Models for DH at Liberal Arts Colleges (& 4 Yr Institutions)

Angel David Nieves
Janet Thomas Simons
Welcome to DHSI 2018!

Thanks for joining the DHSI community!

In this booklet, you will find essential course materials prefaced by some useful information about getting settled initially at UVic, finding your way around, getting logged in to our network (after you’ve registered the day before our courses begin), and so on.

Given our community’s focus on things computational, it will be a surprise to no one that we might expect additional information online for some of the classes - your instructors will let you know - or that the most current version of all DHSI-related information may be found on our website at dhsi.org.

To access the DHSI wifi network, simply go into your wireless settings and connect to the “DHSI” network and enter the password “dhsi2018”.

And please don’t hesitate to be in touch with us at institut@uvic.ca or via Twitter at @AlyssaA_DHSI or @DHInstitute if we can be of any help ....
The 2018 schedule is just about ready! A very few things to confirm, add, etc, but this is the place to be to find out what is happening when / where ...

Psst: Some Suggested Outings

If you're here a day or two before we begin, or staying a day or two afterwards, here are a few ideas of things you might consider doing ....

▼ Suggested Outing 1, Botanical Beach (self-organised; car needed)

A self-guided visit to the wet, wild west coast tidal shelf (and historically-significant former research site) at Botanical Beach; we recommend departing early (around 8.00 am) to catch low tide for a better view of the wonderful undersea life! Consider bringing a packed lunch to nibble-on while looking at the crashing waves when there, and then have an afternoon drink enjoying the view from the deck of the Port Renfrew Hotel.

▼ Suggested Outing 2, Butchart Gardens (self-organised)

A shorter journey to the resplendently beautiful Butchart Gardens and, if you like, followed by (ahem) a few minutes at the nearby Church and State Winery, in the Saanich Peninsula. About an hour there by public bus from UVic, or 30 minutes by car.

▼ Suggested Outing 3, Saltspring Island (self-organised; a full day, car/bus + ferry combo)

Why not take a day to explore and celebrate the funky, laid back, Canadian gulf island lifestyle on Saltspring Island. Ferry departs regularly from the Schwartz Bay ferry terminal, which is about one hour by bus / 30 minutes by car from UVic. You may decide to stay on forever ....

▼ Suggested Outing 4, Paddling Victoria's Inner Harbour (self-organised)

A shorter time, seeing Victoria's beautiful city centre from the waterways that initially inspired its foundation. A great choice if the day is sunny and warm. Canoes, kayaks, and paddle boards are readily rented from Ocean River Adventures and conveniently launched from right behind the store. Very chill.

And more!

Self-organised High Tea at the Empress Hotel, scooter rentals, visit to the Royal BC Museum, darts at Christies Carriage House, a hangry breakfast at a local diner, whale watching, kayaking, brew pub sampling (at Spinnaker's, Swans, Moon Under Water, and beyond!), paddle-boarding, a tour of used bookstores, and more have also been suggested!

Sunday, 3 June 2018 [DHSI Registration + Suggested Outings]

9:00 to 4:00

▼ Early Class Meeting: 4. [Foundations] DH For Department Chairs and Deans (Hickman 120, Classroom)

Further details are available from instructors in mid May to those registered in the class. Registration materials will be available in the classroom.

3:00 to 5:00

DHSI Registration (MacLaurin Building, Room A100)

After registration, many will wander to Cadboro Bay and the pub at Smuggler's Cove OR the other direction to Shelbourne Plaza and Maude Hunter's Pub OR even into the city for a nice meal.

Monday, 4 June 2018

Your hosts for the week are Alyssa Arbuckle, Ray Siemens, and Dan Sondheim.

7:45 to 8:15

Last-minute Registration (MacLaurin Building, Room A100)

8:30 to 10:00

Welcome, Orientation, and Instructor Overview (MacLaurin A144)
10:15 to Noon

Lunch break / Unconference Coordination Session (MacLaurin A144, Classroom)
Chair: Alyssa Arbuckle (U Victoria)
Institute Panel: Perspectives on DH (or, #myDHis …)
Undergraduate Meet-up, Brown-Bag (details via email)

1:30 to 4:00

Classes in Session

1:30 to 4:00

Institute Panel: Perspectives on DH (or, #myDHis …)
Chair: Alyssa Arbuckle (U Victoria)
(MacLaurin A144)

Milena Radzikowska (Mt Royal C): "Release the Kraken: Story-Driven Prototyping for the Digital Humanities."
Abstract: I have spent the last 15 years of my career designing text analysis tools for use by humanities scholars. In this brief presentation, I propose to share a concept-based approach to interface design for DH.

Emily Murphy (U Victoria): "#MyDHis Edgy."
Abstract: I will build upon—or, possibly, perform a misprision of—a tweet by Polina Vinogradova; "#myDHis messy, dusty, edgy, and radically inclusive!" Vinogradova evokes the mess and dust of the archives, the edges that connect nodes of a network, and the political impetus to think of cultural history and community together. I argue that these aspects of DH have a renewed importance as we head into a moment of feminist historiography.

Margaret Konkol (Old Dominion U): "Prototyping Mina Loy’s Alphabet with a 3D Printer.”
Abstract: This talk discusses the interpretive and methodological implications of using 3D printing technologies to prototype the archival diagrams of a proposed but never constructed plastic segmental alphabet letter kit—a game designed by modernist poet Mina Loy for F.A.O. Schwarz. Although intended as a toy for young children, “The Alphabet that Builds Itself,” as a work of “object typography” articulates a theory of language as kinetic, geometric, recombinant, and open to mutation. Alphabetic segments extend into the x, y, and z coordinates in exponential iterations and conjoin with magnets. Combining elements of contemporaneous typefaces like Futura and Gill Sans, which represented modernity’s functional ideals and democratic principles of simplicity, these recombinant letters represent, as this talk argues, Loy’s unpublished modernist poem, an articulation of Loy’s concept of language as a physical fact in which substance, not just form, is semantic.

Lee Zickel (Case Western Reserve U): "Comfortably Trepid."
Abstract: #myDHis found outside the well-established, DH-friendly institutions, at an institution that is devoted predominantly to Medicine and Engineering. I, and with increasing frequency other DH practitioners and instructors, am not positioned in a DH Lab or Humanities Center, but in ITS. Part teacher, part technologist, part translator, I will briefly discuss my work supporting humanities and social scientists, particularly those who are new to or less comfortable with computational methodologies.

Dorothy Kim (Vassar C): 
"#MyDHis Antifascist."
Abstract: I've spent a lot of time in the last 12 months thinking about fascism, digital humanities, its long histories, and what it means to do DH work that centers social justice particularly in this global rise of late fascism. I will speak briefly about DH’s history, including the medieval history related to Busa but how that history really connects to data systems that created the Holocaust and also participated in the Cold War nuclear military complex.
### Tuesday, 5 June 2018

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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>5:00 to 6:00</td>
<td>Opening Reception (University Club)</td>
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<td>We are grateful to Gale Cengage for its sponsorship.</td>
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<tr>
<th>9:00 to Noon</th>
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<td>DHSI Lunchtime Workshop Session (click for workshop details and free registration for DHSI participants)</td>
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<tr>
<td>4:15 to 5:15</td>
<td>DHSI Colloquium Lightning Talk Session 1 (MacLaurin A144)</td>
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<td>Chair: James O'Sullivan</td>
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<td>• New Modes of DH and Archival Skills Acquisition in a Graduate Public History Course. Paulina Rousseau (Ryerson U)</td>
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<td>• Walking a Transect: Exploring a Soundscape. John Barber (Washington State U)</td>
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<td>• Centering the Edge Case: Designing Services for Humanities Data Research. Grace Afsari-Mamagani (New York U)</td>
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<td>• Orwellian Vocabulary and the 21st-Century Politics. Ilgin Kizilgunesler (U Manitoba)</td>
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<td>• Making Open Data from a Gray Archive. Sara Palmer (Emory U)</td>
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<td>6:00 to 8:00</td>
<td>DHSI Newcomer's Beer-B-Q (Felicitas, Student Union Building)</td>
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### Wednesday, 6 June 2018

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<td>&quot;Mystery&quot; Lunches</td>
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<td>Brown Bag Lecture: Alexandra Branzan Albu (U Victoria): &quot;Visual Recognition of Symbolic and Natural Patterns&quot; (Digital Scholarship Commons, 3rd Floor McPherson Library)</td>
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<td>Abstract: Image-based object recognition is a visual pattern recognition problem; one may characterize visual patterns as either symbolic or natural. Symbolic patterns evolved for human communication; they include but are not limited to text, forms, tables, graphics, engineering drawings etc. Symbolic patterns vary widely in terms of size, style, language, alphabet and fonts; however, literate humans can easily compensate for this variability and instantly recognize most symbolic patterns. On the other hand, natural patterns characterize images of physical structures; they often lack the intrinsic discriminability and structure of symbolic patterns, and vary widely in terms of pose, perspective, and lighting. This lecture will explore similarities and differences in approaches designed for recognizing visual and symbolic patterns, and will address the following questions via examples.</td>
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<td>- What are the distinctive characteristics of natural patterns? What dimensions of variability can we infer?</td>
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Alexandra Branzan Albu is an Associate Professor with the Department of Electrical and Computer Engineering and cross-listed with Computer Science. Her research interests are related to image analysis, computer vision, and visual computing. She is actively pursuing outreach activities dedicated to increasing the women's presence in electrical engineering and computer science.
4:15 to 5:15

- Defining a Taxonomy of Abandonment for Online Digital Humanities Projects. Luis Meneses (Electronic Textual Cultures Lab, U Victoria) and Jonathan Martin (King’s College London)
- The Stories We Tell: Representing Gay and Lesbian History through Digital Technologies in the GLLC Project. Nadine Boulay (Simon Fraser University) and Ewan Matthews (Ryerson U)
- Italian Paleography in the Digital Domain. Isabella Magni (Newberry Library)
- Digital Humanities, A Question of Ethics. Negar Basiri (Louisiana State U)
- Writing Poetry in High School. Guadalupe Echegoyen (National Autonomous U Mexico)

6:00 to 7:00

"Half Way There!" [An Informal, Self-Organized Birds of a Feather Get-Together] (Felicitas, Student Union Building)
Bring your DHSI nametag and enjoy your first tipple on us!

Thursday, 7 June 2018

9:00 to Noon
Classes in Session

12:15 to 1:15
UVIC Library/ETCL lunchtime talk: “A Humanities Application of 3D printing and Machine Translation in the ChessBard and Loss Sets” by Dr. Aaron Tucker
Digital Scholarship Commons, 3rd floor, Mearns Centre for Learning / McPherson Library
Bring your lunch and come on up!)

