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Collaborations in Liberal Arts Colleges in Support of Digital Humanities

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Technology-Centered Academic Library Partnerships and Collaborations

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Chapter 2

Collaborations in Liberal Arts Colleges in Support of Digital Humanities

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ABSTRACT

*The field of digital humanities has been rapidly expanding over the course of the last decade. As such, academic institutions have been working to identify ways of supporting these new endeavors in a time of economic struggles. The Digital Humanities Initiative (DH*i*) at Hamilton College was conceived as one possible model of supporting digital humanities scholarship at a liberal arts institution. The DH*i* model relies heavily on collaboration among different teams in the Library and Information Technology Services across campus, and with institutions across the United States. DH*i* also has international partnerships that promote its goals in research, learning, and public humanities. This chapter will describe the various collaborations of DH*i* and offer suggestions for how others can implement similar support models at their institutions.*

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INTRODUCTION

Collaboration, both across various teams within a single institution and across several institutions, is important for supporting and building innovative and sustainable projects. This is especially true in emerging fields such as digital humanities where researchers are pioneers in their fields, and structural support models and technological infrastructure are constantly evolving. Smaller institutions, such as liberal arts colleges, often rely on external collaboration to support such endeavors because they do not have the same resources that are available at larger institutions that may have more funding and more personnel on staff to tackle such projects. The Digital Humanities Initiative (DHi) was formed in 2009 and has received two Andrew W. Mellon Foundation grants, one in 2010 (Barrie, 2010) and one in 2013 (Foster, 2013), to develop digital humanities projects from the liberal arts perspective.

Digital Humanities and/or Humanities Computing have been in existence for some time now (see *Debates in the Humanities*, edited by Gold, 2012), but the technological advances of the past ten years have led to broader and deeper strategies in both research and digital publishing (Spiro, 2011). The potential of this digital scholarship remains untapped (Ayers, 2013) and the models and processes for developing and maintaining faculty research as both context and data/objects of study are constantly evolving (Barry, Knudson, Sprenkle, & Youngman, 2014). The goals of digital humanities (DH) practitioners generate challenges for institutions as they attempt to develop frameworks and support structures for digital humanities (Posner, 2013).

This changing landscape has generated activities that range across disciplines and practices (Roy, 2014) so it is not surprising that five years into the work of DHi, those involved with it are still asked, “What is digital humanities?” The Digital Humanities Initiative at Hamilton College has adopted the definition of digital humanities posed by *Digital Humanities Quarterly (DHQ)*: “Digital humanities is a diverse and still emerging field that encompasses the practice of humanities research in and through information technology, and the [approaches or] exploration of how the humanities may evolve through their engagement with technology, media, and computational methods” (Alliance of Digital Humanities Organizations). The digital research “approaches” and methods in DHi activities are emphasized as the unifying theme across the interdisciplinary work that is done in DHi. Accepted research projects in DHi range across humanities and social sciences disciplines, but they all use digital research approaches in answering humanities based questions.

Collaboration across faculty, information technology, and library units is essential to DHi. Fay and Nyhan (2015) describe the breadth of current DH work in libraries and museums and make a powerful argument for the role of collaborations around best practices in library science and information technologies in digital humanities

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research. The “making” (Posner, 2012) and “hacking” (Vershbow, 2013) nature of DH work is real and results in a DH culture that is necessary to innovation but frustrating to the traditional academic culture.

The model proposed by DHi when it was launched in 2009 was designed to take advantage of emerging technologies in library digital preservation and web platforms (Unsworth, 2002) to unite the objects of humanities research with web presences that serve to contextualize the research and also provide an experience of it for the audience (Burdick, Drucker, Lunenfeld, Presner, & Schnapp, 2012). Others were working in similar and parallel directions, but DHi proposed to develop digital humanities research approaches and platforms by integrating student and faculty researchers into teams with IT and Library professionals.

Collaboration is not a new topic in academia. Library and information technology units on campus are frequent partners. Exline’s 2009 article offers a valuable review of publications focusing on collaboration between what she labels as “content experts (archivist and librarians) and technology experts” (p. 17). More specifically, collaborations in areas such as text encoding (Green, 2014) and making digital projects available (Bayer, 2014) have led to successful projects. Rentfrow (2007) emphasized that collaborations between library, scholars, and information technologists have led to many highly successful projects in digital humanities.

In many respects, the success of Hamilton’s DHi is due to collaboration. Hamilton’s DHi model differs from digital humanities centers elsewhere in that it is collaboratively co-directed across academic and administrative units within a small liberal arts college. Hamilton’s DHi has also facilitated collaboration across a group of similar institutions. Co-Directors Angel David Nieves, Ph.D., Associate Professor and Director of the American Studies Program, and Janet Thomas Simons, M.S., Library Information Technology Services (LITS), unite faculty research goals with technology and library science resources to build upon Hamilton’s significant strengths in teaching and research. The liberal arts environment places emphasis on the undergraduate curriculum and integration of humanities based research questions into undergraduate scholarship.

BACKGROUND: DHi AND HAMILTON COLLEGE

Hamilton College has a strong history of collaboration between the Library and Information Technology Services, dating back to 2000 (Ericson, 2004). This includes the formation of the HILLgroup (Hamilton’s Information and Learning Liaisons). Formed in 2002, HILLgroup was a collaboration of instructional technologists and research librarians, which exists to support digital pedagogy. The merging of the Library and Information Technology Services organizations into a single unit in

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2013 reflects the continued emphasis on a unified organization providing a high level of service through close collaboration (Smallen, 2014). With the official merger of the Library Research & Instruction Services and the ITS Educational Support Services into one team in 2015, the HILLgroup partnership was replaced with the Research & Instructional Design (R&ID) team. Their mission is to “empower students, faculty and staff to use information and technologies to engage in intellectual exploration, make informed decisions, and create and share knowledge” (Research and Instructional Design, 2016). In recent years, members of the Library and Information Technology Services have also been provided with new opportunities to collaborate on projects in digital humanities.

