

## Digital Humanities Pedagogy as Essential Liberal Education: A Framework for Curriculum Development

Brandon T. Locke <brandonlocke\_at\_gmail\_dot\_com>, Michigan State University

### Abstract

Digital humanities projects and methods are becoming increasingly common in undergraduate humanities classrooms. Digital projects and exercises allow students to engage with new technology, collaborate with peers, graduate students, and faculty, and produce tangible scholarship that is publicly visible. The Lab for the Education and Advancement in Digital Research (LEADR), a new student-focused digital humanities initiative at Michigan State University, has introduced digital components into large numbers of History and Anthropology courses. Through two years of courses, it has proven fruitful to frame these not as “Digital Humanities projects,” but as part of a digital liberal arts curriculum that seeks to teach students not only about the domain-specific content, but also essential skills for information retrieval and analysis, media literacy, and communication in the digital age. This framework places these skills as extensions of longstanding skills, literacies, and knowledges that humanities and social sciences have contributed towards liberal arts education.

We ought to be able not only to find any kind of document on the Web, but also to create any kind of document, easily. We should be able not only to follow links, but to create them—between all sorts of media. We should be able not only to interact with other people, but to create with other people. Intercreativity is the process of making things or solving problems together. If interactivity is not just sitting there passively in front of a display screen, then intercreativity is not just sitting there in front of something 'interactive'. [Berners-Lee and Fischetti 1999]

As the field of digital humanities continues to gain traction in disciplinary departments and in libraries, digital projects and methods are becoming increasingly common in undergraduate humanities classrooms. Digital projects and exercises allow students to engage with new technology, collaborate with peers, graduate students, and faculty, and produce tangible scholarship that is publicly visible. Shining examples of these types of experiences are illustrated in edited volumes such as *Digital Humanities Pedagogy* and *Teaching History in the Digital Age*, and *Digital Pedagogy in the Humanities*, in journals like *Hybrid Pedagogy* and *Journal of Interactive Technology and Pedagogy*, at conferences such as ILiADS, HASTAC, and Bucknell's Digital Scholarship Conference, and in numerous blog posts and project pages. As Director of the Lab for the Education and Advancement in Digital Research (LEADR), a lab specializing in digital research for students in humanities and social sciences at Michigan State University, my focus is to develop these types of experiences for undergraduate in collaboration with faculty. Through working with faculty, librarians, graduate students, and undergraduates, we have begun to frame these not as “Digital Humanities projects,” but as part of a digital liberal arts curriculum. This frames our work as teaching students about the domain-specific content, alongside essential skills for information retrieval and analysis, media literacy, and communication in the digital age.<sup>[1]</sup> This intentional focus on crucial critical thinking and skills in the digital realm is the result of our students' lack of knowledge and skills in using digital media and tools for communication and critical analysis, and is backed by research on technology use in the United States.

The World Wide Web that gained commercial success in the early and mid-1990s was very much a read-only medium, where only a privileged few had the skills and the resources to create material that others could access online. The “read-only” web continued into the new millennium, as a sliver of the population began to learn HTML (or software development languages like Java) on their own or in colleges and upper-middle class high schools. In the mid-2000s, Web 2.0 brought about blogging platforms, wikis, message boards, and social media, significantly lowering the barrier to participation. Simultaneously, the digital divide began to narrow, largely due to mobile access becoming more available to lower-income communities. Today, though the digital divide persists in the US in rural, poor, and elderly communities, 84% of American adults use the Internet, and over half of US Internet users have posted photos and videos they have taken to the web (including 81% of internet users age 18-29), and many more use social media, blogs, or personal websites to produce content for the web. With the ubiquity of the web as a platform for communication and knowledge production, critical digital media production and communication in higher education is worth examination [Perrin and Duggan 2015] [Duggan 2013].

In higher education, the conversation surrounding digital technologies has largely been dictated by the characterization of “digital natives,” drawing from Mark Prensky's influential 2001 article, “Digital natives, digital immigrants” [Prensky 2001]. Digital natives and digital immigrants are the two archetypes often used to represent the purported gap in technical proficiency between younger people who have grown up with “the digital language of computers, videogames and the Internet,” [Prensky 2001, 6] and older people, who are moving into digital technology from an analog world. Many in higher education seem to have internalized the idea of digital natives, and presume that students have the inherent ability and tools to work critically and develop digital content [Bennett and Maton 2011]. The digital native/digital immigrant concept has been well-criticized for taking a homogenous view of the generation, ignoring digital divides based on location, race, and income, as well as disparities that encourage young boys to learn technology at a higher rate than young girls [Brake 2014] [Hargittai and Walejko 2008] [Thomas 2011]. Despite the clear problems with the concept of digital natives, the presumption that young people as a whole are well versed in digital media and communication remains strong in classrooms and curriculum development committees