1:30 to 4:00
Classes in Session

4:15 to 5:15

- Documenting Deportation: A Collaborative Digital Collection. Paulina Rousseau (Ryerson U)
- Unleashing the Power of Texts as Networks: Visualizing the Scholastic Commentaries and Texts Archive. Jeffrey Witt (Loyola U Maryland) and Drew Winget (Stanford U)
- #haunteDH: Punching holes in the International Busa Machine Narrative. Arun Jacob (McMaster U)
- Text in World: Computational Analysis of Trauma in Genocide Narratives. Nanditha Narayanaamoorthy (U York) and Krish Perumal (U Toronto)

7:30 to 9:30
(Groovy?) Movie Night

Friday, 8 June 2018 [DHSI; DLFxDHSI Opening]

9:00 to Noon
DHSI Classes in Session

12:15 to 1:15
DHSI Lunch Reception / Course E-Exhibits (MacLaurin A100)

1:00 to 2:00
DLFxDHSI Registration (MacLaurin A100)

1:30 to 1:50
[DHSI] Remarks, A Week in Review (MacLaurin A144)

2:00 to 3:00

- Joint Institute Lecture (DHSI and DLFxDHSI):
Bethany Nowviskie (CLIR DLF and U Virginia): "Reconstitute the World: Machine-reading Archives of Mass Extinction"
Chair: Lisa Goddard (U Victoria)
(MacLaurin A144)
Abstract: The basic constitution of our digital collections becomes vastly more important in the face of two understandings: first, that archives of modernity are archives of the sixth great mass extinction of life on our planet; and next, that we no longer steward cultural heritage for human readers alone. In the same way that we people are shaped by what we read, hear, and see, the machine readers that follow us into and perhaps beyond the Anthropocene have begun to learn from "unsupervised" encounters with our digital libraries. What will we preserve for the living generations and artificial intelligences that will come? What do we neglect, or even choose to extinguish? And from an elegiac archive, a library of endings, can we create forward-looking, speculative collections—collections from which to deep-dream new futures? The most extra/ordinary power we possess is the power to make poetry from records of the past. Could it be called on, one day, to reconstitute the world?
Joint Reception: DSHI and DLFxDHSI (University Club)
DLFxDHSI Poster/Demo Session
- DHSI Colloquium Poster/Demo Session
  - Mediators as a Colonialist Artifact in Menzies’ Journal. Paula Johanson (U Victoria)
  - Camp Edit: the Institute for the Editing of Historical Documents. Nikolaus Wasmoen (Association for Documentary Editing, U Buffalo), Jennifer Stertzer (Association for Documentary Editing, U Virginia), and Cathy Moran Hajo (Association for Documentary Editing, Ramapo C)
  - A Digital Archaeology of Life in Cleveland's Depression-Era Slums. Charlie Harper (Case Western Reserve U) and Jared Bendis (Case Western Reserve U)
  - Feminist Pest Control: controlling and not controlling nonhuman pests. Lindsay Garcia (C of William and Mary)
  - Legends of the Buddhist Saints. Jonathan S. Walters (Whitman C) and Dana Johnson (Freelance Web Developer)
  - Accessibility in Digital Environments Via TEI-Encoded Uncontracted Braille. Gia Alexander (Texas A&M U)
  - Translation3point0: Why Literary Translation Data Matters. Katie King (U Washington)
  - PoéticaSonora: A Digital Audio Repository Prototype for Latin American Sound Art and Poetry. Aurelio Meza (Concordia U)
  - Beauty and the Book: Pre-Raphaelite Artistic Practice Contained. Josie Greenhill (U Victoria)
  - Poetic Procedures/Digital Deformances. Corey Sparks (California State U, Chico)
  - Miranda, the Folger Shakespeare Library's new Digital Asset Platform. Meaghan Brown (Folger Shakespeare Library)
  - Living Song Project. Quinn Patrick Ankrum (U Cincinnati) and Elizabeth Avery (U Oklahoma)
  - Digital Frankenstein Variorum. Rikk Mulligan (Carnegie Mellon U)

9:00 to 5:00
DHSI Colloquium Day Conference (MacLaurin A144)
Welcome
People I: Documenting Online Lives. Chair: Molly Nebiolo (University of New York)
  - Examining Gendered Harassment Online and in Silicon Valley. Andrea Flores (Ulta College)
  - This is Just to Say I Have <X> the <Y> in your <Z>: Modernist Memes in an Era of Public Apology. Shawna Ross (Texas A&M University)
Break
People II: Documenting Lives Online. Chair: Dheepa Sundaram (College of Wooster)
  - Youtube Yoga and Ritual on Demand: The Virtual Economics of Hindu Soteriology. Dheepa Sundaram (College of Wooster)
  - The Resemblage Project: Creativity and Digital Health Humanities in Canada. Andrea Charise (University of Toronto) and Stefan Krecsy (University of Toronto)
Lunch
Projects I: Building and Analyzing. Chair: Yannis Rammos (New York University)
  - Building the ARTECHNE Database: New directions in Digital Art History. Marieke Hendriksen (Old Dominion University)
  - The Ineffective Inquisition: The Holy Office’s Sphere of Influence in Early Modern New Spain. Kira Homo (Pennsylvania State University)
Break
Projects II: Mapping and Visualizing. Chair: Innocent Opara (Qumet Institute)
  - Mapping Sarah Sophia Bank’s Numismatic Collection. Erica Hayes (North Carolina State University) and Kacie Wills (University of California, Riverside)
  - Text Mining and Visualizing 18th Century American Correspondence. Ashley Sanders Garcia (University of California, Los Angeles)
Break
Practices: Digital Scholarship on Campus and in the Classroom. Chair: Alyssa Arhuckle (University of Victoria)
Concluding Remarks

Sunday, 10 June 2018 [SINM + DHSI Registration, Workshops]

8:30 to 9:00  Symposium on Indigenous New Media Registration (MacLaurin A100)

9:00 to 5:00  DHSI Registration (MacLaurin A100)

9:00 to 4:00  ▼ SINM Sessions

   • 63. Symposium on Indigenous New Media: Reading Group (Hickman 105, Classroom)
   • 72. Symposium on Indigenous New Media: Indigitization (Hickman 120, Classroom)
   Full details here

9:00 to 4:00  ▼ DHSI All Day Workshop Sessions  (click for workshop details and free registration for DHSI participants)

   • 53. Building Your Academic Digital Identity (MacLaurin D105, Classroom)
   • 54. An Introduction to the Archaeology of 1980s Computing (MacLaurin D114, Classroom)

9:00 to Noon  ▼ DHSI AM Workshop Sessions  (click for workshop details and free registration for DHSI participants)

   • 55. Regular Expressions (MacLaurin D111, Classroom)
   • 56. 3D Visualization for the Humanities (MacLaurin D1010, Classroom)
   • 58. DH Fieldwork Methods (MacLaurin D016, Classroom)
   • 60. Pedagogy of the Digitally Oppressed: Inculcating De-/Anti-/Post-Colonial Digital Humanities (MacLaurin D107, Classroom)
   • 61. Introduction to #GraphPoem. Digital Tools for Poetry Computational Analysis and Graph Theory Apps in Poetry (MacLaurin D101, Classroom)
   • 62. Creating a CV for Digital Humanities Makers (MacLaurin D115, Classroom)

1:00 to 4:00  ▼ DHSI PM Workshop Sessions  (click for workshop details and free registration for DHSI participants)

   • 64. Agent-Based Modelling in the Humanities (MacLaurin D111, Classroom)
   • 65. Unleash Linux on MacOS (MacLaurin D010, Classroom)
   • 66. DHSI Knits: History of Textiles and Technology (MacLaurin D016, Classroom)
   • 67. Crowdsourcing as a Tool for Research and Public Engagement (MacLaurin D109, Classroom)
   • 69. Web Annotation as Critical Humanities Practice (MacLaurin D103, Classroom)
   • 70. Dynamic Ontologies for the Humanities (MacLaurin D107, Classroom)
   • 71. Social Media Research in the Humanities (MacLaurin D101, Classroom)

4:10 to 5:00  ▼ Joint Institute Lecture (DHSI and SINM):

David Gaertner (U British Columbia): "A Landless Territory?: CyberPowWow and the Politics of Indigenous New Media."
Chair: Deanna Reder (Simon Fraser U) (MacLaurin A144)

Abstract: Following the 1997 launch of Skawennati’s (Mohawk) CyberPowWow, digital space has become a vital new territory for the resurgence of indigenous storytelling and cultural practice: "We have signed a new treaty," Cree artist Archer Pechawis wrote of this period, "and it is good. We have the right to hunt, fish, dance and make art at www.CyberPowWow.net, .org and .com for as long as the grass grows and the rivers flow." This talk will critically explore the theoretical, cultural, political-economic, and gendered dynamics underlying the histories and futures of indigenous new media. Particular attention will be given in examining the ways in which new media and digital storytelling connect to and support key issues in the field of Indigenous studies, such as sovereignty, self-determination, decolonization, and land rights.

After the day, many will wander to Cadboro Bay and the pub at Smuggler's Cove OR the other direction to Shelbourne Plaza and Maude Hunter's Pub OR even into the city for a bite to eat.

Monday, 11 June 2018 [DHSI + SINM]
Your hosts for the week are Ray Siemens and Dan Sondheim.

7:45 to 8:15
DHSI Last-minute Registration (MacLaurin A100)

8:30 to 10:00
DHSI Welcome, Orientation, and Instructor Overview (MacLaurin A144)

9:00 to 4:00
SINM Sessions

- DHSI Classes in Session (click for details and locations)
  - 29. [Foundations] Models for DH at Liberal Arts Colleges (& 4 yr Institutions) (MacLaurin D109, Classroom)
  - 32. Stylometry with R: Computer-Assisted Analysis of Literary Texts (Clearihue A102, Lab)
  - 33. Digital Storytelling (MacLaurin D111, Classroom)
  - 34. Text Mapping as Modelling (Clearihue D131, Classroom)
  - 35. Geographical Information Systems in the Digital Humanities (Clearihue A105, Lab)
  - 36. Open Access and Open Social Scholarship (MacLaurin D115, Classroom)
  - 37. Introduction to Machine Learning in the Digital Humanities (Cornett A229, Classroom)
  - 38. Queer Digital Humanities: Intersections, Interrogations, Iterations (MacLaurin D110, Classroom)
  - 41. Using Fedora Commons / Islandora (Human and Social Development A160, Lab)
  - 42. Documenting Born Digital Creative and Scholarly Works for Access and Preservation (MacLaurin D115, Classroom)
  - 43. Games for Digital Humanists (MacLaurin D016, Classroom & Human and Social Development A170, Lab)
  - 44. XPath for Document Archeology and Project Management (Cornett A128, Classroom)
  - 46. Surveillance and the Digital Humanities (MacLaurin D103, Classroom)
  - 47. Test Analysis with Python and the Natural Language ToolKit (Clearihue A103, Lab)
  - 48. Information Security for Digital Researchers (Clearihue D130, Classroom)
  - 49. Wrangling Big Data for DH (Human and Social Development A150, Lab)
  - 50. Accessibility & Digital Environments (MacLaurin D101, Classroom)
  - 51. Critical Pedagogy and Digital Praxis in the Humanities (MacLaurin D105, Classroom)
  - 52. Drupal for Digital Humanities Projects (MacLaurin D107, Classroom)

10:15 to Noon
Lunch break / Unconference Coordination Session (MacLaurin A144)
(Grab a sandwich and come on down!)
DHSI Undergraduate Meet-up, Brown-Bag (details via email)

12:15 to 1:15
DHSI Classes in Session

- Joint Institute Lecture (DHSI and SINM):
  Jordan Abel (Simon Fraser U): "Indigeneity, Conceptualism, and the Borders of DH."
  Chair: Michelle Brown (U Hawaii)
  (MacLaurin A144)

4:10 to 5:00
Joint Reception: DHSI and SINM (University Club)