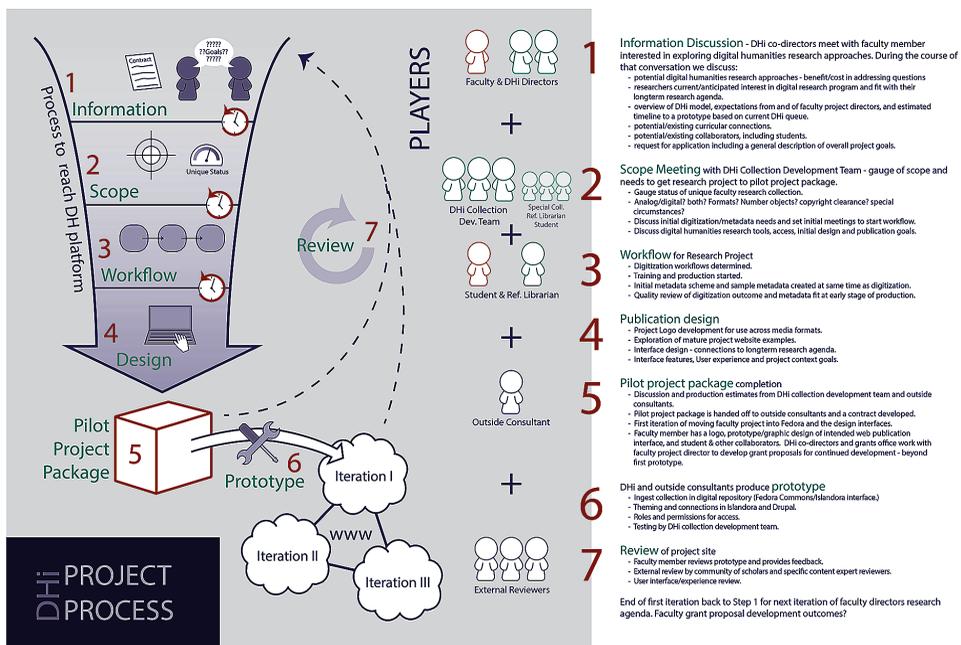
This continuing partnership served as a basis for the development of some of the technological support for DHi. As an initiative in a newly emerging field, DHi had to develop the models and processes (see Figure 1) to achieve the goals of digital humanities scholarship from a liberal arts perspective. DHi benefited from significant existing support for curricular efforts integrating technology into courses on campus from the HILLgroup and R&ID. In the models recently explored by Vinopal and McCormick (2013), DHi began in 2009 somewhere between Tiers 3 and 4 of their Pyramid model (see Figure 2), something that was made possible because the HILLgroup was already in place to handle customized commitment of resources to the curriculum at Tiers 1 & 2. DHi focuses on collaborative research projects that include undergraduates as significant contributors. DHi requires research directors to translate some component of their DHi research project into the curriculum, efforts also supported by R&ID. In addition to the benefits provided by the existence of the R&ID, DHi benefits from the expertise of Special Collections and Archives staff (for example, when DHi research projects include analog archive components), from the humanities curriculum within Hamilton’s recently-adopted Cinema and Media Studies (CNMS) major, and from Hamilton endowments that support humanities research involving undergraduates. With this foundation in place, DHi is able to concentrate on innovation in digital research projects while involving students in each project.

Integral to the success of any digital scholarship initiative at a small liberal arts college is the support of all academic administrative units, especially those in the Dean of Faculty’s Office (at some schools the Provost’s Office) and in the Library and ITS (information technology services). A primary goal of DHi was to incorporate more faculty-led interdisciplinary research into the undergraduate classroom. Previously, faculty found it difficult to share their research with undergraduates because of their need to cover multiple sections of field-specific introductory courses. Many faculty also believed that undergraduates could not effectively assist them in their research. To correct this bias, a second goal at DHi emerged: DHi

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Figure 1. DHi infrastructure

Graphic created by Gregory Lord, Lead Designer & Software Engineer, DHi.



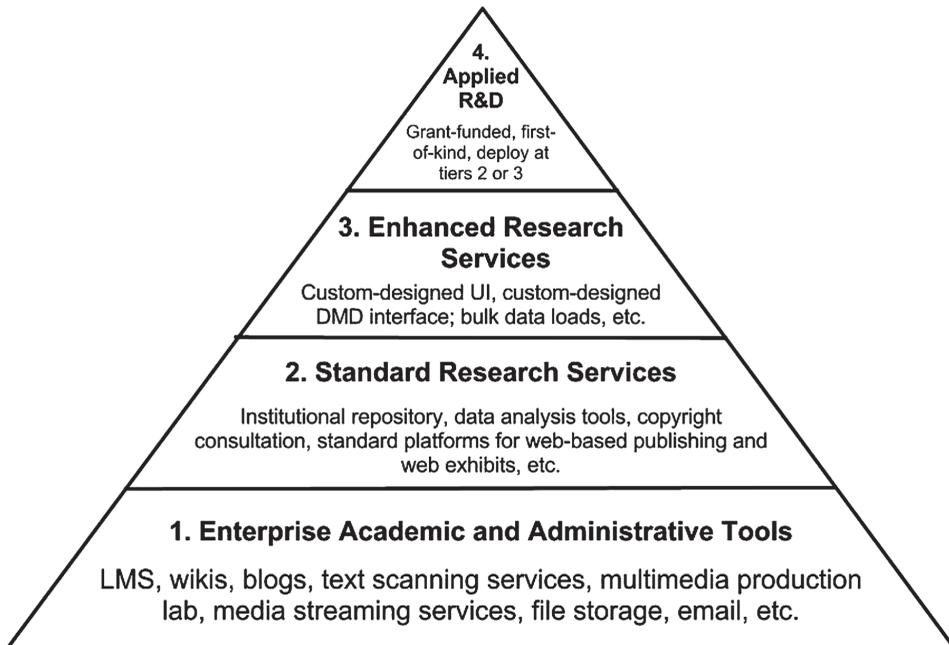
would work to train undergraduates as collaborative researchers on large-scale humanities-based projects. Both goals would be best achieved by leveraging the expertise of tenured faculty who were seeking assistance for research projects already in development, but who lacked the critical support of an interdisciplinary team of researchers, librarians, programmers, and designers. Now, however, DHi-supported faculty would be required to abandon their roles as sole “experts” in the research process and instead work within a team. Then, a comprehensive strategy for staging various aspects of their research into easily achievable deliverables over a two-to-three year time period would be developed. Finally, financial support for faculty-student collaborative projects would be secured, allowing for a “proof-of-concept” to be presented as the first in a series of research-based products available online.

DHi is supported through a combination of grant funding from the Andrew W. Mellon Foundation and financial and staff resources from Hamilton’s Dean of Faculty Office, and Burke Library and Information Technology Services (LITS) at Hamilton College. LITS provides the support of select staff from the Digital Strategies & Library Systems and Network and Telecommunications Services teams. A Lead Designer & Software Engineer (LDSE) position rounds out the team of experts

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Figure 2. Proposed model for digital scholarship services

(Vinopal & McCormick, 2013). Reprinted under the Creative Commons Attribution-NonCommercial 3.0 Unported License, http://creativecommons.org/licenses/by-nc/3.0/deed.en_US.



dedicated to work in DHi. Collectively with the co-directors, they form the DHi Collection Development Team (CDT)¹. The Research and Technology Co-Director (Janet Simons) and LDSE (Greg Lord, currently funded through the Mellon grant) are the only full time positions in DHi. Faculty and students contribute half or more of the work on each project. DHi's model for liberal arts digital humanities depends upon faculty and student researchers in hands-on collaborations with the CDT.

ROLES OF MEMBERS OF DHi'S COLLECTION DEVELOPMENT TEAM

The collaborations between members of the Collection Development Team (CDT) are critical to the success of DHi projects. Each member of the team brings a unique perspective and set of skills to the digital humanities projects developed by the faculty. The organization of these members into one team to support these endeavors allows each person to provide valuable assistance in their areas of expertise.

