholarly, academic, and artistic efforts. The audience for the print and digital Art Journal suddenly became exponentially larger due to the open accessibility of all files. To date, eight faculty, forty-seven students, and six digital librarians have produced four volumes with over 600 pages of high-quality, scholarly, and artistic open access knowledge, which has been downloaded (full PDF) more than 8,000 times by global researchers.

The art/art history faculty sponsors have commented on an unexpected, intangible benefit accruing to the student contributors. As junior artists and scholars, they had become accustomed to, and expected, their audience to be primarily peers, faculty, friends, and family. The Digital Commons IR provides to each contributor access to a download counter (and an optional monthly e-mail statistics notification), which indicates the periodic and cumulative download (full PDF) data for each file. The contributors are now beginning to enjoy the prestige of international visibility and attention as evidenced by the downloads of their artistic and scholarly products.

Example III: Creating digital Latin American literature and art—the Inti project

The Inti project is rare in the powerful confluence of its world-class intellectual and artistic quality, the quantity of issues (82), international reach and longevity (42 uninterrupted years) of the journal, and the synergistic impact and potential of the journal's editorial and network organization collaborating with the robustly resourced Digital Publishing Services. The quantitative impact is great, and the momentum continues to grow (see Bailey 2016 Bailey, Donald Russell. 2016. “Creating Digital Open Access Latin American Literature and Art.” Journal of Technologies in Knowledge Sharing 11(1):1–10. for full case study and select digital resources).

The journal was founded in 1974 as Inti: Revista de literatura hispánica, and it has enjoyed a stable leadership (director-editor and revolving editorial board) for more than forty years. The director-editor was a senior faculty scholar of Latin American language, literature, and culture. Among the contributors of unique content to Inti through 2014 there are: eight contributors awarded the Nobel Prize for Literature (Sweden); sixteen contributors awarded the Miguel de Cervantes Prize for Literature (Spain); three contributors awarded The Neustadt International Prize for Literature (United States); four contributors awarded The Jerusalem Prize for the Freedom of the Individual in Society (Israel); seven contributors awarded the Prix du Meilleur Livre Étranger (France); and five contributors awarded the Prix Médicis (France), as well as many other esteemed international prize and award winners.
The director-editor and the digital librarians began in 2008 to simply digitize and OCR the journal from the earliest issues in the hope of enhancing the well-respected print journal's visibility and accessibility. These early issues are now available in the Digital Commons open access IR (http://digitalcommons.providence.edu/inti/), as are all ensuing issues. Over the first couple of years, the digitizing and publishing workflows were streamlined and made more efficient (cutting the journal into individual sheets for automated scanning), with the OCRing accelerated via a team approach (multiple staff, including students, using the ABBYY OCR tool). By 2014, the digitizing and OCRing of all back issues were completed, and all issues were published in the open access IR.

In 2011 DPS assumed full operational publishing responsibility for preparing each subsequent issue of *Inti* as print on demand. Whereas all previous issues had undergone collection, editing, design, and publishing by discrete individuals and groups in disparate locations, in 2011 *Inti* became consolidated and integrated into a single, library-based digital and print on demand publishing operation. The faculty director-editor, who now worked primarily from the library, received copy electronically and worked online with reviewers and contributors to move all copy into a final form. The contributions in final digital form were then delivered by the director-editor to DPS for design and desktop publishing using the Adobe Creative Suite (especially Photoshop and InDesign). The digital publishing process for each subsequent issue has resulted in a single PDF file, which can be sent to the printer for print on demand of the requested number of print issues. Since DPS assumed all design and desktop publishing responsibilities in-house in 2011, the same PDF file is immediately available for digital publishing (upload, ingest) into Digital Commons as determined and scheduled by the director-editor. Creation of the seamless continuum print-*Inti* ↔ digital-*Inti* was now complete.

In 2008, *Inti* was a print subscription-only journal, with over 350 copies available to scholars worldwide (with additional copies of selected issues provided to individuals as strategic marketing). By 2016, the 1,650 files/articles/images published in digital *Inti* had been downloaded (full PDF downloads) over 500,000 times. Over half of those 1,650 files had been downloaded more than 50 times. One particular article was downloaded 14,356 times.

What has been the impact of digitally publishing *Inti* into open access? Until the beginning of digitization in 2008, *Inti* was accessible by about 350 scholars worldwide (subscribers, additional individual issue recipients, and articles acquired via interlibrary loans). In 2012, at the request of the director-editor, Digital Publishing Services facilitated the placing of special print *Inti* issues for sale on Amazon.com. In 2013, based on both the scholarly reputation of print *Inti* and the newfound visibility of digital *Inti*, Ithaka/JSTOR—a major scholarly aggregator, indexer, and vendor—contracted with the *Inti* director-editor to purchase publication rights and to digitize the entire *Inti* backfile, making it available digitally to all JSTOR proprietary subscribers (in addition to open access of the full *Inti* corpus via the Providence College Digital Commons repository site). And, finally, a high benchmark was reached in the month of May 2015 when 12,539 scholars discovered and downloaded (full PDF downloads) *Inti* files/articles/images on the Providence College Digital Commons site.

**Conclusion**
The progressive, robust, and inexorable development of digital tools, resources, services, and “spaces” for teaching, learning, and research continues and accelerates. As the development progresses, the advantages of open access both increase and become clearer. While the development in proprietary digital tools and resources excluded access for many potential researchers from less well-resourced areas of the world, these open access research knowledge resources provide greater and more equitable inclusion of access for all, including these less well-resourced research groups. As the roles of academic libraries have evolved and expanded beyond their traditional roles, those roles that support, enable, and facilitate the open access digital publishing of an institution's intellectual capital into digital IRs have grown significantly.

This article highlights three examples, models of sorts, developed in the last decade at a relatively small institution of higher education in the United States (4,200 FTE students, 300 + FTE faculty) within a relatively small library (37 FTE staff). The three examples share common elements: focusing for content on valued intellectual activity and products currently being supported and developed in the institution; planning and implementing with energized but realistic goals in mind; and capitalizing on cross-departmental, cross-divisional, unusual opportunities for coordination, cooperation, and collaboration as key organizing principles for all of these open access digital publishing projects.

Focusing on these three examples offers meaningful glimpses into real success stories of open access digital publishing in higher education libraries. These success stories are not unusual and thus suggest more strongly the existence and growth of such open access knowledge creation and digital publishing as feasible, useful, and scalable throughout higher education libraries.

References