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Implicit in the rhetoric of the digital native is the notion that students are skilled in both the use and creation of digital content. This ranges from the scientific — studies do show that the majority of young people are using, creating, and publishing digital content — to the anecdotal — teachers, parents, and professors alike have stories about how their students or children have had to assist them with new technologies. Though many in higher education generalize their undergraduate students as being well acquainted with technology and approach their studies through a digital lens, students often struggle when it comes to critical content creation and mediation. The characterization of undergraduates as “digital natives” ignores the significant portion of students who are from an older generation, as well as students whose families and schools were not able to afford these devices. Even for students who have grown up with digital devices and can fairly easily adapt to digital interfaces, they have most often grown up as *consumers* of digital media and commercialized sharing services. Students are often much less adept at creating content that is not tightly mediated by some kind of commercial service with restrictions on form (e.g. Snapchat, Twitter, Facebook). Commercial services limit the form and functionality (though not necessarily the creativity) of content created to advocate for social or political change, analysis, information, art and entertainment, or commercial interests, and create a greater divide between those who can freely communicate in digital forms, and those who can communicate only through limited form.

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There should be reason for concern that students are often taking part in digital information and media transmission, but are not currently trained in the literacies and affordances of the technology they use. For the most part, content creation and sharing involves proprietary software or services that heavily mediate creation. This means that some “tech skills” often come through narrow technology that limits potential outcomes and often monetizes user-created content — platforms and software such as Twitter, Instagram, Snapchat, YikYak, PowerPoint, and Facebook create a rigid form for content, and make simple interfaces for creation and publication. While this is greatly beneficial in that it provides a low bar, it means that users become skilled at using a particular tool, not in the theoretical or technical principles, or even potential options. Tool-based literacy limits sustainability, cross-platform work, and understanding of the impact of media upon the message. Critical evaluation of digital media and the means to produce them is valuable for both consumption and production of digital media and information. The integration of digital skills in the liberal arts course is an opportunity to promote the continued strength of a skilled, literate, critical culture. Ideally, digital content creation and publication should be done using free and open source means, or at least software that is widely used and amenable to multiple sources of distribution. This allows users to continue their creative, civic, and personal communication or media production with platform and service agnostic tools, and a better understanding of production.

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Consider the following example: If a person wished to promote a social justice group, she may do so easily using platforms like Facebook, Twitter, and Snapchat. She could develop a Facebook page with a text description and distribute photos, video, and calls to action via all three platforms. However, she is forced to adhere to limits of each platform, such as design constraints, inability to use custom HTML/CSS, and size and space constraints. She may also be forced to pay to promote content for others to see her group’s media. Furthermore, she is subject to the limits of the platforms’ terms of use. Should she experience harassment or misbehavior on these platforms, she will likely be powerless to prevent it. On Facebook, for example, she is required to use her full legal name (and would be required to provide legal documentation if challenged). Meanwhile, the content she produces is monetized by the platform on which she publishes. If, on the other hand, she were skilled at creating media, she would be able to create a standalone website to host media in whatever size and form she desires; she would have freedom to style and hyperlink any text, and she (and her organization) retains sole rights to the use and reuse of their content. Once content is produced to the website, social media platforms may be leveraged to generate site traffic.

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## Liberal Arts in the Digital Age

While many in higher education are calling for more (and better) digital pedagogy for students, the field of Digital Humanities continues to experience substantial growth [Hirsch 2012] [Thomas and Lorang 2014]. An increasing number of universities are offering minors, majors, and specializations in Digital Humanities and similar fields, and still more are including digital project development and critique of existing digital projects in coursework. Rather than continuing to produce students who are unfamiliar with many of the common communication, analysis, and research methods of the modern day, this framework seeks to apply a liberal arts rationale for the development of critical analysis and development of web interaction and writing, multimodal projects, data analysis and visualization, and large-scale analysis.<sup>[2]</sup> These skills all have parallels in liberal arts classrooms that have been taught for generations, such as effective persuasive writing, critical analysis of arguments, and techniques for research and information source analysis. If instructors are not familiar enough with these technologies to teach them themselves, partnerships with digital humanities specialists, librarians, or instructional designers can be productive.