Tuesday, 12 June 2018

9:00 to Noon
Classes in Session

Lunch break / Unconference
"Mystery" Lunches
- DHSI Lunchtime Workshop Session (click for workshop details and free registration for DHSI participants)

12:15 to 1:15
- 73. Introduction to ORCID (Digital Scholarship Commons, Classroom).
Wednesday, 13 June 2018

1:30 to 4:00  Classes in Session

4:15 to 5:15  DHSI Colloquium Lightning Talk Session 4  (MacLaurin A144)
  Chair: Lindsey Seatter
  - Mapping Indigenous and Chicana/o Environmental Imaginaries using GIS. Stevie Ruiz (California State U, Northridge), Quetzalli Enrique (California State U, Northridge), Enrique Ramirez (California State U, Northridge), and Tomas Figueroa (California State U, Northridge)
  - Doing DH with Graphic Narratives. John Barber (Washington State U)
  - “But is it any good?”: A quantitative approach to the popularity of digital fanfiction. Suzanne Black (U Edinburgh)
  - The American Prison Writing Archive (APWA). Doran Larson (Hamilton C), Janet Simons (Digital Humanities Initiative, Hamilton C), and William Rasenberger (Hamilton C)

6:00 to 8:00  DHSI Newcomer's Beer-B-Q  (Felicitas, Student Union Building)

Thursday, 14 June 2018

9:00 to Noon  Classes in Session

12:15 to 1:15  Lunch break / Unconference
  "Mystery" Lunches

1:30 to 4:00  Classes in Session

4:15 to 5:15  DHSI Colloquium Lightning Talk Session 5  (MacLaurin A144)
  Chair: Lindsey Seatter
  - Faraway, so close: Has the political environment really changed in Ecuador?. Luis Meneses (Electronic Textual Cultures Lab, U Victoria)
  - Re-mixing Melville’s Reading: Text Analysis of Marginalia with R and XSLT. Christopher Ohge (U London, School of Advanced Study) and Steven Olsen-Smith (Boise State U)
  - Developing Interactive and Open-Source OER: Inquiry-Based Music Theory. Evan Williamson (U Idaho)
  - Spatial Humanities and the Web of Everywhere. Ken Cooper (SUNY Geneseo)

6:00 to 7:00  "Half Way There (yet again)!”  [An Informal, Self-Organized Birds of a Feather Get-Together]  (Felicitas, Student Union Building)
  Bring your DHSI nametag and enjoy your first tipple on us!

Friday, 15 June 2018

9:00 to Noon  Classes in Session

12:15 to 1:15  Lunch Reception / Course E-Exhibits  (MacLaurin A100)

4:15 to 5:15  DHSI Colloquium Lightning Talk Session 6  (MacLaurin A144)
  Chair: Lindsey Seatter
  - Composition not Inheritance: Imagining a Functional Digital Humanities. Andrew Pilsch (Texas A&M U)
  - Plotting Our Trajectories: Navigating, Situating, and Re-Inventing Research Topoi with R. Sean McCullough (Texas Christian University) and Jongkeyong Kim (Texas Christian U)
  - Herb Simon and His Books. Avery Wiscomb (Carnegie Mellon U) and Daniel Evans (Carnegie Mellon U)
  - (De/Re)Defining “The Digital”: A Decolonial Approach to Digital Humanities. Ashley Caranto Morford (U Toronto) and Arun Jacob (McMaster U)

7:30 to 9:30  (Groovier?) Movie(r) Night  (MacLaurin A144)
(MacLaurin A144)

Abstract: Much has changed and continues to change in digital humanities since the formal establishment of Iter in the Fall of 1997. However, the mandate of the not-for-profit partnership to support "the advancement of learning in the study and teaching of Middle Ages and Renaissance (400–1700) through the development and distribution of online resources" continues to have relevance. This presentation explores the striking challenges faced by Iter and presents our current thinking on the realization of this mandate for the future through a platform with a focus on facilitating the discovery of the academic resources necessary to our work; creating an environment for collaboration, sharing and developing projects; and on enabling the distribution and publication of our scholarship.

Awards and Bursaries Recognition
Closing, DHSI in Review (MacLaurin A144)

Contact info: institut@uvic.ca P: 250-472-5401 F: 250-472-5681
Models for DH at Liberal Arts Colleges (& 4 Yr. Institutions)
Instructors: Simons (jsimons@hamilton.edu) & Nieves (anieves@hamilton.edu)
DHSI 2018, University of Victoria, BC

Monday, June 11, 2017
Morning:
● Introductions
  o Where are you located in the organizational chart of your institution?
  o Where is digital humanities/digital scholarship located? Library? Academic Affairs?
  o Describe your goals, opportunities & challenges
● DH at Liberal Arts Colleges?
  o DHi @ Hamilton College (see, http://www.dhinitiative.org)
  o Categories of DH models with examples

Afternoon:
● Small Group Exercise: Describe the status of DH/DS at your institution?
● Report out and cerate common themes for course week
● DH project planning begins

Readings:
2. Lippincott, “Digital Scholarship Centers ...”
3. Presner, “The Promise of Digital Humanities ...”
4. Unsworth, “What is Humanities Computing ...”

Tuesday, June 12, 2017 Morning:
● LAC Digital Pedagogy – Examples https://digitalpedagogy.mla.hcommons.org/
  o Discussion groups on readings
    ▪ Course Ideas?
● LAC Undergraduate Digital Scholarship – Examples
  o Discussion groups on readings
    ▪ Project Ideas?

Afternoon:
● Small Group Exercise: Brainstorm goals you wish to achieve
  o Potential Examples:
    ▪ A research project integrating undergraduate students so that they own a component of the research
    ▪ A course redesign, program or curricular design
    ▪ A DH/DS center
• Large Group Discussion: Similarities/differences among projects? Resource/Support needs for these projects? Timelines for the projects?
• Innovation and Preservation – When? What? How?

Readings:
1. Roy, “Either/Or? Both/And? Difficult Distinctions within the DH …”
2. Siemens, ‘It’s a team if you use “reply all” …’

Wednesday, June 13, 2017 Morning:
• DH Awards: http://dhawards.org
• Characteristics of archive based DH research projects with examples
  o resource and support needs
• Grant Writing & Publishing
• Promotion and Tenure Considerations and Resources

Afternoon:
• Concurrent/Switch Activities
  o Situation based consulting with small groups – What do you wish to know about DH/DLA projects and who/where might you obtain answers/solutions?
  o Games & Game Play - Gam Jam at Hamilton Spring 2018
  o Toolkit independent explorations – what might you try and why?
• Report Out – Common themes in consulting questions and feedback on toolkit explorations and game points!

Readings:
2. Salen, “Games as Narrative Play,” Rules of Play …
3. Taylor, “Organization of Recorded Information …”
4. Van Eck, “Digital Game Based Learning …”
5. Please review UFlorida’s site: http://digitalhumanities.group.ufl.edu/dh-uf/tenure-promotion/

Thursday, June 14, 2017 Morning:
• Program and Center Level DH
  o Examples
• Small Group Exercise:
  o Common Characteristics?
  o Opportunities? Challenges?
Afternoon:

- Concurrent/Switch Activities
  - Situation based consulting with small groups – What do you wish to know about DH/DLA projects and who/where might you obtain answers/solutions?
  - Project development
    - Elevator pitch
    - One year Project plan with timeline and examples

Readings:

1. Koh, “A Letter to the Humanities ...”

Friday, June 15, 2017

Morning:

- Project time with consulting available
- Development of Final Presentations

Afternoon:

- Elevator Pitches to Deans and Chairs Members
- One year plan
  - Questions and Answers
DH/DS/DLA Institutional Structures and Models:
- Bucknell Digital Scholarship Center - http://dsc.bucknell.edu/
- Behrend at Pennsylvania State University http://behrend.psu.edu/school-of-humanities-social-sciences/academic-programs/digital-media-arts-and-technology
- College of Wooster - http://www.wooster.edu/academics/research/
- Dartmouth Digital Humanities - http://digitalhumanities.dartmouth.edu/
- Dickinson College DH - http://www.dickinson.edu/homepage/305/digital_humanities
- Hamilton College DHi - http://dhinitiative.org/
- Hope College Mellon Scholars Program - http://www.hope.edu/academics/mellon-scholars/
- Occidental College CDLA - http://www.oxy.edu/center-digital-liberal-arts
- Ohio Five Digital Scholarship & Pedagogy - https://digital scholarship.ohio5.org/
- St. Olaf’s DHH https://wp.stolaf.edu/dh/
- Tri-Co Digital Humanities (Bryn Mawr, Haverford, Swarthmore) - http://tdh.brynmawr.edu/
- UNC Digital Innovation Lab - http://digitalinnovation.unc.edu/
- UVa Scholars’ Lab - http://scholarslab.org/
- Washington and Lee DH@W&L- https://digitalhumanities.wlu.edu/
- Western University, London, Canada http://www.uwo.ca/arts/digitalhumanities/
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 (DHi) at Hamilton College was conceived as one possible model of supporting digital humanities scholarship at a liberal arts institution. The DHi model relies heavily on collaboration among different teams in the Library and Information Technology Services across campus, and with institutions across the United States. DHi also has international partnerships that promote its goals in research, learning, and public humanities. This chapter will describe the various collaborations of DHi and offer suggestions for how others can implement similar support models at their institutions.

DOI: 10.4018/978-1-5225-0323-1.ch002
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
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). 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.
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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
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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)
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).

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.
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
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 Congress) 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
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. 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,
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
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
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. 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.
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, DH i 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. 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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### ADDITIONAL READING


Collaborations in Liberal Arts Colleges in Support of Digital Humanities

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.
CNI Workshop Report
Digital Scholarship Centers: Trends & Good Practice
Joan K. Lippincott and Diane Goldenberg-Hart, Coalition for Networked Information

Introduction/Overview

The Coalition for Networked Information’s Digital Scholarship Centers Workshop, held on April 2, 2014 in St. Louis, Missouri, brought together individuals representing a variety of centers in order to identify good practice and key challenges. Workshop attendees included 35 participants from 24 institutions, including some from research universities and some from liberal arts colleges. CNI’s Executive Director Clifford Lynch welcomed them and noted that they represented the forefront of an emerging phenomenon in higher education institutions. The majority of attendees were from academic libraries (including individuals with a wide variety of titles); others included faculty, information technologists, academic staff, and one graduate student. This report summarizes the workshop itself; in addition, CNI has developed a website that includes profiles of each center represented at the workshop and the presentations by speakers at the program. In order to participate in the workshop, each institution completed a template with information about their program, describing the center’s mission, an example of a project supported by the center, the services offered, the types of staff in the center, and links to the center’s homepage and projects; these are available on the workshop website (www.cni.org/go/cni-dsc-workshop-2014/).