DHi Processes: DHi Co-Directors

It is important to distinguish the role DHi plays at Hamilton College. DHi is a research collaboratory. DHi's faculty and students work with staff at DHi on digital humanities research projects, not on developing courses. DHi is a small unit at a small private liberal arts college. Although generously funded by Mellon, the resources and options are nowhere near those of larger R1 institutions. DHi encourages interdisciplinary research that focuses on "core humanities" questions (Koh, 2015). The research approaches and methods employed are combined with examination of their socio-cultural implications in research. DHi Co-Directors decide in consultation with the Dean of Faculty if a project is to be accepted into the DHi queue. Determination of where a project might fall in the queue is based on input from the entire DHi CDT. There are two basic categories of DHi research projects: archive based digital research collections and exploratory research projects. A research agenda may plan elements of both and both yield digital scholarship. DHi and LITS are proactive in targeting emerging tools/technologies and proposing them as potential solutions to faculty project needs. DHi's Mellon grant included "seed funds" for research exploration of methods, tools, and collaborations that might be risky but yield high rewards in digital humanities.

DHi has a high threshold for entrance into its project queue. DHi research project directors agree to:

- Use DHi's sustainable technology infrastructure for archive based projects.
- Integrate undergraduate students into their research program.
- Translate a component of their research into a new course or assignment.
- Seek grant funds to support their research project from prototype stage forward.

In return, researchers are promised a collaborative team of experts to develop their digital research agenda. DHi works with researchers to develop digital research methods and collections tailored to their specific research goals. This includes everything from initial humanities data generation (e.g., oral history or ethnographic interviews) and analysis through digital tools (e.g., text analysis of transcripts) and methods (e.g, TEI, 3D models and virtual world historical recreations, time based annotation of video interviews), to data sets for preservation of their research as archive based digital research collections (e.g., searchable digital archive of interviews with associated annotation indexed transcripts and scholarly contextualization). In archive based research projects, faculty and student researchers spend considerable effort working with DHi to organize their projects and develop metadata for their digital objects. Faculty and students frequently describe the time this requires and also the

benefits that result from developing metadata. In addition to being the foundation for digital research archives, these activities lead to greater skill development among our undergraduates with the result that five DHi students have acquired library or museum internships.

Students play a key role in DHi and have the opportunity, either as DHi Interns or as Culture, Liberal Arts & Society Scholars (CLASS)² to be part of a collaborative research team. As such, they internalize a research agenda, they learn about pertinent technology areas in DH research, and they immerse themselves in current DHi-sponsored and faculty-led research projects.

DHi's technology infrastructure and research support models are designed to be innovative and sustainable. This approach reduces the need for regular revamping of static faculty research web pages by creating infrastructure and processes that maintain research outcomes as "living" web presences accessible for faculty and student collaborative scholarship. Digital humanities scholarship is by nature iterative, evolving, and never "Done" (Brown et al., 2009). To support this approach, it is necessary to build a flexible technological framework.

Building the Infrastructure: Systems Administration

Traditional "closed" software solutions do not generally inspire collaboration. "Closed" software solutions are often provided by a company for a purchase price and do not normally come with the original source code. The "closed" nature of this software means that it cannot be changed or modified to suit custom needs, a necessary component for digital humanities projects. Collaboration in such a restrictive environment requires returning to the proprietary vendor for updates to the software, at which time the vendor may elect to ignore the request for modifications or improvements. Open source software offers an alternative model to the traditional "closed" software options.

A major advantage of open source software is that it naturally fosters collaboration. Many open source software packages provide some sort of public forum that provides users of the software with the ability to share updates and documentation for that specific software with users from around the world. In many cases, it is possible to edit the source code and make an enhancement. Collaboration is encouraged through methods that provide a patch to the primary software that promote ongoing use and development. Issues getting software to work are often easily addressed by searching user forums or mailing lists for others who have encountered similar problems. Open source software is just that: generally open to everyone.

Hamilton College's investment into open source computing began with the inclusion of the HPC/Unix System Administrator (SysAdmin) into Library and Information Technology Services (LITS), as the High Performance Computing (HPC)

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Infrastructure at Hamilton started as a result of grants within the Chemistry department. Hamilton's HPC is comprised of Linux based servers that provide numerous open source software services. This infrastructure has primarily been utilized by the research sciences within the College but is a shared resource available to any department/faculty needing HPC. As such, this existing infrastructure provided a natural environment for the growth of the DHi. It runs solely on open source software and provides DHi with the expertise to manage the many different open source software packages involved with a typical installation of a digital repository. This installation involves many different and independent software packages which when put together allows for the creation of a Digital Repository (DR).³

One of the early tasks of the Collection Development Team and others from the Library and Information Technology Systems department was to select the components of the software stack that would be used to support the work of DHi. After several possibilities for the technological infrastructure were reviewed, the decision was made to use Fedora Commons (<http://fedorarepository.org/>) with a middleware interface of Islandora (<http://islandora.ca>) and a Drupal front-end (<http://drupal.org>) (see Figure 3). This combination was selected because of its utilization of open source software and the subsequent benefits offered by each component.

Fedora Commons was chosen both for its scalability and the inherent adaptability it possesses that allows it to access objects over an extended period of time. Fedora also has built-in flexibility for the creation and maintenance of relationships between objects and across digital collections, as well as the ability to accommodate a robust metadata schema.

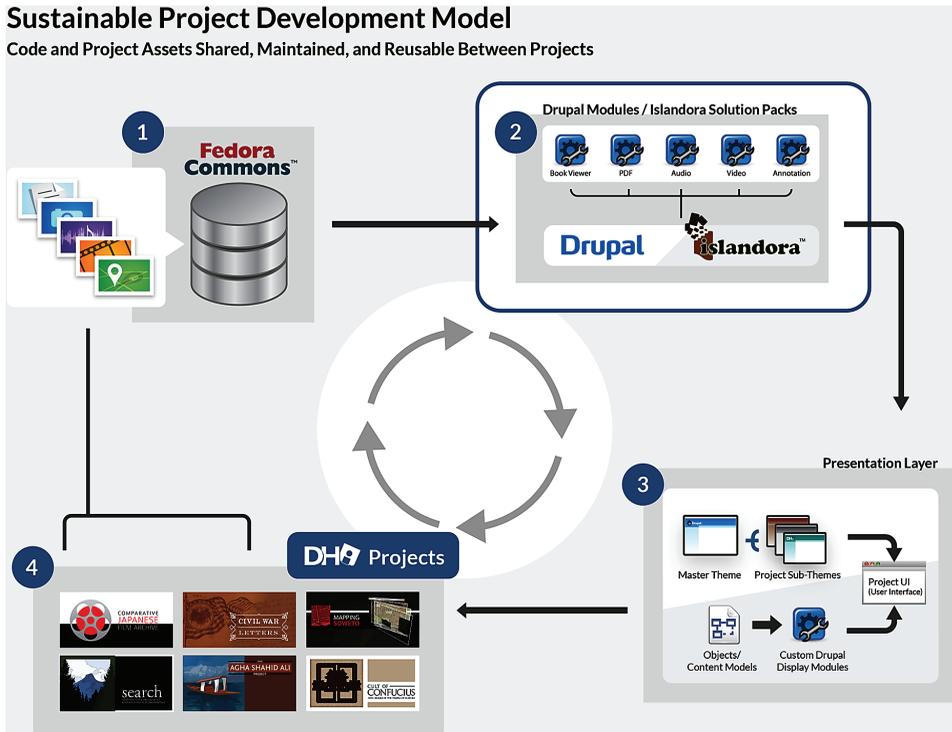
The digital repository is broken down into two main parts: the backend object data storage (ObjectStore) software stack and the front-end web presentation software stack. The backend is where the digital objects are "ingested" into the Fedora Commons database. This Fedora Commons database software is uniquely different from traditional relational database software in that it allows for the original digital objects to be stored on the server in their original form. It does this while still being able to quickly present this object along with the metadata when queried in a search.