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## The Lab Model for Digital Research

Founded in August of 2014, LEADR is both a physical space and a curriculum development initiative developed as a collaboration between the Department of History, the Department of Anthropology, and Matrix: The Center for Digital Humanities and Social Science at Michigan State University, a large public research university in the United States. LEADR emerged out of feeling that students needed to engage more critically with the digital materials and techniques that faculty were using for their own research. The space itself was designed to facilitate collaboration and openness in a decentralized learning space. Nearly all of the furniture is movable, facilitating shifts between seminar-style arrangement and group project work, in addition to decentralized poster-like presentation spaces. LEADR is also fully equipped with large screens for group work, machines, cameras, audio and light kits, 3D printers, micro computing equipment, and other technology to facilitate innovative digital work. The LEADR staff, comprised of two full-time academic staff members and three PhD students from the History and Anthropology departments, assist faculty with the development of assignments, develop and teach digitally-focused instruction and discussion sessions, provide assistance in developing grading guidelines, and staff the lab space, which is open nearly fifty hours per week.

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LEADR works with courses at all levels (graduate as well as undergraduate) and across a number of departments, programs, and colleges. Faculty in History and Anthropology teach the vast majority of courses, but these courses can be listed as History, Anthropology, Integrated Social Science, residential colleges, or other programs. Although some courses are specifically developed as Digital History or Digital Humanities courses, most courses visit the lab a few times per semester, often with at least one visit aimed solely at a flipped classroom-style work session, where students read or watch

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content ahead of time and complete activities or project work in the classroom. The LEADR component for these courses is similar to the use of labs in many science courses – it is an opportunity for students to take the content and methods that they have read and discussed and apply them in hands-on experiences where they can build, experiment, and play, and then reflect on their experiences.

For our students entering the fields of History, Anthropology, or related fields as graduate students, researchers, or careers in libraries, galleries, or museums, the benefits of digital humanities skills may be fairly apparent. These skills enable them to engage with emerging work and to produce their own research, projects, or critiques capable of making public and scholarly impact. However, for students taking these courses as non-majors fulfilling degree requirements, the benefits may be less obvious, especially to the students themselves. For these reasons, it is important to break down the skills, methodologies, and literacies that comprise or could comprise digital humanities coursework, and to subsequently focus on these skills when creating digital curricula and adding digital activities and assignments to existing courses.

Rather than teaching “Digital Humanities,” we began thinking about project building as an entryway to teaching essential liberal arts skills using new media and web publishing, and visualization and analysis tools. There are many great reasons to incorporate digital project creation into courses — students build technical skills, create scholarship that is accessible to others, approach their research objects in new and dynamic ways, collaborate and develop project management skills, learn emerging methods of knowledge, production, and build their portfolio. If constructed thoughtfully, the literacies, hard skills, and soft skills that go into digital humanities work can contribute both directly to the growth of knowledge and capabilities within students’ own disciplines. They can also contribute more generalizable skills that can be understood as digital extensions of long-standing liberal arts skills that History, Anthropology, and other disciplines have long imparted to students, such as writing, evaluation, critical thinking, and synthesis. The ability to break these down and understand them as teaching liberal arts in the digital age allows for more clarity in the development of assignments, and it is also a useful way to encourage instructors to integrate these projects and activities into their classrooms.

## DH Pedagogy as Essential Liberal Arts

The framework employed in LEADR consists of four flexible learning objectives that can be packaged and built upon to meet the needs of the course and the desired outcomes of the faculty member and partners. The objectives are 1) Information Literacy, 2) Digital Literacy, 3) Data Literacy, and 4) Computational Analysis.

### Information Literacy

Students in LEADR are often required to develop digital projects that include digital primary sources, including digital collections and narrative-driven websites. Usage of digital objects can range from a few photographs used to illustrate central concepts in writing to creating exhibits that draw upon large collections of digitized documents, artifacts, and photographs. Because primary source discovery and evaluation is a critical component of nearly all projects, information literacy instruction in conjunction with LEADR often begins with a strong focus on finding, evaluating, and understanding digital information. Librarians at MSU Libraries are often brought into classrooms to fulfill this learning frame, drawing upon their expertise in information literacy and the usage of digital resources.