One of the key points of discussion throughout the workshop was how to conceive of a digital scholarship center (DSC); there were varying points of view about the definition, purpose, and characteristics of such centers. Often DSCs are compared to or assumed to be the same as digital humanities centers. Almost all of the centers represented at this workshop were located in libraries in colleges or universities while digital humanities centers are typically located in academic departments. A major advantage of housing a center in the library is that it provides a mechanism for the democratization of expensive technologies and a means to experiment with new forms of scholarship without making a personal or departmental monetary investment. A few of the centers represented at the workshop focus on humanities projects, but most work with a wide array of disciplines in the humanities, social sciences, and, in some cases, sciences. Joan Lippincott, Associate Executive Director of CNI and workshop facilitator, seeded the discussion with a comparison of DSCs versus digital humanities centers. Lippincott posited that DSCs have a different administrative home (e.g. the library), wider set of clientele, a service mission, and often a broader disciplinary focus than digital humanities centers. The challenges to that point of
view centered more on what a DSC is than on the distinctions between that type of organization and a digital humanities center. A primary point of contention was referring to what centers offer as “services” rather than “partnerships,” “expertise,” or other terminology that did not suggest that the center staff was there to “serve.” While definitional questions surfaced throughout the workshop, the primary purpose of the event was to understand what is actually happening on the ground in institutions today. CNI plans to hold a discussion in the future that will focus on the definitional aspects of DSCs.

Over the past few years, CNI has included presentations about DSCs (also sometimes called digital scholarship labs, research commons, or other variations) at membership meetings and has promoted discussion of this emerging trend to support digital scholarship through a coordinated set of services, often in a physical space in an institution’s library. As research practices are changing to incorporate new technologies and tools, some institutions have found that creating a center to support digital scholarship in a centralized place like the library can have benefits for the institution. Many DSCs serve a wide range of disciplines (not just humanities), provide expensive hardware, software, and tools for all members of the campus community, and offer expertise and a program of support for both novices and experts. Some of the high-end technologies may exist elsewhere on campus but are often restricted to members of a institute or lab or a particular department or school. When libraries offer these technologies, they provide a means for a wide spectrum of individuals and teams to use new tools and technologies and also encourage cross-disciplinary use of those resources, thereby promoting campus-wide innovation in research, teaching, and learning. These centers make it much more possible for those without research grants (whether faculty, graduate students, or undergraduates working on capstone projects), for example, to employ new types of tools in their research.

At the workshop, a number of participants were invited to give brief presentations on a topic (establishing a center, working with constituencies, services and staffing, and teaching and learning) and then all participants were encouraged to add their perspectives. This report summarizes the points made in these presentations and discussions; presentation materials are available on the workshop website.

**Establishing a Center**

Regardless of how they developed, a striking commonality of almost all of the centers represented at the workshop was that they were located in a library and had a strong library presence. A small number of centers represented at the workshop date back to the 1990’s, but many are relatively new. Some resulted from disparate departmental or school programs merging into larger, formalized centers, others were established as new entities. Just as their longevity and origins vary, numerous factors contribute to the establishment of DSCs depending upon the institution, including things like influential champions, partnerships between faculty and librarians, new leadership within the library, and growing awareness of the kinds of skills graduates would need upon entering the workforce. Sometimes a DSC is established in the library because it is seen as a growth area by the
library, or in some cases, researchers or students themselves identify the library as a potential resource for the kinds of services they seek. One center was established by a task force whose members included library staff, representatives from the institution’s central information technology (IT) unit, faculty, and graduate students.

Workshop participants identified these additional factors that led to the establishment of a center at their institution:

- Growing awareness of students graduating without necessary skills, and competition with peer institutions providing relevant training. One center was founded specifically because the university was losing graduate students to other institutions that were providing digital scholarship services and learning opportunities.
- An assessment conducted by the university determined the need for an operation that could offer a suite of services for digital scholarship.
- New construction at the institution offered the opportunity to build a DSC.
- A major infusion of funds led to the center’s establishment.
- Reallocation of existing resources enabled a DSC to come into being.

**Working with Constituencies: Successful Collaborations and Relationships**

For many workshop participants, engagement with constituents as partners, not as clients, has been key to success and growth; several attendees expressed the need to move away from the legacy “client” model because a partnership model has been more likely to lead to positive, sustainable results. Being alert to the particular factors impacting the institution and the “on the ground reality” within the organization has been a key factor in establishing centers where staff and constituents have effectively collaborated with one another. Some institutions lack good pathways or mechanisms to reach certain sectors of the campus community, whereas at others, outreach has been relatively straightforward; overall, communication strategies have depended upon the culture of the organization. While outreach has been important, it has been also critical to have a plan for sustainability and follow-through in order to avoid a disaffected constituency. Planning a course of action for each stage of the process can help avoid trouble down the road.

Beyond the importance of long-term planning, making contact with constituents has been vital to success. There are many ways to reach target audiences, but workshop participants recounted how, literally, going to where potential constituents are, and meeting them there, has been a particularly effective strategy for getting their attention and winning their trust. Attending departmental talks and parties, and engaging with faculty substantively, has helped center staff establish credibility. Some centers have encouraged student involvement by enlisting their assistance: hiring a graduate student to organize an event, for example, or inviting an undergraduate to speak to peers about the center and its work have been very effective ways to reach those populations.

At the University of Virginia, the year-long Praxis Program, run by the Library’s Scholars’ Lab, is a library-funded fellowship, developed to have similar characteristics and remuneration as
other departmental fellowships, that serves as an introduction to digital humanities for students with varied backgrounds and at different stages of their graduate careers. Programs like Praxis have helped to foster both the community of fellows it supports, as well as the center staff, who eventually come to regard the program participants, whom they mentor, as colleagues. The Praxis Fellows have helped disseminate information about digital projects and the work of the Scholars’ Lab to faculty and other graduate students in their home departments.

Some suggestions regarding building successful relationships shared by workshop participants, based on their own experiences and observations were:

• Make outreach relevant to faculty priorities and demonstrate understanding of the stressors faculty face. Be aware that there are substantive reasons why faculty can be difficult to reach, including the fact that, increasingly, there are fewer tenured faculty available to do the work required of them.
• Other people count, too: faculty can bring in great ideas, but so can many others, including staff, students, librarians, etc. Centers should support those research agendas as well.
• Some centers elect to discontinue relationships with faculty who seek a service provider, infrastructure, labor and/or space, but have no firmly formulated research objective or interest in genuine partnership.
• In talking about potential projects with faculty, it is useful to begin with a substantive conversation regarding scope; this kind of dialog also helps determine if there is a different place on campus better suited for the project.
• Look for opportunities to partner with faculty within stages of the research cycle: one institution communicates directly to researchers what they offer relative to where they are in their cycle.
• Faculty who want to educate their graduate students about digital scholarship present ideal opportunities because they know center staff can fulfill this teaching and training need. Collaborating with faculty to design a curriculum ideally suited to the students’ needs can result in successful partnerships.
• Strategic staff management can make a difference: referring to DSC staff as experts (not staff) lends credibility.
• Institutional initiatives to hire clusters of faculty to work in digital humanities has been effective in bringing great ideas for projects that involve teaching and undergraduates.

Developing partnerships at a number of the institutions represented at the workshop have led to center staff being written into grants. In some cases, some center staff have been invited to be co-authors on faculty grants, and in other cases faculty ask to be listed as co-authors on centers’ grants; periodically faculty members arrive with grants in-hand.

While the workshop did not include a detailed discussion of the physical spaces in DSCs, some noted that creating an informal space where faculty, students, and center staff can
enjoy a cup of coffee together has served as an effective strategy to foster casual conversations, which lead to ideas and collaborations; the gathering place draws people into the center.

**Perspectives on Services, Activities and Staffing**

The types of services offered in DSCs, and the profiles of the staff who provide them, can vary widely, depending upon myriad factors, such as funding sources, availability of resources (both tangible and intangible), local needs and priorities, institutional size and type, etc. Situations can be quite different even across comparable organizations so it is difficult to generalize. Some services and activities are one-time consultations or events; others may involve semester or years long commitments. Based on the results of a survey of the participants, the most common services offered by centers were:

- Consultation on digital technologies
- Consultation on digital preservation/curation
- Workshops
- Consultation on digital project management
- Intellectual property consultation

In some cases, frequently mentioned services were offered as a combination of physical space, specialized equipment and tools, and consultation services; for example:

- Makerspace
- Media production studio
- Visualization studio

Many offered credit courses and/or certification programs and hosted conferences. A number of center staff discussed their efforts to build a community among all of those working on projects in the center: staff (including students), graduate students, and faculty.

Additional services or activities mentioned by a smaller number of centers included:

- Grant writing assistance
- Repository development/management
- Working as partners on project development
- Data services
- Imaging
- Text analysis
- Internships
- Graduate student fellowships
- Consultation in pedagogy/instructional technologies
- Usability lab
- Seed grants
In discussions among participants, it was clear that both large and small institutions involved staff with a range of expertise depending on what type of project or service was being addressed. Teamwork and flexibility seemed to be key attributes of flourishing programs, which often had to respond quickly to changing needs and new requests for assistance or partnerships and the emergence of new tools and technologies. Most centers included a variety of staff that brought particular expertise. Most frequently mentioned in our survey were:

- Librarians
- Information technology professionals
- Graduate students
- Multimedia professionals
- Faculty

Two institutions provided in-depth perspectives on their staffing and services. At the University of Oregon (UO), a large, research institution, establishment of a DSC was conceived, in part, as a vehicle to help further many of the University Library’s strategic directions, and it continues to help advance numerous organizational objectives. For example, the DSC is seen as an important component in supporting the lifecycle of scholarly content, in providing support for instruction, in improving the user experience, in helping the institution become a learning organization, and in improving diversity. Staffing for the center originally came from a number of library departments that converged and some of these, or parts of them, flowed into the center. Reorganization of the central university information technology group also impacted the DSC.

The staffing situation at UO’s center is very dynamic, reflecting changes in the field; Oregon struggles with recruiting skilled developers and programmers due to local competition with other non-university prospective employers who can easily beat salaries offered by the university. The DSC has had to be creative in finding, recruiting, and keeping talent; their strategies have included developing in-house expertise, looking to non-traditional sources for talent, building strong teams, and offering interesting training and professional development opportunities.

DSC’s are also feasible, and, indeed, can serve as critical components of advancing core agendas, at small liberal arts colleges. Lafayette College’s center grew out of its special collections unit, but today it is its own department, offering services such as digital imaging, preservation, geographic information systems (GIS), and workshops, all focused on scholarship. Liberal arts colleges are committed to having students learn by doing, and to providing ways for students to engage with faculty doing research; the center lends itself to the interplay of teaching and research that, in part, define institutions like Lafayette. Staffing for the center came from the reallocation of resources for existing positions elsewhere in the organization, and most of staff time is spent on digital project development and management. Currently the unit is running a service-oriented operation with some funding from The Andrew W. Mellon Foundation, primarily used to develop faculty projects.
Workshop participants noted that with regard to the type of staff and the skills they possess, it is more important to have the proper mix of abilities overall across personnel than it is to have any one particular type of staff member. The ability to learn new skills, adaptability, and agility are qualities in personnel that can be even more important than the expertise that they initially bring to the position. One suggestion was to require staff to periodically spend a fixed amount of time mastering something new.

**Digital Scholarship Centers Supporting Teaching & Learning**

Many centers have an explicit teaching component in their program, and there are different models of how this aspect of the center’s work is manifested. There was not adequate time to discuss the relationships between the teaching and learning initiatives of the represented centers and the work of other teaching and technology initiatives on their campus that might have a home in the institution’s center for teaching and learning or even the information literacy program of the library. At the workshop, two presentations focused on teaching and learning initiatives, but through the subsequent discussion it was clear that most programs had some connection with undergraduate and/or graduate education.