The other half of the DR is the front-end content management system (CMS). While there are many options available for CMSs, Drupal multisites are used for DHi research projects. Drupal modules of specific features integrate with the Fedora Commons database. One such collection of Drupal based modules is the Islandora software stack. These modules are collectively referred to as Islandora.

Islandora and other open source collaborative tools are used to interface with collections in Fedora. Islandora can be used to create customized themes for faculty collections and projects. When research projects are ready for initial web access (at a prototype stage), Drupal multi-sites are tailored to meet scholarly contextualization goals.

Figure 3. DHi infrastructure diagram

Graphic created by Gregory Lord, Lead Designer & Software Engineer, DHi.



Islandora is a very sophisticated set of processes that are packaged as modules ready to be used with Drupal, which is an open-source content management system that can handle a wide variety of content types. Drupal comes with dozens of built-in and thousands of user-contributed modules that perform specialized tasks such as building custom branding, making image galleries, providing full-text searching, and tracking user accounts. Because Islandora is so closely integrated into Drupal, Islandora repository managers can take advantage of the wide variety of existing Drupal modules to improve the delivery of the digital objects and metadata they are storing in Fedora Commons.

Initially, this infrastructure was built on one physical server with the assistance of an outside software vendor. For those who are new to building such infrastructure, working with a vendor for the configuration and installation of the software is often a preferred starting place. With so many moving parts to this system, it can be challenging to get all of the many pieces configured and working together, and a vendor can help troubleshoot this. Community members of Fedora/Islandora have

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recently created a downloadable vagrant image that can be installed and tested in an afternoon.

It is necessary for the systems administrator to complete maintenance for the digital repository infrastructure technology, as well as other tasks including installing software, making backups, monitoring systems, checking security, and automation of tasks with scripts. Although open source software is free, some costs are entailed in the need for a Unix System Administrator (SysAdmin) to manage it. The Unix SysAdmin must have experience working with Unix systems and enjoy a “comfort zone” doing so. It is the responsibility of the SysAdmin to manage, build, and maintain the computing infrastructure. In addition, the SysAdmin assists in the research and development of open source tools that might be integrated for digital humanities research approaches and software maintenance including Apache, Tomcat, Drupal, MySQL, Fedora Commons, Islandora (Drupal modules), Solr, Djatoka and DuraCloud.

The selection and maintenance of the infrastructure used for DHi projects is critical to the success of DHi. The systems used by DHi were selected to provide flexibility for faculty scholars so as to present their research while also maintaining the integrity of a database with plans for long-term support. Continuously updating and monitoring of the system provide security in the infrastructure that allows the rest of the DHi workflow to begin with the design of the metadata schema.

The Metadata Process: The Role of the Metadata and Catalog Librarian

A key component of several DHi projects is the creation and maintenance of a digital repository. The innovative nature of the projects supported by DHi frequently requires the use of a custom metadata schema because no pre-existing metadata schema exists that would fully support the searching functionality and site build sought by the DHi research project director.

The process of designing a metadata schema for a research project director’s project begins shortly after the project is approved into the DHi project queue. An initial meeting is arranged between the research project director, the DHi Co-Director, the Metadata and Digital Initiatives Librarian (MDIL), the Library Information Systems Specialist, and, optionally, a student working with the project director. In this meeting, the metadata needs of the project are discussed and the metadata schema begins to take shape. To facilitate this discussion, the metadata librarian asks the research project director questions about how they envision using the collection and how they see others (including other subject experts, students, and those without specific knowledge of the subject) interacting with the collection. They also discuss other digital projects that the project director identifies as having components that

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the project director likes. The MDIL then explains how metadata plays a role in the features that the research project director desires: geospatial coordinates encoded in the metadata for maps, specific fields for faceted searching, keywords/tags being used to generate a word cloud, etc. This interaction with a project director often leads to them having a greater understanding of and appreciation for metadata's role in the project.

Following this meeting, the Metadata and Digital Initiatives Librarian works to customize the standard DHi metadata spreadsheet. The standard spreadsheet is based on the MODS (Metadata Object Description Standard, a metadata schema developed by the Library of Congress⁴) and includes descriptive metadata fields that are completed by the faculty scholar and are required for all DHi projects. These fields include:

- Title,
- File name,
- Author (if applicable),
- Language,
- Date fields (both for date digitized and original date of creation for any corresponding analog object),
- Publisher (if applicable),
- Tags,
- Duration/size,
- Physical location,
- Copyright status,
- Name of submitter,
- Relationship to other items in the database.

In addition to the required descriptive metadata fields, administrative metadata fields are also included in the spreadsheet and required of each project. These include fields such as MIME types, Library of Congress Subject Headings, genre (using a local controlled vocabulary), and a formalized, structured relationship based on the relationship described by the faculty member in the spreadsheet. These fields are generally completed by either the Metadata and Digital Initiatives Librarian or a metadata assistant contracted to assist in preparing the material for ingest.

Customized metadata fields allow the research project director the ability to track the metadata they believe will be of greatest interest to the various sets of users of the collection. These customized fields are unique to the individual project director's project. While they are usually not easily incorporated into the standard elements that are used in MODS, the <extension> element is used to house these

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fields, thus creating the ability to have the additional metadata functionality that the research project director desires, while still maintaining a high standard for the integrity of the metadata.

Once the spreadsheet is customized to the research project director's needs, a second meeting is established with the project director, DHi Co-Director, the Metadata and Digital Initiatives Librarian, and any students involved in the metadata creation. During this meeting, the MDIL provides an overview of the structure of the color-coded spreadsheet: one color for the standardized columns required of all DHi projects (completed by the research project director), one for the customized metadata fields (also completed by the research project director), and one for the administrative metadata (completed by the MDIL or a contracted metadata specialist). Together, the group catalogs a sample item so that the research project director understands how to add the metadata to the spreadsheet. This also serves as a valuable opportunity to evaluate the spreadsheet's ability to fulfill the needs of the project director. Occasionally, the spreadsheet will undergo some additional editing if it is found that additional metadata needs to be recorded.

Once the research project director feels comfortable with the structure of the spreadsheet and the workflow of completing the metadata, they are asked to complete the metadata on their own for 5-10 additional objects, which the Metadata and Digital Initiatives Librarian then reviews for accuracy. Once the MDIL is satisfied that the faculty member knows how to accurately complete the spreadsheet, the research project director is then released to fill in the metadata for the rest of the objects in the collection. The MDIL remains available to answer questions as they arise, and checks in with the project director on their progress. Depending on the time the research project director has to dedicate to the work, and whether or not they have students working on the metadata as well, it may take a month, several months, or even a year to fully complete the necessary metadata for the project.