The American Library Association defines information literacy as “an overarching set of abilities in which students are consumers and creators of information who can participate successfully in collaborative spaces” [ACRL 2015]. The information literacy objectives used in LEADR are informed by the ACRL’s *Framework for Information Literacy for Higher Education*, which includes six frames [ACRL 2015]:

- Authority Is Constructed and Contextual
- Information Creation as a Process
- Information Has Value
- Research as Inquiry
- Scholarship as Conversation
- Searching as Strategic Exploration

The sources students use for their digital projects — images, datasets, documents, film, etc. — can be found all over the web. Many resources, especially images, can be located with incomplete metadata, incorrect information or with questionable provenance. Although studies have shown that students do usually end up in library journal databases when seeking reliable or scholarly sources, based on experiences in the LEADR classroom, students rarely think about similar repositories for accessing primary source material [Asher and Duke 2012]. Source location and evaluation exercises in LEADR have shown that the great majority of students turn directly to Google Image Search when asked to find a historic photograph to use as a source. To alleviate this problem, students are introduced to librarians early on, and have a session on finding and working with primary source material whenever relevant. In addition to learning about available resources through library databases, students are shown local collections in the MSU Museum or the MSU Library Special Collections. This gives students the additional benefit of meeting and speaking with the curators and librarians who possess relevant expertise about the collections, and students are strongly encouraged to visit the locations and conduct more research. These exercises are molded to meet the *Authority is Constructed and Contextual* and *Searching as Strategic Exploration* frames.

Legal and ethical intellectual property use is a key component of digital literacy in the classroom. Throughout the first two years of courses in LEADR, a substantial portion of students would correctly cite the sources they used in their writing, but would use images on their projects without citations, even when this was mentioned as a requirement. There is seemingly a disconnect between traditional requirements of paper writing and web project development. In response to this, LEADR staff, librarians, or museum staff put strong emphasis on the *Information Has Value* frame, including lessons on citation practices in academic writing, copyright, Creative Commons licensing, and fair use in courses by discussing preferred media citation practices for the digital platform being used.

Ithaka S&R’s recent US Faculty Survey shows that information literacy remains both valued and underdeveloped in the Humanities and Social Science classrooms. Over 60% of Humanities faculty and approximately 55% of Social Science faculty strongly agreed with the statement “My undergraduate

students have poor skills related to locating and evaluating scholarly information,” while over two thirds of both faculty groups strongly agreed with the statement, “Improving my undergraduate students’ research skills related to locating and evaluating scholarly information is an important educational goal for the courses I teach” [Wolff et al. 2016, 57–64]. Focused studies on information usage in the classroom have shown that most US faculty find that the greatest issue students have is not in finding appropriate material, but instead in thinking critically and using these sources to augment a larger argument [Foster 2013] [Head 2013] [Dimmock 2013, 12]. In-class exercises go beyond access, and engage students in deeper evaluations of the sources they have found. These exercises, which draw on deeper engagement with resources, allow MSU Libraries and LEADR staff to build on the aforementioned frames, as well as frames such as *Research as Inquiry*, *Scholarship as Conversation*, and *Authority is Constructed and Contextual*.

**Potential Information Literacy Topics:** Determine the extent of information needed; access and evaluate secondary and primary sources; understand source biases and evaluation; understand economic, legal, and social issues surrounding the use of information

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### Information Literacy Example: Historical Sources and Their Uses

#### Assignment

Working with Bobby Smiley of Michigan State University Libraries, students in an introductory historical methods course (HST 201) located primary sources related to their research, and then found secondary journal sources that directly engage those primary sources. Once students located these sources, they placed selected primary sources in conversation with matching secondary sources to identify how historians use primary sources.

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#### Process

The ability to source material for research is essential to scholarly practices, and the library furnishes an excellent resource for locating those sources, as well as helping students understand how they are used in scholarship. The first component of this lesson required students to familiarize themselves with specific library resources to find primary source documents of interest (whether in the catalog, or a highlighted database), and then secondary source journal articles which remark on the primary source. To understand how the historian uses a primary source in their analysis, both documents were placed in JuxtaCommons, which displays documents side-by-side. This program highlights exact phrases appearing in both documents, enabling students to see how one source is used in the other. Accompanying activities examined fidelity to original sources, analysis of use in secondary sources and a comparison of context in the primary document, in addition to understanding how historical arguments are constructed.

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As befits a library-specific approach, instruction is framed by beginning with informational literacy principles from the ACRL Revised Framework, which undergird the class exercise. In this case, the focus is on the framework element, *Authority is Constructed and Contextual*, which is paired with the data informational literacy competency, *Discovery and Acquisition* [ACRL 2015] [Shorish 2015]. When creating a learning outcome for the class, those two elements are combined with an appropriate disciplinary expectation — in this case, the AHA’s *History Discipline Core* [AHA]. The idea of crosswalking and aligning these elements is to stress how an information literacy-focused approach to working with digital sources and tools transcends demonstration and is instead anchored firmly in library and disciplinary-oriented teaching and learning.