The staff of Occidental College’s Center for Digital Learning + Research (CDLR) has worked hard to build relationships with faculty, and to establish its own credibility as teaching faculty. Hosting a summer digital institute for faculty allowed for talks, visits to other centers, and project work. Thematically linked faculty learning communities sponsored by the center brought participants together for regular interactions over the course of a semester, and the center has also hosted conferences and speakers. Using these kinds of strategies has helped the CDLR reach about a third to half of the college faculty. In the course of using faculty outreach strategies, naturally, interactions were occurring with students. Some center staff, including post-docs, taught courses at the college in various disciplines, reinforcing the perception that the CDLR understood the institution’s academic program.

The CDLR regularly engages with students using scholarly tools to work on their own projects, including capstone projects and summer research projects. Additionally, the CDLR provides consultations and instruction (usually lasting about one to four weeks) to classes at the college. The next phase of the center’s work includes two new initiatives. A faculty fellows program will give faculty needed time to explore digital technologies in their own work. A digital liberal arts labs program will provide the option for students to add a lab credit to specified courses, to provide students with a hands-on experience in digital technologies related to their course; many of the workshop participants were particularly interested in this approach.

By contrast, the University of Richmond’s Digital Scholarship Lab uses a project-driven model, where the focus is on production of various projects at any given time. Learning does take place within the context of producing projects, although that may not be the explicit goal of the lab’s role in any one project. Students who work on the center’s historical
projects, for example, develop real research skills as they investigate materials and make decisions about their findings. Those working on literary projects gain experience with textual analysis and close reading. Sometimes students develop their own research projects based on their work in the university lab. Students are learning as part of their interactions with the projects, but the majority of the lab’s work with undergraduate students is as employees.

A successful example of faculty collaboration, integrating digital projects into the curriculum, and working directly with undergraduates on projects is a semester-long class at the University of Rochester River Campus Libraries. There, the center’s director has worked with a professor from the English department to create a “co-curriculum” on narrative temporalities. Technical skills came from the center staff, and the faculty member brought his research ideas. As part of the course, students worked collaboratively to create data models to show the temporal narrative of a work of literature, for example. So far, results of the collaboration have been very positive.

**Reported Top Successes and Challenges**

During the workshop attendees were asked to complete cards indicating what they perceived as the greatest success and the greatest challenge of their center. Very little guidance was provided to the participants regarding the types of activities or issues that might be listed, and yet there were many commonalities among the successes and challenges identified by the group. By far the largest number of individuals identified building community and partnerships on campus as their greatest success. Other frequently identified successes that focused on the center’s projects and activities included their work on projects, outreach and awareness to the campus community, developing and implementing tools, and integration of the digital scholarship center with library/librarian services and research. Some of the successes noted by participants focused on administrative or operational aspects of their center, including their training program for their own staff, developing a great and diverse staff, and becoming an integral, not peripheral, part of the library’s services.

While the enumeration of successes provided indications of robust and growing programs, most DSCs also face some daunting challenges. Those identified most frequently focused on administrative issues, including staffing, especially regarding recruitment/retention, the need for ongoing training and agility, achieving buy-in and support from the library administration and/or other parts of the library, and space needs. Challenges related to the program of the center included managing priorities, offering services at scale, articulating and developing a shared vision, managing relationships with other campus units, and outreach within the institution.

One area that will be of future interest to CNI is to understand what types of assessments these centers are doing of their programs and how they conceive of “success.”
Key Themes and Observations

Donald Waters, Senior Program Officer for Scholarly Communications at The Andrew W. Mellon Foundation, provided his observations on the workshop’s presentations and discussions in the context of his own work with digital scholarship and digital humanities scholars. His comments focused on the need to view the support of digital scholarship in an institutional context, not narrowly in a library context. In his view, digital humanities centers and faculty institutes are often the places that bring new ideas in – they are at the leading edge of developments; in contrast, the kinds of centers this workshop focused on allow new tools, methods, and infrastructure to move from the edge to the center, making those things available to more individuals and to a broader range of disciplines than the faculty institute serves. As DSCs develop, they will always have more demands on them than resources, and Waters suggested that developing a peer review process that emphasized such factors as the benefit of the project to the institution’s mission, the potential applications of the outcomes of the project to other scholarship, the potential inter-institutional dimensions of the project, and the development of robust tools that could be used in teaching and learning environments as well as in research, would assist in identifying priority projects.

Moving Forward

The vibrancy of programs in the centers represented at this CNI workshop was palpable. They represented deep engagement with the mission-critical work of higher education institutions: research, teaching, and learning. All of the programs have aspirations for ongoing growth and change. For example, several of those with makerspace initiatives have been very successful, but are currently too limited considering the demand; they need additional resources. Others stated that they would like the ability to offer sandbox space where constituents could experiment with new ideas and the latest technologies. Overall, many noted the great need for a budget structure that could respond more quickly to requests and needs; having to plan years in advance does not fit well with the current pace of plans and projects. Sustainability over time, including offering preservation services, specifically of the center’s own products, are an ongoing concern. Support for projects requiring high performance or enterprise level computing and data management are challenges; some noted that while those types of services might be available through the institution’s central IT department, often faculty found working with them to be so complex that the center had become a “translator” for faculty. It is also possible that some centers will become liaisons or brokers between their faculty and national or international cyberinfrastructure programs or large digital repositories of content. Others suggested that perhaps the library could participate in providing high performance or cloud computing services as part of a start-up package for new faculty.
DSCs depend on a cohort of faculty and students who actively pursue new modes of doing research. Concerns about achieving tenure and promotion represent some of the biggest roadblocks to faculty working on digital projects. Some scholarly societies are addressing the lack of recognition of digital scholarship evident in many institutions’ promotion and tenure guidelines; these efforts can be influential, but decisions ultimately are made at the institutional level. The University of Nebraska-Lincoln formed a task force, made up primarily of faculty from academic departments doing work in digital humanities, to provide guidance to promotion/review committees on how to evaluate digital scholarship. The group issued the document *Promotion & Tenure Criteria for Assessing Digital Research in the Humanities* (cdrh.unl.edu/articles/promotion_and_tenure.php), which was ultimately approved by the University Library and, later, by the Department of Arts and Sciences. A librarian from the university’s DSC was active in this task force.

The workshop provided a means for the participants to learn about each other’s programs and to share ideas and perspectives. It is likely that many will return to their institutions and work on replicating or adapting some of the ideas they learned about from colleagues. The workshop website is another mechanism for sharing the ideas discussed at the workshop with a wider audience.

CNI is planning two follow-on activities addressing DSCs: a small workshop to assist in developing a framework or way of describing what such centers do, and how they do or do not differ from other entities such as digital humanities centers. In addition, we will offer a workshop in spring 2015 for those institutions that are planning DSCs or are in the early stages of implementation; this workshop will be co-sponsored by the Association of Research Libraries. Additional information on these activities will be made available on the CNI website.
The Promise of Digital Humanities
A Whitepaper
March 1, 2009 – Final Version

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Special thanks to the Mellon grant for Transformational Support in the Humanities for supporting the development of this whitepaper through two year-long seminars in Digital Humanities and Media Studies. For more information: http://www.digitalhumanities.ucla.edu
This whitepaper is a call to action and leadership at UCLA. UCLA has made great strides forward in the emerging fields that we define as Digital Humanities, and can already lay claim to national and international prominence. With concentrated effort and resources, UCLA can lead the country and the world in creating, applying, and interpreting new digital and information technologies. Our faculty is poised for this, our students are eager, and Digital Humanities—interdisciplinary, collaborative, socially engaged, and global—is a great fit for the strength, position, and aspirations of UCLA as an institution. At a moment in which our entire relation to knowledge is changing, it is imperative that we respond in visionary and focused ways that move research and education forward in the twenty-first century.
The Promise of Digital Humanities

I. Digital Humanities Defined

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, including history, anthropology, arts and architecture, information studies, film and media studies, archaeology, geography, and the social sciences. At the same time, Digital Humanities is a natural outgrowth and expansion of the traditional scope of the Humanities, not a replacement or rejection of humanistic inquiry. In fact, the role of the humanist is critical at this historic moment, as our cultural legacy migrates to digital formats and our relation to knowledge, cultural material, technology, and society is radically re-conceptualized.

Already within the broad field of Digital Humanities, we are seeing a flowering of interdisciplinary, collaborative, and technologically-sophisticated research and pedagogy that is producing new modes of knowledge formation, reaching new audiences for digital scholarship, and setting new intellectual agendas and priorities for the twenty-first century. At UCLA, faculty from the College already collaborate with faculty and students from the Graduate School of Education and Information Studies, the School of Arts and Architecture, and the School of Theater, Film, and Television, all divisions which house humanists working with advanced digital tools. We also see new collaborations emerging between north and south campus, as cultural and social analysis impacts the development of technology and new technologies affect culture and society.

Over the past decade, many leading universities in the United States have recognized the profoundly transformative effect that new media and digital technologies have had on research and teaching. In 2001, Stanford established the Stanford Humanities Laboratory, a collaborative research environment for supporting cross-disciplinary, technologically transformative, intellectually rigorous, multi-institutional projects, bringing Humanities scholars together with artists, technologists, and scientists in a laboratory setting. Duke, a founding member of the international consortium HASTAC (Humanities, Arts, Science, and Technology Advanced Collaboratory), adopted a similar model for the establishment of its interdisciplinary programs in "New Technologies in Society" and "Information Science and Information Studies" as well as its John Hope Franklin Humanities Institute. In 2007, Duke received a multi-year Mellon grant to build a "horizontal" program in Visual Studies, which operates—at all levels—at the interface between science, social science, and humanities. The University of Virginia established the Institute for Advanced Technology in the Humanities, which currently supports more than forty Digital Humanities research projects, and designed a curriculum for a masters program in Digital Humanities. Other top-tier universities such as Harvard, Dartmouth, USC, Berkeley, Princeton, Georgia Tech, and University of Michigan have begun to aggressively hire in the multidisciplinary fields represented by Digital Humanities. In addition, centers, labs, and institutes devoted to specific sub-fields of Digital Humanities can be found at USC, Brown, and MIT. USC, in particular, has emerged as a leader in the field by harnessing a substantial amount of institutional and extramural support
to create the Institute for Multimedia Literacy, the Institute for Creative Technologies, and Vectors, a radical reinvention of the electronic journal format.³

Digital Humanities can be characterized as follows:

1. **Interdisciplinary**: Digital Humanities scholarship 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. For example, tools from Geographic Information Systems (GIS) help historians to map the transmission of cultural artifacts; architectural modeling and simulation tools aid archaeologists in the investigation and recreation of ancient city spaces and societies; text-analysis and data-mining tools help linguists and literary scholars to detect and analyze patterns in the study of complex textual corpora.

2. **Collaborative**: Digital Humanities scholarship is team-based, often engaging humanists, technologists, social scientists, artists, architects, information scientists, and computer scientists in conceptualizing and solving problems. Information and computer scientists may help humanists discover patterns or come up with ways to optimize the search and retrieval process when mining large-scale cultural datasets. At the same time, humanists and social scientists may help technologists by providing real-world data and experiences to test theoretical algorithms or conceive new tools. Working with artists and designers, digital humanists participate in the creation of user interfaces, information navigation systems, and content management systems, all of which directly impact research and pedagogy.

3. **Socially Engaged**: Digital Humanities scholarship opens and extends the reach of the university by bridging diverse communities. Building on the community engagement and activism of the professional schools, digital humanists often work with external cultural institutions (museums, archives, historical societies, and libraries) as well as with local communities, advocacy groups, non-profits, and schools. By bringing together academic and local experts, new knowledge and new forms of civic engagement emerge for community-based learning experiences.