After completing the metadata for which the research project director is responsible, and after the necessary data files are digitized and organized using a comprehensive file naming schema, the Metadata and Digital Initiatives Librarian is notified that the project is ready for the next phase. During this time, either the MDIL or a metadata specialist who is specially contracted for the project vets the metadata, making sure that standard conventions such as the use of sentence case for the title, the formatting of dates (YYYY-MM-DD), and the entry of names as LastName, FirstName, are followed. The additional administrative metadata fields are also completed at this time.⁵ Once this is complete, the data files and metadata are then turned over to the Library Information System Specialist for the next stage of the project.

Repository Administration/Ingest and Islandora Repository Manager

Approximately 40% of Hamilton College's Library Information Systems Specialist's time is allocated to serve on the DHi Collection Development Team as the Islandora Repository Manager (RM). The RM's primary duty is to ensure that materials prepared for each digital humanities project are displayed and searchable in Islandora in a way that meets the needs of the research project director through configuring Islandora based on specifics from each project. Configuring an Islandora repository would ideally only be done once, but the reality in dealing with digital humanities collections is that Islandora has to be configured differently for each project because each digital humanities collection has unique content, metadata structure, and delivery needs.

Repository managers who manage library digital collection style repositories can usually rely on best practices that have emerged in the library world for the selection of content, digital formats, metadata schemas, controlled vocabularies, and delivery mechanisms. However, in the world where digital humanities collections live, these best practices are too restrictive. For example, instead of TIFF images that are of an archival quality, digital humanities projects often bring JPEG images, text files come as PDFs or even Microsoft Word documents, and audio and video files are rarely in repository-ready formats. Library staff working on digital humanities projects have to be ready to handle a wider variety of file formats, and they will have to modify their well-established metadata schemas to accommodate elements that severely stretch the ones commonly used in libraries. Sometimes compromises need to be made on both sides between the DHi Collection Development Team and the research project director over what content and what metadata an Islandora repository can accommodate.

One matter more frequently encountered in digital humanities collections than in a typical library digital collection is the complex relationships between content objects. For example, two images in a DH collection may be two different views of the same object. A textual object may be a transcription of an image representation of the same document. An image file may be a single still frame from a video file. A video file may be a clip from a full feature movie. Project directors quickly learn that these relationships need to be made explicit so the repository manager can formalize them in the repository software, so that the relationships are preserved during delivery to the user. A full understanding of these relationships can only be achieved by working directly with the research project director and the metadata librarian.

A key factor as to how the Islandora repository is configured for a digital humanities collection is the nature of the basic content in the collection. Some DH collections are text-oriented, some are image-oriented and others are video-oriented,

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but most of them are multi-modal. Because of this variability, the Islandora front end for each collection tends to be different. For example, a specific set of menu options may be implemented with canned searches to ensure direct access to key content in the collection. For a text-oriented collection that has full-text OCR behind each item, full-text keyword searching might be offered, but cannot be offered for a collection of, for example, videos, where there is no full-text behind the objects to be searched. If one research project director wants a download button so users can easily download a document, but another research project director does not, or if one project director wants to offer crowdsourcing of the content but another one does not, it is necessary to ensure that these features are available on only the specified collection. Most research project directors want their collection to have a custom banner, color, layout or other user experience enhancements. It is at this point, that the Repository Manager collaborates on the configuration and customization tasks with DHi's Lead Designer & Software Engineer.

Unfortunately, it is not possible to offer unlimited customization for every digital humanities collection in Islandora because in many cases these customizations would not survive an Islandora version upgrade. To protect any customizations from loss during an upgrade, the Repository Manager can take advantage of coding techniques such as CSS, PHP templates, and Drupal hooks (code overrides), but even these techniques only get one so far in meeting a research project director's expectations and those techniques often require programming that the RM may not have the skills or time to implement. This is where the online Islandora community can come to the rescue because someone else may have already resolved the many changes an RM might make to the repository and be able to share it. If not, the repository manager can add an enhancement request to the ticketing system for Islandora, which is taken into consideration by the code developers.

Digital humanities projects are ongoing projects – not just one-offs. This sometimes means that the flow of collection materials coming to the repository manager may be erratic due to the vicissitudes of the academic calendar, teaching loads, availability of student workers, and professional deadlines. If months go by without getting any new materials to process, it is easy for the repository manager to forget exactly what processing scripts were used before. Reconstructing these steps can be time-consuming, error prone, and thus demoralizing. Because of this, it is important to keep detailed records of the processing steps used in a multi-collection repository and to keep copies of the scripts in a version control environment such as GitHub.

A repository manager who is experienced in the library world working as a member of a digital humanities project team can find satisfaction and even enjoyment working with faculty and with content they would never have the privilege of working with otherwise. Research project directors of digital humanities projects benefit by working with a DH project team that helps them organize their materials

and formalize their knowledge in order to take advantage of the power of computation to expose their work using new modes of scholarly communication such as an Islandora repository. The contributions of the repository manager are key to a successful digital humanities project team.

Reaching an Audience: The Role of the Lead Designer and Software Engineer

One of the strongest goals for DHi and its many projects is creating clear visual communication with an audience. For DHi as an organization, this means creating a recognizable brand across a wide range of print and digital media, effectively advertising DHi's goals, accomplishments, and events, and informing its audience about its work. These goals are much the same for each of DHi's projects as well, but with the additional task of presenting a project director's research material itself in the most effective and usable manner possible. To meet these goals, DHi relies on the grant-funded, full-time position of the Lead Designer & Software Engineer (LDSE), who divides his time between the graphic design and software development needs of DHi's research projects, along with DHi's own in-house design, and technology research and development.

From the earliest conceptual stages of each new project, a number of graphic design goals begin, each intended to help bring the idea of the project to life. The first of these involves a project's identity design, starting with the project logo. Given that many of DHi's research project directors must begin to advertise and present their project almost immediately, a strong logo and identity help to realize the project for an audience, and provide an opportunity to visually communicate the project's themes and goals. Given the central importance of the project's visual identity, the identity stage of a project's early development can take anywhere from hours to weeks to fully accomplish, often requiring several meetings and iterations of design drafts between the research project director and the LDSE. Once this is finished, this work is adapted into the many forms of media necessary to begin advertising a project, including flyers, posters, postcards, digital presentations, and web designs. It is vital to the success of a project that all of these various media are unified by a clear and cohesive design, ensuring that the project is easily identifiable and strongly established in the mind of its audience.

Beyond the individual projects, DHi itself requires a great deal of in-house graphic design work to effectively advertise its own events and efforts, and to communicate its goals to its on-campus and institutional partners. Foremost among these considerations is DHi's annual Speaker Series, which hosts guest lecturers and campus workshops each month, each event requiring the LDSE to design a

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number of supporting media, including a poster and announcement postcard, website updates, and announcements across DHi's various social media outlets, helping to reach and draw the community participation that makes these events so valuable to the DHi and Hamilton community. In addition to these events, DHi and the individual members of its Collection Development Team regularly require a number of visual aids in their various presentations and proposals, for which they will turn to the LDSE for designs such as diagrams, infographics, and digital presentation files. These materials may be used in everything from conference presentations to grant proposals or requests for features from outside contractors. In each of these cases, it is important to be able to effectively communicate DHi's methods and goals, ensuring that the audience understands what can often be complex or deeply technical aspects of DHi's research.