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#### Learning Outcomes

Students will be able to locate primary and secondary source materials and from the library’s e-resources, and use those sources to identify how historians use sources in constructing their analyses.

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### Digital Literacy

The critical production and consumption of digital media is much more effective with an understanding of both the technical principles and theoretical affordances of the media. Digital communication is not only important in the disciplinary sense, as History and Anthropology scholarship is increasingly being produced digitally, but also as an essential skill for participation in civic society. In LEADR, students learn how to write for a web audience in a variety of ways — identifying audiences and users, using appropriate rhetoric, structuring narratives to function well on the web, integrating multimedia, and using HTML/CSS or a content management system (CMS) to publish and distribute scholarship. The American Library Association defines digital literacy as “the ability to use information and communication technologies to find, understand, evaluate, create, and communicate digital information, an ability that requires both cognitive and technical skills” [ALA 2013, 1]. There is a great deal of overlap between the ALA’s Information Literacy and Digital Literacy frameworks, but their Digital Literacy report can be instructive for the production, reuse, and communication of digital information. ALA’s digital literacy report stresses that academic libraries play a key role, as undergraduate students are not nearly as digitally literate as often assumed [ALA 2013, 5–17]. “Generally, neither children nor adults acquire critical thinking skills about mass media, popular culture or digital media just by using technology tools themselves...One thing is certain: simply buying computers for schools [and libraries] does not necessarily lead to digital and media literacy education” [Hobbs 2010, 25] [ALA 2013]. The critical evaluation of the “digital-ness” of an object promotes a better use of the affordances of the media and information, while also understanding external implications, such as ethical and legal rights, privacy, permanence and impermanence, audience reception, and feedback.

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Metaliteracy, the expansion of traditional information skills (determine, access, locate, understand, produce, use) as described by Thomas P. Mackey and Trudi E. Jacobson, plays a key role in teaching students to produce and remix digital content [Mackey and Jacobson 2014]. Mackey and Jacobson have expanded the traditional notions to include “the collaborative production and sharing of information in participatory digital environments” that, crucially, “requires an ongoing adaptation to emerging technologies and an understanding of the critical thinking and reflection required to engage in these spaces as producers, collaborators, and distributors” [Mackey and Jacobson 2014, 1]. Mackey and Jacobson list the following metaliteracy learning goals and objectives:

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- Understand format type and delivery mode
- Evaluate user feedback as active researcher
- Create a context for user-generated information

- Evaluate dynamic content critically
- Produce original content in multiple media formats
- Understand personal privacy, information ethics and intellectual property issues
- Share information in participatory environments

Metaliteracy also addresses the challenges of maintaining literacy over time. Technologies change, and the (mostly) proprietary platforms that make production and publication easy will require sustained monetary contributions and will likely fade away in lieu of new ones. This means there should be a focus on communication using open and sustainable tools that allow for total freedom and ownership of content, including the creation of video and visualizations and the production of content on flat HTML files, or at least an open source CMS. It should also include the metacognition that is at the center of Mackey and Jacobson's metaliteracy. Metacognition allows for an understanding of content creation within a system of moving and evolving parts, enabling (at least partially) an ability to adapt to new technologies and environments [Mackey and Jacobson 2014, 41–44].

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**Potential Digital Literacy Topics:** Web publication (HTML/CSS and CMS), user experience, multimodal communication, film composition and editing, critical engagement with technology, social media, and third party data collection

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### Digital Literacy Example: Digital Atlas of Egyptian Archaeology

#### Assignment

Anthropology students collaboratively developed an atlas of archaeology sites as a final project for an Archaeology of Ancient Egypt course (ANP 455).<sup>[3]</sup>

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#### Process

Students had a basic introduction to HTML and CSS through a class session in LEADR, and developed skills using Codecademy modules with staff available to help. Students then learned about Git, GitHub, and collaborative coding through a subsequent class session. To build the project, students forked the course website, copied and customized an HTML template for their site, then added their location information to a CSV that comprises the back-end of the map, then did a pull request to make their changes visible in the main repository.

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#### Learning Outcomes

Students have a basic understanding of experience in collaborative coding, version control (Git), and primary web technologies.