4. **Global**: The new audience for Digital Humanities scholarship and pedagogy is truly global. Because this scholarship is primarily web-based, the general public can not only access it but also engage critically with it. New publication venues such as Google Earth and new broadcasting systems and virtual worlds such as Second Life facilitate long-distance learning.

5. **Timely and Relevant**: Digital Humanities is engaged with the rapidly changing world of today. It is imperative that we prepare our students—both undergraduate and graduate—to be competitive in the job market of the twenty-first century. Digital Humanities teaches students the critical thinking skills, media literacies, and technical knowledge necessary for success in the digital information age.
II. Innovative Educational Opportunities

The changes effected by new technologies—ranging from web-based media forms and digital archives to social networking and cluster computing—are so proximate and so sweeping in scope and significance that they may appropriately be compared to the changes wrought by the print revolution. But these changes are happening on a very rapid timescale, taking place over months and years rather than decades and centuries. Because of the rapidity of these developments, the intellectual tools, methodologies, disciplinary practices, and pedagogical approaches have just started to emerge for responding to and interpreting the massive social, cultural, economic, and educational transformations happening all around us.

Our students were born in a world in which computing and information technologies are ubiquitous. Consequently, they are eager to use and apply these technologies to their own learning. Although many students are involved in the creation of their own expressive media presence through personal webpages and social networking, they are infrequently engaged in either interrogating or applying these technologies in their learning and scholarship. In order to be successful in the world of tomorrow, there are significant technological, social, cultural, and intellectual skills that students need to master. These skills include literacy in both traditional and new media, the technical skills related to this literacy, the development of tools for critical analysis, the ability to navigate across, reconfigure, and evaluate different media forms, the ability to negotiate and work across diverse cultures and communities, the ability to synthesize material and bring together different methodologies to solve complex problems, the ability to interpret and construct models for responding to real-world situations, the ability to critically evaluate the potentials and limitations of new technologies, and the cultivation of a broad understanding of the social, historical, linguistic, and cultural context in which they are learning and working. At its core, Digital Humanities addresses these issues by teaching students to create and critique media content, to develop the necessary skills and abilities to evaluate this content, to manipulate and transform digital media technologies, and to develop the requisite literacy across media forms, including textual, aural, visual, and digital domains.

Because Digital Humanities cuts across undergraduate education, it offers a compelling model for transformative scholarship and pedagogy. Digital Humanities facilitates the necessary critical thinking, analytic skills, and creativity at the heart of the undergraduate educational experience and thus impacts all fields that use new technologies to undertake research. As more and more courses utilize digital technologies for instruction, new information platforms are emerging, which encourage collaboration, creativity, and interdisciplinarity. For example, the “HyperCities” platform—a web-based tool for digital cultural mapping—is used by students in Humanities GE courses on Berlin and Rome, the LA Cluster course, and a range of architectural history classes. Such platforms create powerful new mechanisms for involving students directly in cutting edge research. Trained in new research methodologies, students join collaborative projects as domain experts, eager to use tools and apply skills that did not exist only a few years prior. Projects in Digital Humanities have redefined excellence in undergraduate research by enabling students to make significant contributions to scholarship in fields ranging from archaeology and architecture to history and literature. While few undergraduate essays have ever advanced the state of an academic field, a student contribution to a project focused on the three-dimensional visualization of an ongoing archaeological excavation could easily find its way into a highly-selective academic journal.
Next year, students enrolled in the new program in Digital Cultural Mapping will work in collaborative teams throughout the Los Angeles community to realize capstone projects that are published in Google Earth, allowing students to share their research with the very communities in which they are working. Finally, in an effort to formalize this program, an interdisciplinary group of faculty has already begun to develop a minor in Digital Cultural Mapping and is currently considering the development of a GE cluster course as well as an undergraduate degree and an interdepartmental program in Digital Humanities. In sum, Digital Humanities teaches students the critical thinking skills necessary for success in the digital information age by preparing students to be active participants, rather than passive spectators, in the production of knowledge and the building of this new world.

III. Digital Humanities at UCLA: A Proven Track Record in Extramural Funding

Within the UC system, UCLA has already distinguished itself as the premier institution for Digital Humanities research and education, attracting millions of dollars in extramural support and with the potential for generating much more. Nationally, UCLA is one of a handful of top-tier universities for Digital Humanities. Our peer institutions are Duke, Stanford, USC, and UVA.

1. **W.M. Keck Program in Digital Cultural Mapping:** In 2008, the Keck foundation made its first ever grant in the liberal arts to a research university. The $500,000 grant to UCLA will support the creation of an undergraduate curriculum in the emergent field of digital cultural mapping. The interdisciplinary curriculum draws on faculty from seven departments, three schools, and three research centers at UCLA. It places project-based learning at the heart of the curriculum, with students working in collaborative teams to realize research projects with real-world applications. Faculty directors: Diane Favro (Architecture and Urban Planning), Todd Presner (Germanic Languages and Comparative Literature), Jan Reiff (History and Statistics), and Willeke Wendrich (NELC).

2. **Digital Humanities Funded by NEH, IMLS, MacArthur, Mellon, and ACLS:** Over the past several years, all of the major humanities foundations have supported digital humanities projects at UCLA, amounting to several million dollars in extramural support:

   - The Encyclopedia of Egyptology: $675,000 in two phases from NEH. PI: Willeke Wendrich (NELC)
   - The Karnak Temple Complex: $196,000 from NEH. PIs: Diane Favro (Architecture and Urban Design) and Willeke Wendrich (NELC)
   - The Digital Roman Forum: $750,000 from the Mellon Foundation. PIs: Diane Favro (Architecture and Urban Design) and Bernard Frischer (Classics; now at UVA)
   - HyperCities: $238,000 from the MacArthur Foundation as part of its Digital Media and Learning initiative. Directed by Todd Presner (Germanic Languages) with co-PIs Dean Abernathy (Architecture, Orange Coast
College), Mike Blockstein (Public Matters, Los Angeles), Phil Ethington (History, USC), Diane Favro (Architecture and Urban Design), Chris Johanson (Classics), and Jan Reiff (History and Statistics). Also, $80,000 Digital Innovation grant for "Hypermedia Berlin" from ACLS. PI: Todd Presner (Germanic Languages)

- Digital Cuneiform Project and Iraq Initiative: $925,000 from the Mellon Foundation; $749,000 IMLS Leadership Grant, NEH/NSF Grants amounting to $976,000. PI: Robert Englund (NELC)
- NEH Summer Institute: Models of Ancient Rome. $125,000. PIs: Sander Goldberg (Classics), Diane Favro (Architecture and Urban Design). Institute Coordinator: Chris Johanson (Classics)
- St. Gall Monastery Plan: $1.1M from the Mellon Foundation. PIs: Patrick Geary (History) and Bernard Frischer (Classics; now at UVA).
- Cathedral of Santiago de Compostela 3D Reconstruction: €100,000 from Sociedade Anónima de Xestión do Plan Xacobeo, Xunta de Galicia, Spain; $19,000 from GTE Foundation. PI: John Dagenais (Spanish and Portuguese)
- Digital Humanities has also been identified by the UCLA Mellon steering committee as one of the target areas for institutional support and hiring through the $2.5M Mellon grant for "Transformational Support in the Humanities." To date, the Mellon program has supported the hire of one junior professor in Digital Humanities, a postdoctoral fellow in Digital Humanities, and two faculty-graduate student seminars in Digital Humanities and Media Studies.

3. **Mellon Seminar in Digital Humanities**: During the 2008-09 AY, an experimental Mellon seminar in digital humanities was put together by Todd Presner (UCLA) and Jeffrey Schnapp (Stanford University). The seminar is held simultaneously in “real-life” (at UCLA’s Visualization Portal) and in the virtual world of “Second Life,” where a live broadcast is fed via the web. More than half of the one hundred participants—faculty, students, library and technology staff, as well as foundation representatives—attend through Second Life, representing research universities such as Stanford, Caltech, Harvard, NYU, Rice, and USC as well as small, liberal arts colleges like Hamilton College and the Seattle Arts School. Although Second Life participants currently do not receive course credit, SL represents an exciting opportunity for long-distance learning and credentialing.

4. **Collaborating Centers and Facilities**: UCLA has several dynamic campus institutions that over the last few years have promoted digital research and education. Scholars and students in the humanities utilize the technical and staff resources of the Center for Digital Humanities, the Experiential Technologies Center, and Academic Technology Services to conduct research and teach courses. In 2009, an interdisciplinary group of faculty representing the Division of the Humanities, the Division of Social Sciences, the School of Arts and Architecture, and the Graduate School of Education and Information Sciences organized a consortium (“HASIS”) for promoting and supporting Digital Humanities at UCLA. As the “north campus” arm
of the Institute for Digital Research and Education (IDRE), “IDRE-HASIS” is an innovative, interdisciplinary network of faculty, staff, students, and technical resources for Digital Humanities research and teaching at UCLA.

5. Recent Press about Digital Humanities at UCLA

- “Recreation of an Egyptian Temple Complex Merges Technology and Scholarship,” in Chronicle of Higher Education (January 20, 2009)
- “Digital Karnak Project Launches Website,” The American Research Center in Egypt (October 2008).

IV. The Future: What is Needed to Build Upon This Success?

Unlike other areas of research, which face cutbacks at all levels, the sources for external funding of Digital Humanities projects are increasing. To wit, after the extraordinary success of a pilot initiative, the NEH created an Office of Digital Humanities and a series of domain-specific grants. In addition, Digital Humanities remains one of only two endowment-wide granting initiatives.

Because Digital Humanities engenders truly interdisciplinary work with a potentially global impact, granting agencies now recognize that the Humanities, like other disciplines, have entered the age of the grand challenge. For example, an unprecedented interdisciplinary and international collaboration between the Joint Information Systems Committee (JISC–UK), the NEH, the NSF, and the Social Sciences and Humanities Research Council (SSHRC) from Canada has just announced the Digging into Data Challenge intended to answer the question, “What do you do with a million books? Or a million pages of newspaper? Or a million photographs of artwork?” Interdisciplinary collaboration is a prerequisite for answering these questions and applying for such grants.

While Digital Humanities has a substantial track record at UCLA, much of its success has come without the support of university infrastructure to sustain it and stimulate its growth. To address this deficiency, faculty representing all divisions from north campus in conjunction with staff from the Library, CDH, OID, OIT, and ATS have created IDRE-HASIS, a new branch of the Institute for Digital Research and Education (IDRE). IDRE-HASIS will cultivate excellence and innovation in all areas of digital research and education that impact the broad study of culture and society. This collaborative organization has initiated a “pipeline” for sharing resources, concentrating efforts, and applying for grants that span the
artificial divisional and departmental silos that have for years limited truly interdisciplinary, collaborative projects.