In the other half of the position, the Lead Designer & Software Engineer acts as DHi's primary programmer, developing both the visual designs and the functionality for many parts of DHi's technology infrastructure. The largest piece of the LDSE's role as a web developer involves the creation and visual "theming" of Drupal components. Since Drupal (an open source Content Management System) is the central technology in DHi's project infrastructure, each tool or feature required by DHi's projects must eventually become a Drupal module, extending the functionality of Drupal's core features. In DHi's case, this also means that these Drupal modules also extend the features of the Drupal-based Institutional Repository software, Islandora and Fedora, as well.

While this approach promises the long-term sustainability of the software (and its full integration with the rest of DHi's tools and repository objects), this work is necessarily slow and exacting, which makes it unsuitable for early experimentation and rapid iteration. To facilitate faster development and prototyping of DHi's projects, the Lead Designer & Software Engineer will often begin a project's software development with an "offline" prototype version, built outside of DHi's technology infrastructure (Drupal and Islandora/Fedora) at first, allowing the prototypes to be quickly built with basic and standard web technologies including HTML/CSS, PHP, and Javascript/jQuery.⁶ During this prototyping phase, the LDSE will work closely with the project director and the Collection Development Team to capture a full list of desired features for the finished website, making sure that the prototype reflects each of the required multimedia technologies for the project (such as image galleries, video and audio players, interactive interfaces, etc.). The LDSE will also use this moment to create site "wireframes," or website blueprints, which will later inform the layouts of the website and user interface designs of the finished project. These wireframes serve as a useful review draft for the Collection Development Team, offering a chance to evaluate the layout and features of each page as a group,

and better allowing each member to offer their feedback and suggestions to each of the individual pages that make up the prototype and eventual Drupal theme and template pages.

After an additional period of development, this process finally yields an interactive prototype website, which can then be tested and reviewed by the research project director and the Collection Development Team, giving each of the team members a chance to experiment with a functional draft of the site's design and functionality. Given that the tools used in this prototype are still outside of the DHi infrastructure, it is a quick and easy process to revise this prototype, allowing the project director and CDT to either change or even add or remove features once they've had the chance to experiment with a close approximation of the finished project functionality.

Upon final approval of the project prototype, the LDSE is ready to begin the project's final development, recreating the prototype within DHi's technology infrastructure. During this phase, the features that were developed for the prototype are implemented either as existing Islandora/Drupal modules (or "Solution Packs," in Islandora parlance), or by creating new, custom modules for those features that are not available for use in Islandora already. In the event that new functionality must be added, these modules are scoped to be as generalizable in nature as possible, in the hopes that they might be usable by future projects as well. In this way, DHi encourages the greatest possible level of sustainability within its tools and infrastructure development process. In effect, this creates an ever-expanding list of potential tools and features that each project can consider utilizing from its conceptual stages, offering DHi's faculty researchers a range of approaches to their research data.

The use and design of these tools does require that a project's metadata be carefully structured so as to be usable by the Islandora Solution Pack. This requires the LDSE to work closely with the members of the Collection Development Team in planning and scoping the software development efforts. To facilitate this process, the LDSE will meet with the CDT and research project director from the project's outset, to discuss any new features and to align them as closely as possible to DHi's existing metadata structures, ensuring the minimum possible changes to a project's metadata structures to ensure that the tool is compatible with the project's objects. From there, the LDSE will conduct regular meetings with both the Metadata and Digital Initiatives Librarian and the Library Information Systems Specialist to design a tool's metadata requirements and to test its functionality over the course of its development.

Finally, as a combination of both the design and software development roles, the LDSE is responsible for the web and interface designs of all of DHi's software, ensuring that the layout and graphical elements conform with the rest of a project's design (and DHi's design standards in general), and that the functionality is both intuitive and usable. In the case of styling Drupal modules, the design work involves

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the use of special Drupal systems called “templates,” which define both the layout and the available data within a page or module, and “themes,” which define the overall aesthetics. To ensure that DHi’s work is both sustainable and extensible, the Lead Designer & Software Engineer builds and maintains one general DHi theme, which is used as a default starting point for each of DHi’s site designs. The use of this “base theme” gives each project a set of reusable layouts and graphical elements (such as columns, headers, fonts, buttons, etc.), which ensure a baseline visual consistency from the earliest stages of a site’s development. From there, the LDSE is able to build and implement a series of “sub-themes” for each project, each of which inherits the “base” theme’s rules and aesthetics, but is able to override these defaults to create a custom design, without needing to change the base theme. This both accelerates the design work and ensures an obvious visual cohesion across DHi’s many projects, all without losing the link back to the original theme, should something need to be changed across all of the projects at once. In practical terms, this limits the number of files involved in the creation of each new theme, from potentially dozens of files down to a reasonably small few. These files can then be stored in their own unique code repositories (GitHub), and maintained alongside their sibling and parent themes, making it easy for the Lead Designer & Software Engineer to update both the individual projects and the base elements shared by all project websites, with minimal duplication of effort.

Although design and software development are traditionally two separate roles within a project development team, the many overlapping needs of these two considerations make it a natural fit to combine these two facets into one position, and help the Lead Designer & Software Engineer to ensure a standard aesthetic, and functionality, across all of DHi’s many public faces and research projects.

COLLABORATION WITHIN DHi AND THE HAMILTON COLLEGE COMMUNITY

Collaboration exists in many layers within and external to DHi. Without successful collaboration between the members of the Collection Development Team, among others at Hamilton’s LITS, as well as the partnership formed by working with faculty project directors and students, the digital humanities projects supported by DHi would never have come into existence.

Partnering with Faculty Members

DHi Co-Directors proposed a sustainable technology infrastructure model to the Mellon Foundation that required innovation in digital scholarship. This innovation is

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only permitted by collaborative development of ideas. DHi Co-Directors brainstorm with faculty to propose the research methods and interface features that will best fit the research focus and also foster ongoing collaboration around a research project. These research agenda descriptions are the foundation for scoping and further development of the research project by the CDT. They also serve as the basis for grant proposals to keep the longer research agenda moving forward. DHi Co-Directors work with researchers and Hamilton's grants office to write grant proposals and create budgets that include a line item for the work DHi's CDT will contribute to the research. These efforts to sustain the longer-term research project agenda are one funding aspect of ongoing collaborative digital scholarship (Kirschenbaum, 2009).

The collaboration process between the research project director and the Metadata and Digital Initiatives Librarian is a key component of the success of DHi projects. Each brings a unique set of skills and knowledge to the process. In addition to the objects for the collection and the curation that goes into developing these collections, the project director brings a wealth of knowledge about the content and materials that comprise the collection. Their subject knowledge and awareness of other related projects are irreplaceable. The Metadata and Digital Initiatives Librarian brings knowledge of metadata schemas, as well as familiarity with how the metadata is used by the system and interface to support the robust repository. Without both of these key components, the collections that are supported by DHi would be severely lacking in functionality and the user experience would suffer because of it.