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### Data Literacy

As “open data” and “big data” become increasingly common phrases, the ability to access, refine, manipulate, critically evaluate, and share data becomes more of an essential skill. Librarians and data curators have made efforts in recent years to move curation “up the stream,” and to train researchers and scholars to start data collection with good practices in mind. This greatly increases reusability and clarity of the data, and reduces the work required in preparing the data for sharing. Training often occurs in university-wide workshops, brief seminars to train researchers in data curation practices, or perhaps a lab-specific workshop faculty, staff, and graduate student researchers [Carlson et al. 2011]. These sessions teach attendees about establishing metadata standards early on in the research process, documenting their data processing, and using sustainable formatting, among other curation practices, but are often brief and divorced from content and community practices [Carlson and Johnson 2015, 2–3]. Instead, teaching data principles in courses allows for a greater focus on uses of the data that take full consideration of the context and the potential questions that could be asked of the data.

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The Data Information Literacy (DIL) initiative, led by Jake Carlson and Lisa R. Johnson, is an extension of the ACRL Information Literacy Framework that focuses on both the creation and consumption of data. The authors describe DIL as “...merg[ing] the concepts of researcher-as-producer and researcher-as-consumer of data products. As such it builds upon and reintegrates data, statistical, information and science data literacy into an emerging skill set” [Carlson et al. 2011, 634]. Data information literacy is a framework designed to be integrated into courses and graduate research processes in the context of subject-specific data and domain-based community practices. DIL is comprised of 12 primary frames:

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- Introduction to Databases and Data Formats
- Discovery and Acquisition of Data
- Data Management and Organization
- Data Conversion and Interoperability
- Quality Assurance
- Metadata
- Data Curation and Re-use
- Cultures of Practice
- Data Preservation
- Data Analysis
- Data Visualization
- Ethics, including citation of data

The target community for data literacy is typically limited to those doing research for peer-reviewed publication — faculty, academic staff, graduate students, and undergraduate research assistants [Carlson and Johnson 2015] [Shorish 2015]. However, these are valuable skills for all citizens, and basic introductions to concepts should be taught broadly at the undergraduate level. Data skills and literacies are becoming crucial, as terms like ‘big data’ become more and more pervasive in the news, scholarly research, and across industries, and governments and other entities increasingly make data open in the name of transparency. Without the skills to access and evaluate data, there can be great hurdles to successfully use and analyze these

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resources as scholars, citizens, and employees.

With growing access to humanities datasets through both library vendors and open repositories, data literacies and skills can greatly benefit students in History and Anthropology courses working on small, course-based or thesis research projects.<sup>[4]</sup> One promising project for effective information and data literacy pedagogy in the humanities is the *Library-Led DH Pedagogy: Modeling Paths Toward Information and Data Literacy* symposium [Padilla et al. 2015]. Librarians at Michigan State University specializing in digital humanities, data curation, and information literacy called a symposium of librarians and disciplinary faculty from across the region to discuss and develop library instruction that melds together disciplinary information and data literacy needs.

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The ability to evaluate and use data gives students the ability to ask different types of questions, and to utilize growing resources for analysis. Data literacy skills have great utility that extends beyond large research projects, and even beyond academic research. New technologies and the increasingly widespread use (and misuse) of data visualization in journalism and politics make data competencies such as collection, evaluation, and management a crucial skillset. Data skills are essential if we wish to transform students from passive data consumers to critical consumers and producers of data. In LEADR, data literacy lessons are delivered using domain-specific data as well as domain-specific norms for data curation and manipulation, but examples and use-cases from mainstream sources are discussed whenever relevant.

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**Potential Data Literacy Topics:** Data collection, manipulation, cleaning, and structuring; critical evaluation of data; data sharing and publication

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### **Data Literacy Example: Archaeology Field School Data Visualization**

#### **Assignment**

Campus Archaeology Field School (ANP 464) students learned about archaeological data structure, data organization, and visualization in two sessions in LEADR.<sup>[5]</sup>

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#### **Process**

Students were introduced to basic concepts of data structure and organization, such as the difference between structured and unstructured data, foundational metadata, and principles of *Tidy Data* [Wickham 2014]. Students were then introduced to data from previous Campus Archaeology digs, and were shown how to manipulate the data in order to visualize and analyze it with the selected tools. In the first session, students were introduced geospatial data and used CartoDB to map artifacts and analyze their spatial distribution. In the second session, students used Raw to visualize item-level metadata. Both sessions included ample time for students to experiment with the tools and data, and produce their own visualizations. They were then asked to reflect on their findings and produce a blog post on their experiences.

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#### **Learning Outcomes**

Students are able to think critically about the ways in which data can be collected, analyzed, and curated. Students also learned the affordances of particular data types and data sets, and how data collection can impact the understanding and analysis of archaeological collections.