To formalize this collaboration and remain competitive in the rapidly expanding extramural funding landscape, institutional support is vital. The critical areas of support that are needed include the following:

- Hiring strategies that cross departmental and divisional lines and which target the most innovative leaders in the field of Digital Humanities. We can no longer simply "hire to replace" but must make strategic hires that build bridges and benefit the university as a whole. At the same time, flexible graduate student support for Digital Humanities (across departments and divisions) must be made available to fund graduate students at all stages of their degree. Undergraduate research opportunities need to support and target digital research projects that are team-based and cumulative in scope and duration.
- Close cooperation between IDRE-HASIS and UCLA’s Office of Development to investigate and pursue the widest possible sources of funding and facilitate the targeting of Challenge Grants that require substantial matching funds.
- Dedicated space and technology staff resources (programmers and designers) to work with faculty and students on realizing digital research projects, managing equipment, and collaborating with a range of users. The space should function as a collaborative “sandbox” for conducting research and teaching as well as housing visiting scholars, post-doctoral fellows, and student researchers.
- Dedicated staff to advise and administer grants (both institutional and project-based), which span departments and divisions.
- Dedicated staff to work with faculty and the library on archiving, digitizing, and publishing data generated by Digital Humanities research as well as on developing the requisite standards, metadata, and accessibility for this data.
- Institutional encouragement in the form of “incubation grants” and “fellows programs” for Digital Humanities projects in their rudimentary stages; matching seed funds for successful grant applications that involve multiple departments. (At present, in grants with co-principal investigators, only one department receives the full benefit and recognition for a successful grant application.)

In lean times, universities strive to preserve core programs that prepare students to meet the challenges of rapid and sweeping changes. We recognize that difficult decisions must be made in the years to come. We believe that maintaining and expanding Digital Humanities at UCLA not only preserves mission critical skills that will empower students to engage actively in addressing these challenges, but that such an investment positions UCLA at the forefront of a recovery effort that will fuel the next generation of scholars and leaders.


3 USC has been developing infrastructure to integrate digital media technologies into the humanities for more than a decade. Their Institute for Multimedia Literacy (IML), founded in 1998 with funding from alumnus George Lucas, is an organized research unit dedicated to developing educational programs and conducting research on the changing nature of literacy in a networked culture. The IML's success has fostered a huge range of digital humanities efforts across USC. USC feels that their undergraduate schools of Cinema/Television, Engineering, and Business are very well defined, and wants to have a similar kind of distinguishing and identifiable approach to their core undergraduate college experience. There are now discussions at the Provost's level of literally “rebranding” their College of Letters, Arts, and Sciences as a Digital Humanities initiative. The Annenberg School’s recent hiring of renowned convergence theorist/media activist Henry Jenkins away from MIT this year is yet another sign of the significant investment USC has made to embrace digital humanities.

4 According to the 2005 Pew Internet and American Life project, more than half of American teenagers who use the Internet are media creators. Far from just passively “surfing” the web, these students are creating media, such as webpages, videos, music, blogs, stories, and other online content. This does not even include the vast number of students who also engage in multiplayer gaming, social networking, and other forms of web-based communication. For a full discussion, see Henry Jenkins and others, Confronting the Challenges of Participatory Culture: Media Education for the 21st Century, MacArthur Foundation (2006). The paper is available at: http://digitallearning.macfound.org/atf/cf/%7B7E45C7E0-A3E0-4B89-AC9C-E807E1B0AE4E%7D/JENKINS_WHITE_PAPER.PDF

5 The New Media Consortium defined new media literacy as “the set of abilities and skills where aural, visual, and digital literacy overlap. These include the ability to understand the power of images and sounds, to recognize and use that power, to manipulate and transform digital media, to distribute them pervasively, and to easily adapt them to new forms.” A Global Imperative: The Report of the 21st Century Literacy Summit.

6 E.g., http://www.chass.uiuc.edu/Projects/Entries/2008/5/20_Grand_Challenges_in_the_Humanities.html. See, for example, the grand challenges of global health (http://www.grandchallenges.org/Pages/default.aspx) and engineering (http://www.grandchallenges.org/Pages/default.aspx).
Appendices -- Recent Press
Cultural mapping enters new phase in digital humanities

We live in a digital world in which just about every academic discipline is part of a sprawling landscape that aids pedagogy, scholarship and communication.

On Jan. 30, a team of UCLA scholars will launch a leading-edge interdisciplinary digital program aimed at further exploring the relationship people have with physical spaces and culture. Called the W.M. Keck Digital Cultural Mapping Program, the $500,000 initiative will expand on the pioneering efforts of the Center for Digital Humanities to forge a technology-driven liberal arts education in which a range of subjects are spatially and temporally represented.

This marks the first time that the W.M. Keck Foundation has funded the liberal arts in any research university. Using photographs, videos, animated timelines and sophisticated Geographic Information Systems (GIS) – of which Google Earth imagery is the best-known example – the project reflects an increasing emphasis on “mapping” in higher education. Through mapping, everything from distinctive landmarks and industries to such intangible elements as personal histories and cultural concepts are immersed in a catchy and highly engaging digital world.

“‘Mapping’ is the critical word but it’s not about (cartographical) maps,” explained Diane Favro, a professor of architecture and urban design, who is one of the four directors of the program. Rather, she added, the program “promotes thinking about evolutions of a place.”

In an era in which rapidly changing technologies are used to examine social and cultural questions, “students are constantly collaborating in research-based participatory learning,” said Todd Presner, an associate professor of Germanic languages and comparative literature, who is also one of the program’s directors.
The cultural mapping program brings together the resources and expertise of the Center for Digital Humanities, Academic Technology Services and the Experiential Technologies Center to develop an interdisciplinary minor curriculum for undergraduates. Also associated with the program are other departments, including Architecture and Urban Design, Near Eastern Languages and Cultures, history, statistics, anthropology, sociology and archaeology.

The program will begin with an introductory workshop on Jan. 30 for participating faculty and others who might already be conducting similar digital programs. Scheduled to be held at the Visualization Portal in Room 5628 of the Math Sciences Building, the event, which runs 9 a.m. to 12 noon, will follow an 8:30 a.m. breakfast buffet.

The introductory workshop will present a conceptual framework for exploring cross-disciplinary collaborations as well as a discussion of the curriculum, replete with demonstrations of projects tested in classrooms and labs on campus.

These include the Digital Roman Forum, a 3-D reconstruction of imperial Rome developed by the Cultural Virtual Reality Lab on campus, and HyperCities, an interactive Web-based research platform for analyzing the cultural, architectural and urban history of some of the world’s leading cities. (The first of these cities, Hypermedia Berlin, has already been developed to much critical acclaim under Presner’s direction.)

One of the highlights of the program is Digital Karnak, a project developed by Favro, who is also the director of the Experiential Technologies Center, and Willeke Wendrich, an associate professor of Egyptian Archaeology and another of the program’s directors.

The project revolves around a digital reconstruction of Karnak, an ancient temple complex in the Fayum region of Egypt. Combining years of scholarship with the newest technology, the project offers photographs, videos, animated timelines and Google Earth images of the renowned temple to showcase not just its striking architecture but also how it was built – and repeatedly rebuilt – over a period of more than 2,000 years, replete with information about the rituals and festivals that occurred there.

Another key goal of the collaborators is to introduce critical thinking about the digital realm. Typically, students will learn about the effects of presenting complex subject matter digitally, particularly how digital interaction changes the nature of perceived events over time and space.

A city’s history is a good example. “We’re used to saying history is chronological,” explained Jan Reiff, an associate professor of history and statistics who, along with Favro, has already taught several digital mapping classes on campus. “But change doesn’t happen at the same time everywhere.” With the help of spatially related maps, students can better understand how a place truly changes from period to period.

A training workshop for faculty is scheduled in March. It will offer consultations, tech support, access to labs, plus exposure to new ideas and basic skills in such areas as GIS, Google Maps and creative thinking.
“This is true collaboration that changes the landscape of UCLA,” said Wendrich, who returned this month from a 12-week field trip to Egypt along with 10 undergraduate and six graduate students regarding the Karnak project. “We’ve all experienced that in our own research, and now we’re bringing it to students.” To learn details about the program, go to this website. For more information about the Jan. 30 event, send an e-mail.

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Digital Humanities address changing nature of knowledge in seminar featured on Second Life

After much economic gloom and confusion in 2008, the new year is a good time to reflect on an increasingly vital issue for universities: The future of knowledge in the digital age.

Under an initiative sponsored by a $2.5 million grant from the Mellon Foundation two years ago, faculty, postdoctoral fellows and guest scholars from more than 10 departments are exploring new research methodologies and disciplinary paradigms in the humanities. On Jan. 5, they met for the latest in a series of “Media, Technology, and Culture” seminars that offers vital insights from experts in the evermore collaborative fields of media studies, game theory and literary and cultural studies.

In a relatively new twist to Internet-enabled distance learning, the “Humanities Tools in Digital Contexts” seminar was also featured on Second Life (SL), the San Francisco-based 3-D metaverse that some call the campus of the future. Numerous universities, colleges and schools offer courses or educational programs in the digital realm, where they own virtual “islands.” Their representatives communicate with people in “real life” through cartoonlike virtual characters known as their “avatars,” or online alter-egos.

Open to graduate students for credit as well as to the general public, the three-hour seminar was presented by Information Studies Professor Johanna Drucker in the Math and Sciences Building’s Visualization Portal, a 40-seat theater replete with virtual reality technologies.

Drucker’s seminar focused on the cultural, intellectual, pedagogical and technological challenges that still dog the digital humanities after years of pioneering efforts to improve the ways in which the field makes knowledge visually appealing and archives it for wider and more productive use.

For the Second Life aspect of the seminar, a live video feed of the discussion was transmitted to
a virtual “island,” Entropia, as has been the case with past seminars in the Mellon series, which began last October and are offered monthly. The SL virtual island is run by the Digital Library Federation, a consortium of libraries worldwide, including UCLA Library, which communicates key information technology trends and encourages information sharing.

Entropia is remotely managed by Esther Grassian, an information literacy outreach coordinator at the College Library, along with Deni Wicklund, manager of the Stanford University Libraries Tech Support Group. Grassian feeds text transcripts of the seminars on SL for those who might be having trouble listening to the audio version. These are then mounted onto a “wiki,” an online storehouse of the discussions for each seminar, to which users can freely contribute.

“This is the first time in the humanities that anything has been done on such a scale,” said Todd Presner, associate professor of Germanic Languages and Jewish Studies, who chairs the Center for Digital Humanities faculty advisory committee and co-organizes the seminars with Jeffrey Schnapp, a Mellon visiting professor of digital humanities from Stanford.

The seminars are interactive. SL avatars don’t just watch and listen but also ask questions that are answered by the seminar speakers. Meanwhile, attendees in the Visualization Portal focus simultaneously on the seminar as well as the interaction on SL.

“What we want to do is to show how the nature and communication of knowledge is changing,” added Presner, who is the founding director of two notable digital mapping projects – Hypermedia Berlin and Hypercities – that use geographic information systems to explore the cultural, architectural and urban histories of city spaces. “If we want our students to be competitive, we have to train them professionally in the technologies of the 21st century.”

One important aspect of these technologies is that it enables all kinds of knowledge to have an impact well beyond university campuses. The digital humanities seminars on SL, for example, are attended by as many as 75 people, many of them affiliated with leading universities such as the Massachusetts Institute of Technology, New York University, Stanford and Rice.

Although a nascent field, digital humanities is a union of complex open-source practices that treat knowledge in novel, sometimes emotive ways. “We want to create a manifesto of what the humanities can be – or should be – in the 21st century,” said Presner, explaining that one of the results of the Mellon seminars has been a collaborative effort to create a statement about the digital humanities that takes into account not just the future of the humanities but of knowledge itself. (To contribute to the manifesto or to know more about the Mellon seminars, go to http://www.digitalhumanities.ucla.edu/).