Research project directors also work very closely with the Lead Designer & Software Engineer. Together, they conceptualize and design the graphic identity for the research project that combines content with an appropriate and representative form. This results in an overall graphic design aesthetic, as well as draft versions of the website, user interfaces, and project logo. The process involves give-and-take, with the project director proposing a certain idea for the goals of their project, and the LDSE relying on his experience and familiarity of design conventions to suggest the best possible way of bringing this to life. Ideas continue to build on each other and new iterations of logos and websites move back and forth between the LDSE, the research project director, and the rest of the team working on the project.

Students as Collaborators

DHi undergraduate research students have earned significant recognition for their roles in collaboratively developing and inputting metadata, exploring digital research tools and methods, and developing their own scholarly research. Examples of undergraduate research in DHi include Kerri Grimaldi's project (<http://dhinitiative.org/demos/grimaldi/>) tracing the depth of Emily Dickinson's influence in a poem written by Agha Shahid Ali and documentary video shorts (<http://dhinitiative.org/>)

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projects/refugee) based on the oral histories of refugees resettled in the nearby city of Utica. As a liberal arts initiative, DHi depends upon and is dedicated to integration of undergraduates in digital humanities research and scholarship.

DHi also employs a cadre of student interns. These students are paid hourly wages and frequently interact with members of the CDT. DHi Interns work closely with the DHi Co-Directors to research and develop technologies, fill in gaps in skills on ongoing projects, communicate DHi activities through social media, and manage the daily activities in DHi.

Collaboration on the Collection Development Team

The completion of the metadata marks the beginning of key collaborations within the CDT on the metadata. With the metadata fully finished in the spreadsheet, the Metadata and Digital Initiatives Librarian verifies that all of the fields, particularly the custom metadata fields, are represented in the scripts for the multi-step conversion process of the Excel document to the MODS XML files. This is done by working closely with the Library Information Systems Specialist and Islandora Repository Manager; together they vet the scripts. Once the IR Manager runs the scripts that generate the XML files, a sample of the records is sent to the Metadata and Digital Initiatives Librarian to check for any inaccuracies in the mapping of the metadata. If any are identified, the Metadata and Digital Initiatives Librarian returns these to the IR Manager who in turn edits the scripts accordingly. When the resulting records are determined to be accurate, the set of MODS XML records and corresponding data files are ingested into the Fedora repository by the IR Manager.

An additional layer of collaboration involving the Metadata and Digital Initiatives Librarian occurs with the Lead Designer & Software Engineer and the Repository Manager. The Repository Manager and Metadata and Digital Initiatives Librarian discuss the role of the metadata in the website and the search structure, ensuring that the metadata adequately meets any system requirements such as geospatial metadata that is used for mapping. This process is ongoing throughout the completion of the metadata schema, but is also apparent during the theming of the website. The Collection Development Team consults together to ensure the integration of the metadata view into the display structure. Relationships between objects that are a key component of DHi collections are also accurately implemented and represented.

Through the various layers of collaboration in the building, support, and incorporation of the metadata, a key framework is created for the integration of the metadata into the collection. These collaborations allow personnel with valuable skills to support the necessary components by making robust metadata an integral part of the collections built by DHi.

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The Repository Manager's primary role of ensuring that all materials for each DHi project are displayed and searchable in Islandora leads him to work closely with every member of the DHi Collection Development Team. The Repository Manager works with the HPC/Unix System Administrator to ensure that the Islandora repository software is installed, up to date, and fully operational. He frequently troubleshoots issues with the repository, particularly with regards to updates to the system. The Repository Manager works with the Metadata and Digital Initiatives Librarian to configure Islandora with the appropriate metadata schema to meet the specific metadata tracking needs of that DHi research project. This includes entering the custom metadata schema into the project scripts to accurately translate the Excel file to MODS XML records that will be ingested into the repository.

The RM works with the Lead Designer & Software Engineer to ensure that any custom theming and added interface functionality is not going to break during a repository software upgrade. Each of these interactions is driven by an intimate understanding of the project's needs gained through repeated committee meetings with the research project director and DHi Co-Directors. Configuring Islandora for most digital humanities projects requires repeated conversations between the research project director and the Metadata and Digital Initiatives Librarian to get an accurate understanding of the range of content types involved, the metadata fields to be used, the searching mechanism required, how the content should be displayed, and the ways in which a site may require unique customizations to present its content.

Partnering with Others on Campus

In addition to all of the efforts of the Collection Development Team for supporting the work of faculty project directors, others on campus also contribute assistance in a variety of ways. As mentioned earlier in this chapter, R&ID is a key method of supporting the work of faculty in the classroom. Educational technologists and research librarians are equal partners of R&ID and work closely with faculty members to ensure that their course goals are met.

Educational technologists offer a valuable skill set. They are natural partners of faculty members due to their knowledge of various useful technologies. The time constraint of the semester creates challenges in using some of the DHi research project approaches. Educational technologists are frequently called upon to help design learning experiences that maintain the substance of the research project, but pare it down to a feasible course project. In these collaborations, educational technologists may work one-on-one with students, groups of students, or entire classes, to integrate technology meaningfully with content. Public presentations (oral, poster, website, etc.) are frequently integrated into courses at Hamilton, and are very effective at sharpening students' design and communication skills.

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Research librarians contribute to the work of faculty scholars primarily in two key ways. Much like educational technologists, research librarians at Hamilton work to support the needs of faculty members and students in the classroom. Research librarians may work one-on-one with students during research appointments to assist with the necessary research for classroom projects and papers. Research librarians may also present new tools, resources, and skills in the classroom as part of the class lecture. During this time, both faculty members and students benefit from the knowledge of the research librarian.

Educational technologists and research librarians from LITS particularly contribute to these projects through course support as DHi faculty scholars are also required to design a course or assignment based on their DHi research. They are important partners in the work done by DHi.

COLLABORATION ACROSS INSTITUTIONS

While the teamwork that drives DHi's Collection Development Team is crucial to research projects, DHi's collaborations with software contractors, other liberal arts institutions, and international partners are also essential components in how DHi operates as a small liberal arts initiative to accomplish digital humanities research goals. This collaboration helps to extend the work of DHi beyond what can be accomplished solely by those affiliated with Hamilton College.

The DHi CDT joins with Islandora and Fedora Commons consultants at Common Media (<http://commonmedia.com/>), Discovery Garden (<http://www.discoverygarden.ca/>), and also Islandora Consortium Group partners, Barnard, Grinnell, Hamilton, The Three College Digital Library Project Partners (Hampshire, Mt. Holyoke, Smith), Vassar, Wesleyan, and Williams Colleges, to create a digital scholarship infrastructure. The modules that DHi has developed with collaborators and outside consultants remain open source and available for other schools to use and extend for their purposes.

Since 2011, DHi has collaborated with peer institutions (Amherst, Grinnell, Lafayette, Vassar, and Williams) to develop models for sustainable digital collections and scholarly publications built within open source architectures. The goal is to develop and implement a model in which the Liberal Arts Colleges (LAC) are able to gain efficiencies through collaboration in the development and maintenance of digital scholarship infrastructures with interdisciplinary focus. Its most recent efforts include shared code development of an Islandora webform module (consulting with Common Media) that may be configured for use in any Islandora/Fedora Commons collection, enabling caption/transcription/upload activities by authenticated visitors to a digital archive. Submission of a caption/transcription or

upload of an item progresses to a vetting queue, and, if approved, a nearly turnkey “ingest” of the item into that specific Fedora collection.