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### **Computational Analysis**

Computational analysis is used here to signify a wide-ranging set of tools and methodologies that rely upon computational processes to assist in the asking and exploring of research questions, including but not limited to text mining, network analysis, GIS and web mapping, 3D modeling, desktop fabrication, and topic modeling. These lessons are grounded in disciplinary methodology, and illustrate the ways in which scholars are using computationally-aided methods to ask new questions of their sources, as well as exploring more traditional questions. Once the methodological groundwork is established, students are instructed in the usage of a tool or tools, and then encouraged to experiment with the tool(s) and dataset(s) before reflecting on the experience.

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Although computational analysis is often seen as a means to a scholarly end, it holds great value in its ability to challenge students to think differently about a resource — to break down the way we convey information and think about ways to work through those abstractions. The disciplinary benefit is not necessarily the development of computational research skills, but instead in teaching students about research methodologies and new ways of thinking about sources [Mahony and Pierazzo 2012] [Sayers et al. 2016]. Computational methods can serve as valuable aids to think about datasets, electronic representations of materials and cultures, and the affordances that come with each. Stephen Ramsay, long a proponent of teaching programming as a way to help students learn both computational and humanistic thinking, wrote, “The center of digital humanities, after all, is not the technology, but the particular form of engagement that characterizes the act of building tools, models, frameworks and representations for the traditional objects of humanistic study” [Ramsay 2012]. Emerging practices in physical computing and desktop fabrication allow for the making, breaking and alteration of real and speculative objects, enabling interested parties to engage critically with the form, function, and materiality of objects [Sayers et al. 2016].

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Teaching the ubiquity of this kind of analysis, along with critical approaches to the strengths and shortcomings of such analysis, can help to remove the black box that often surrounds such digital outputs, and allows for thoughtful criticism of these methods employed in our everyday lives. For example, the usage of text mining and text analysis in the undergraduate humanities classroom does not only lead to learning more about the content and the humanities methodology, but also about the potential and limits of surveillance analytics [Sinclair and Rockwell 2012]. Likewise, critical makerspaces can contribute to “advanced thinking and policy-development around critical issues like privacy, surveillance, intellectual property, consumerism in education, data exploitation, and sustainability and the environment” and “foster productive thinking on issues of representation, contingency, privilege, and other structural problems in academic labor” [Sayers et al. 2016, 16].

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**Potential Computational Analysis:** Text analysis, 3D fabrication and modeling, network analysis, mapping

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## Computational Analysis Example: Intro to Text Mining with Tweets

### Assignment

Students in Eating Industrial (ISS 310) evaluated the rhetoric surrounding different types of food using several collections of a few thousand food-related tweets.<sup>[6]</sup>

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### Process

Prior to the LEADR session, students read a linguistics study of the rhetoric of food reviews on Yelp, an online business review company, and thought about how they may approach large collections of text to analyze the modern processed food industry [Jurafsky et al. 2014]. Once students arrived in class, they were invited to browse several thousand tweets archived via a number of food-based Twitter searches, and to think about how they may design an analysis of the sample tweets. Students evaluated each of the default analysis tools in Voyant, and were given examples of how to use the visualizations, statistics, and concordances to construct an analysis of the corpus. Following the session, students were asked to write a blog post reflecting on their process and their findings.

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### Learning Outcomes

Students learn how to use text mining and exploratory text analysis to develop and answer research questions, and gain an understanding of distant reading techniques and methods.

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## Benefits of the Framework

The use of this framework over the past academic year has led to a number of changes in the ways courses are conceptualized, structured, and taught. On the whole, these changes have contributed to more course partnerships, to more immersive and engaged assignments and activities, evaluation that focuses on literacies and reflection more than final product, and, in the end, more undergraduate students who are equipped with technical and critical thinking skillsets for engagement in digital environments on and off campus. On the administrative level, the framework has enabled these improvements in several ways:

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First, it moves the assignment focus away from the deliverable and back into the process and the praxis. There are a number of tools that offer sleek final interfaces, but little in the way of customization, and limit the actual learning about publication, research methods, and the technology behind them. The domain, method, and technical objectives should be considered first, with the process and expectations can be determined accordingly. It can be tempting to formulate learning objectives and then jump to the simplest solution to produce a deliverable, abandoning or partially conceding learning objectives in the process. The framework helps us keep these in mind, and also informs grading rubrics that value the demonstration of methods and skills over a shortcut to a presentable deliverable.

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Second, this framework is helpful in engaging people who are new to digital research, or even those who are skeptical of its values. Some humanists may be dismissive of digital projects because of the presumption that they are flashy but lacking in substance, while others may be intimidated by the technical work required to make a digital project function effectively. The framework makes it much easier to move beyond conversations that focus too much on the output or the technology and instead focus on the learning that occurs throughout project development. This type of reframing may be obvious to many immersed in digital humanities, but can go a long way toward making digital methods more interesting, valuable, and approachable for those who are new to the field.

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Third, the framework serves as an excellent way to start and manage collaborations between faculty, librarians, graduate students, education technology specialists, and others. Conversations between domain specialists with limited digital skills and librarians, programmers, user experience designers, or others who may have knowledge of the technical skills, but little or no background in the domain develop more easily because expectations and needs are clarified. By centering the conversation on clear-cut learning goals, parties can much more easily determine where their own expertise may be valuable to the learning process.

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## Conclusion

Douglas Rushkoff, a Professor of Media Theory and Digital Economics, delivered an oft-cited talk at the 2010 South by Southwest Festival proclaiming that citizens in the imminent future must “program or be programmed” [Rushkoff 2010]. In his book, which gets its title from this proclamation, he wrote of his typical response when people ask him if they really do need to learn to program:

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And while I always answer, “Yes, you do have to learn to program,” the real answer is probably no. You don’t. You can get by without becoming a literate participant of the digital age. You may not know what’s going on, you may not have much of an impact on the future of our species, and you may begin to feel like technology knows more about you than you know about it-but no, you don’t have to learn to program. [Rushkoff and Purvis 2011, 7–8]

While Rushkoff’s response may be a bit facetious, his larger point, articulated throughout his book, is that digital media and technologies are full of decisions made by people, and those decisions have an impact on the everyday lives of others. Without an understanding of how technology works — even a surface level understanding — an individual has reduced agency in their everyday lives. It is the duty of liberal arts educators to ensure that students retain this agency, at least in the ways that they experience media, think critically, and communicate on personal and societal levels.

It is my hope that the framework articulated here will facilitate and aid others to include these crucial skills into their teaching, in much the same way they have long facilitated skill-building and discussion of things like writing, evaluating evidence, and critical thinking. Digital humanities provide an opportunity to integrate the disciplinary study of literature, historical primary sources, and archaeological discoveries with these skills and knowledges for the twenty-

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first century. The framework here also provides an approach that enables instructors to focus on the core learning outcomes without gravitating towards an easier or more attractive deliverable.

Although the framework was developed within a digital research-oriented lab, the framework can be useful for collaborations between disciplinary faculty, librarians, educational technologists, instructional designers, or graduate students. Educators in the liberal arts must continue to grapple with emerging forms of communication and analysis, or we risk leaving our students lacking in critical areas of the liberal arts. Media and information literacies and multimodal and digital writing skills are essential for effective communication and civic engagement now and in the future, and liberal arts courses must engage with them. This flexible and extensible framework offers one fruitful route, by developing digital humanities projects intended to impart such skills while engaging with domain-specific content.

## Notes

[1] Ryan Cordell has reflected on his experiences with students who find little interest or appeal in “Digital Humanities.” William Pannacker has argued for the usage of the term “digital liberal arts,” particularly at liberal arts colleges because it is much more inclusive, approachable, and less politicized than digital humanities. For more see [Cordell 2016] [Pannacker 2013].

[2] Here I use “liberal arts” to describe the disciplines that are intended to teach broad sets of skills such as writing and communication, social awareness and responsibility, critical thinking, and analytical and problem-solving skills. The terminology comes from the charge that these skills and subjects are essential for all free individuals to take part in civic society. While there is clear overlap with the US model of liberal arts colleges, the term is intended to fit into much broader contexts in humanities, social science, and liberal education.

[3] This course was taught by Ethan Watrall in the Department of Anthropology and was supported by Brian Geyer, a PhD student in Anthropology, with design support provided by Austin Truchan at Matrix.

[4] A few examples of emerging resources for data include HathiTrust, University of Pennsylvania Libraries' OPENN, Michigan State University Libraries' Humanities Data Collection, JSTOR's Data for Research, and University of North Carolina Chapel Hill Libraries' DocSouth Data collection.

[5] Campus Archaeology Field School was led by Lynne Goldstein of the MSU Department of Archaeology, and the project was supported by PhD students in Anthropology Katy Meyers-Emery and Brian Geyer.

[6] This course was taught by Helen Veit of the Michigan State Department of History and supported by History PhD student Liz Timbs.

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