Recognizing that professional development for collaborative teams using these digital technologies is necessary, DHi and College of Wooster initiated a plan in 2012 for a LAC Digital Scholarship/Humanities Institute for faculty, staff, and students. Over twenty-three liberal arts schools self-organized to develop a Summer Institute for Liberal Arts Digital Scholarship (ILiADS) followed by a weekend conference.⁷ The Summer Institute (one week in length) is structured similarly to the NEH Summer Institutes for Humanities, but is targeted at research teams consisting of faculty/students/librarians/technologists working on an interdisciplinary digital humanities research project with digital research or teaching goals. It was followed by a weekend conference open to the general public to generate connections across broader communities and open discourse across expert constituencies and collaborators in the humanities. ILiADS is part of the DHSI training network (DHSI.org) and will be hosted by different liberal arts schools each year.

DHi is also actively developing international digital scholarship communities in the liberal arts to specifically include undergraduate research. By leveraging DHi collaborations with peer and R1 institutions nationally and internationally, undergraduates interact and learn from expert scholars and other undergraduate researchers. Creating a network of activities among communities with similar research interests connects scholars to other institutions and helps create a “pipeline” for undergraduates applying to graduate programs and post-baccalaureate fellowships.

Almost all of the current DHi research projects are international in scope. This is largely due to the nature of research interests but is also important as many of the advances in graduate programs, digital approaches, and technology developments are happening on the international front. DHi has developed undergraduate internships with international partners that provide the praxis component of the DHi CLASS fellows experience. The existing collaborations with the University of Victoria in British Columbia (DHSI.org), The British Museum, and with Ritsumeikan and Doshisha Universities bring language, cultural heritage, and advanced digital humanities approaches to the undergraduate experience.

FUTURE RESEARCH DIRECTIONS

The models and collaborations developed by DHi are constantly changing and evolving. As new methods of doing digital humanities are tested at other institutions, DHi examines how successful strategies and tools can be incorporated into what it does. Looking towards the future, DHi looks to continue to develop new tools

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that benefit faculty scholars and new partnerships to continue supporting the work of its faculty members. To accomplish this, DHi is leading research and prototype efforts toward shared development of tools for digital scholarship in the liberal arts through its work in the Islandora Consortium Group. DHi is also collaborating with other liberal arts schools in providing the framework for team based professional development opportunities for digital pedagogy and scholarship through its ongoing work in developing ILiADS. These partnerships will help to sustain the work of DHi as the term of the Mellon Grant come to a close and the support of DHi falls primarily to Hamilton College.

CONCLUSION

Collaboration across units within Hamilton College and across institutions has been integral to the efforts of the Digital Humanities Initiative. While it has its benefits, collaboration is not without cost. The costs of collaboration include, at the very least, increased communication load, longer timeframes for coordination, and the need to manage expectations. In building collaborations, it is important to begin with mutual goals, to obtain buy-in from all levels (especially initially from the top), and to define clear roles and responsibilities. Unfortunately, in pioneering new initiatives, collaborators are often doing things for the very first time. There is ambiguity, uncertainty, and risk. Doing this type of work requires simultaneous documentation of the work being done, for later reflection and refinement. The process is developed along the way, with many unknowns and little understanding of clear expectations or roles and responsibilities. Collaboration in pioneer efforts, however, still begins with mutual goals and hopefully mutual investment. One of the lessons learned in DHi is that all collaborators must bring expertise to the table. Interest is great but collaboration requires real contribution or it is not worth the communication overhead. Collaboration takes time and develops organically. As such, these collaborative activities do not easily translate into suites of project management system tasks, or systematic molds of any kind. Over time, and with experience developing among all involved in the collaboration, the activities become defined processes with sets of tasks and hand-offs among collaborators. The similarities within the collaborations become more predictable and expectations are clearer. Models and more routine processes, developed from experiences, make the efforts easier to understand and manage. Fortunately for the innovators among us, the excitement of leading edge collaboration outweighs frustration, and sustains us as we move forward.

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KEY TERMS AND DEFINITIONS

Digital Humanities: Digital Humanities is an umbrella term for a wide array of practices for creating, applying, and interpreting new digital and information technologies. These practices are not limited to conventional humanities departments, but affect every humanistic field at the university or college level. Developments in computing and their performative and analytical capacity have created an environment for a quantum leap in humanities research and practice. In DHi at Hamilton College, we adopt the DHQ definition, “Digital humanities is a diverse and still emerging field that encompasses the practice of humanities research in and through information technology, and the approaches or exploration of how the humanities may evolve through their engagement with technology, media, and computational methods”.

Digital Scholarship: Effective use of digital research approaches and design of online publication interfaces to communicate significant understanding of specific and often unique subject matter.

Design: Effective integration of content and form to communicate content and/or facilitate function.

Drupal: An open source Content Management System (CMS) enabling users to develop their own websites with customized data structures. While Drupal offers publication of simple pages and blog posts by default, its functionality can be extended with community-maintained “modules” that offer custom functionality, and its interfaces can be customized with visual “themes” that alter the web design. Drupal users are free to either use pre-existing modules and themes, or to create and maintain their own.

Fedora Commons: Best practices library digital collections and archives repository system. Its flexible and modular architecture stores all types of content and metadata.

GitHub: A hosted Source Code Management (SCM) repository, using the open source Git distributed revision control software. GitHub allows users to host, update, and share their software projects with other users, enabling community collaboration and decentralized software development practices.

Interdisciplinary: Scholarship that not only cuts across and unifies traditional fields in the humanities (literature, history, the arts) but also brings the tools—both technological and methodological—of other disciplines to bear on the analysis of culture and society.

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Islandora: Drupal based open source software that interfaces with a digital repository system (e.g. Fedora Commons), to facilitate management of digital assets.

Liberal Arts: Academic subjects such as history, literature, philosophy, mathematics, and social and physical sciences as distinct from professional and technical subjects. Often used as a synonym for humanities, because literature, languages, history, and philosophy are often considered the primary subjects of the liberal arts.

Metadata: “Data about data”; or, the words and phrases that are used to describe data to make it accessible to users.

ENDNOTES

¹ For more information about the Collection Development Team, visit <http://dhinitiative.org/community/collectiondev>.

² For more information about CLASS, please visit: <http://dhinitiative.org/students/class>.

³ This section of the chapter is written to provide a basic overview of the infrastructure used for DHI’s systems. For more detailed information about the technological infrastructure used to support DHI’s digital repository, please visit <http://wiki.dhinitiative.org/doku.php/systems/resources>.

⁴ For more about MODS, please visit: <http://www.loc.gov/standards/mods/>.

⁵ For additional information about the role of the metadata and digital initiatives librarian and methods of acquiring the necessary skills to support digital humanities projects, please see McFall (2015).

⁶ Since these are all technologies that Drupal and Islandora will also use, it is safe to develop these prototypes outside of the framework of DHI’s infrastructure, while still being confident that the finished product will be compatible with Drupal’s requirements, and able to be converted into the framework of a Drupal module.

⁷ Please visit <http://www.ILiADS.org> for more information about ILiADS.