“The manifesto is brash and provocative and I think it will be a significant publication when it’s done,” Presner said. “We don’t have all the answers but we’re asking the right questions.”

For more information about the SL seminar, contact Esther Grassian.

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Digital Legacy for Imperial Rome -

The Rome Reborn virtual reality project -

An international team of archaeologists, architects and computer specialists premiered a computer simulation of Ancient Rome at a press conference in Rome in June. Ten years in the making, the project provides a reconstruction of almost 7,000 buildings at the time of emperor Constantine, approximately 320 AD, when Rome was at the height of its power and size. It may be the start of a virtual time machine making it possible to experience the history of many ancient cities and civilisations as virtual worlds.

When it comes to archaeological Rome you may think you've seen and read it all. But when was the last time content aware interaction interfaces, entity workspace, real-time object segmentation, augmented reality, free-space transparency and hybrid immersive environments featured in your conversations on Chichen Itza, Rome or Persepolis? A safe bet is you won't find references to the latter anywhere in the analytical index of Edward Gibbon's Rise and Fall of the Roman Empire. Archaeology has come a long way since the days when Heinrich Schliemann merrily went about blowing up trenches with dynamite in the hillside of Troy or Howard Vyse scribbled Khufu's name inside the Great Pyramid in Giza, with technology now playing a lead role in the fields of advanced non-destructive surveying and conservation. The trowel and calliper may have been replaced by ground penetrating radar and laser range scanning but while archaeological fieldwork remains a process of controlled destruction, technology is providing new scope for the data-banking and study of existing finds. Virtual reality and digital animation techniques have already made staggering contributions to education and entertainment, and in a very real sense are beginning to change both our perception and understanding of reality.

All in the name

Technology is not a means unto itself and testimony to that was provided by the project's masterminds, professors Bernard Frischer (University of Virginia) and Diane Favro (UCLA). In fact, there's more to the project's name than meets the eye. Rome Reborn gets its name from the book by Renaissance scholar Flavio Biondo, Roma Instaurata. Written between 1444 and 1446, Biondo's work has had an enduring effect on that of latter-day archaeologists by providing the first systematic topographical study of ancient Rome, and is an outstanding example of the spirit which drove today's researchers and academics to embark on the Reborn project: the desire to reconstruct the imperial capital at the height of its wealth and size, hosting a rich, polyglot culture of peoples. On a more contemporary note 'reborn-digital' laser scanning techniques are what provided the raw material for the 3D visualisation layout, generating digital data replicas of objects in physical space. The sheer bulk of data potentially generated through reborn digital techniques is a big issue when it comes to 3D modelling based on commercially available hardware, and some have objected that smaller urban settlements such as Athens, Pompeii and Ostia may have allowed for greater detail on a city-wide scale. Rome however offers an unrivalled combination of archaeological and cultural information and a significant proportion of the modelling – and educated guesswork – is based on surviving literary and historical sources. So although, extent-wise, more Roman remains actually stand in Pompeii than they do in Rome, the lack of substantial written records concerning the former swayed the balance in favour of
the imperial capital. In that sense, the challenge facing academics and developers was not so much a case of acquiring primary and secondary sources – which abound – as much as how to provide a faithful and comprehensive representation of the data available.

**Roman plaster...**
The Rome Reborn 1.0 simulation environment is admittedly an ambitious project and its creators and developers would ideally like to see progress beyond the current version. Above and beyond the engineering ingenuity of software developers a conspicuous amount of the inspiration – in terms of bulk data – was provided by the probably less well known work of Ostia's excavations superintendent and architect, Italo Gismondi, and his staggering plaster of Paris model of imperial Rome hosted at Museo della Civiltà Antica in Rome's EUR district. The 16 x 17.4 metre, 250 m² model of Constantinian Rome, was started in the mid 1930s; the model, as seen today, is the end product of forty years of academic research conducted by leading Italian archaeologists under Gismondi's leadership. Built to a scale of 1:250 the 'Plastico di Roma Antica' provides accurate details as to the size, architecture, location, elevation and urban layout in fourth-century Rome, and although conjectural aspects of the model have been questioned in the face of more recent findings the Plastico essentially provided the bulk of what the Reborn project delivers today in digital, fly through format.

... Milanese lasers, ...
Converting the physical Gismondi model – packed with temples, fora and houses only a few centimetres tall – was no mean feat and one that was accomplished by researchers at Milan's Politecnico Indaco laboratory. Boiled down to its simplest terms what the Reborn project required (and lacked) was a template in which to locate digitally enhanced models of Rome’s architectural features; so the job at hand for laser specialists was to effectively scan the entire surface of the Plastico in order to generate a digital 'carbon copy' of it. Although laser scanning is a commonly used technique, most of its engineering applications are accurate on either the very large or the very small scale, but nothing in-between. High resolution (small scale) laser optometry has already been successfully applied to another ongoing archaeological project in Rome, namely the rendering, mapping and compositing of the 1,186 surviving fragments of the huge marble map of Rome known as the Forma Urbis, which adorned an entire wall in the Templum Pacis from the reign of Septimus Severus. The Plastico however was a veritable optometric nightmare, packing detailed features over a large surface, none of which could be captured via conventional techniques. The solution was achieved by ingeniously applying radar physics to laser technology, resulting in the development of an all-new laser radar, capable of providing full detail to under one millimetre accuracy. The digital 'mould' – the data ‘cloud’ – of Rome was in fact so detailed – 260,000,000 rendering polygons – that it had to be cut down to size for the purposes of subsequent real-time virtual reality animation.

... and Californian chips
And then came virtuality. If you think an ‘experiential center’ is something out of Hunter S. Thompson’s “Fear and Loathing in California” you’d be right about California, but wrong about the Hunter. The brains and PCs behind the serious business of turning the raw data into an interactive digital 3D model were provided by California’s UCLA Experiential Technologies Center. Yet again, it was not just a case of applying open source rendering engines to bulk data and then crunching. Detailed modelling of internal and external structures, texturing as well as including updated hypotheses into the Plastico’s original layout were all fed into the project at this stage in the development process and were then combined within a virtual reality interactive platform which – once available to the public – looks to provide users with a fully immersive experience of imperial Rome.

**Digital Rome wasn’t built in a day**
The successful merger between hard data and virtual reality on this scale is a true achievement, and one whose primary scope and focus is research. The creators of Rome Reborn still have a long way to go before their stated aim of 1996 concerning the development a comprehensive
model of Rome – from iron age to the empire's fall – is achieved (In fact most of the project's raw data acquisition was completed in 2004 and number crunching took place subsequent to that). What the project has sought to do – and has indeed succeeded in accomplishing – is establish a new framework for collaborative research. Proof of that, if any were needed, is in the lengthy list of international participants to the project. However, sponsors' heavy-side focus on technology has so far taken precedence over the project's research goals which, in the least glamorous – and academically precious – of terms, is to provide an interactive database in which to test their assumptions about the rise and fall of ancient Rome. If the thinking behind the original project remains true to itself, ticking beyond the 1.0 version will reflect advances in researchers’ understanding of ancient Rome rather than improvements in graphics rendering and interactivity.

3D Rome spin-offs
Clearly we all look forward to its X-Box or Playstation spin-offs and there's always room for a Steve McQueen Bullit-style – or Charlton Heston if you prefer Ben Hur and the 50s – grand theft chariot scene (perhaps I should narrow that down to just me, in case any of you friends-of-Heston are reading this). But the 'serious' truth about this project remains firmly grounded in testing historical and archaeological speculation. If confined to the realm of pure research, on the other hand, the project might risk being used to run simulations on time dependent variables such as the rate of weed growth on imperial Rome’s streets in order test assumptions concerning the size of its slave labour road maintenance workforce.

Somewhere in-between pure research and unabashed entertainment lies edutainment, which more often than not has provided the answer to researchers’ funding prayers. Encouraging signs on that front came with the announcement that the project could be funnelled into Second Life (provided that bubble doesn’t burst) and that the 1.0 simulation would be used as the set for a 3D time travel ride in Rome as early as 2008. Not a chariot in sight, but we can hope that the digital weeding is done sooner rather than later.

3D Rome roundup
Rome Reborn 1.0 - www.romereborn.virginia.edu You can watch videos and look at selected images from around the virtual city on the Rome Reborn web site.

Digital Roman Forum – http://dlib.etc.ucla.edu/projects/Forum Polished if lifeless 3-D renderings of buildings on the Roman Forum at different points in the city’s history.

Plan de Rome - www.unicaen.fr/rome/index.php?langue=anglais A 1:400 scale model of Rome built in 1900 and situated at the University of Caen, France. The web site includes some virtual reality videos and images based on the model.

Stanford Digital Forma Urbis Romae Project - http://formaurbis.stanford.edu Not a 3-D recreation but a fascinating project nonetheless. The Forma Urbis Romae project seeks to rebuild the ancient map of Rome from the hundreds of fragments of the original that hung inside the Templum Pacis.

Antonino John Scoppettuolo
December 2007
Photo: View of the Colosseum and Roman Forum from the Caelian Hill (Rome Reborn, UCLA)
WHAT IS HUMANITIES COMPUTING AND WHAT IS NOT?

We are the mimics. Clouds are pedagogues. (Wallace Stevens, Notes Toward a Supreme Fiction.[1])

Any intelligent entity that wishes to reason about its world encounters an important, inescapable fact: reasoning is a process that goes on internally, while most things it wishes to reason about exist only externally.[2]

Abstract

I'll give the short answer to the question »what is humanities computing?« up front: it is foreshadowed by my two epigraphs. Humanities computing is a practice of representation, a form of modeling or, as Wallace Stevens has it, mimicry. It is also (as Davis and his co-authors put it) a way of reasoning and a set of ontological commitments, and its representational practice is shaped by the need for efficient computation on the one hand, and for human communication on the other. We'll come back to these ideas, but before we do, let's stop for a moment to consider why one would ask a question such as »what is humanities computing?«

First, I think the question arises because it is important to distinguish a tool from the various uses that can be made of it, if for no other reason than to evaluate the effectiveness of the tool for different purposes. A hammer is very good nail-driver, not such a good screw-driver, a fairly effective weapon, and a lousy musical instrument. Because the computer is – much more than the hammer – a general-purpose machine (in fact, a general-purpose modeling machine) it tends to blur distinctions among the different activities it enables. Are we word-processing or doing email? Are we doing research or shopping? Are we entertaining ourselves or working? It's all data: isn't it all just data processing? Sure it is, and no it isn't. The goals, rhetoric, consequences, benefits, of the various things we do with computers are not the same, in spite of the hegemony of Windows and the Web. All our activities may all look the same, and they may all take place in the same interface, the same ›discourse universe‹ of icons, menus, and behaviors, but they're not all equally valuable, they don't all work on the same assumptions – they're not, in fact, interchangeable. To put a more narrowly academic focus on all this, I would hazard a guess that everyone reading this uses a word-processor and email as basic tools of the profession, and I expect that many readers are not the humanities. Even so, you do not all do humanities computing – nor should you, for heaven's sake – any more than you should all be medievalists, or modernists, or linguists.

So, one of the many things you can do with computers is something that I would call humanities computing, in which the
computer is used as tool for modeling humanities data and our understanding of it, and that activity is entirely distinct from using the computer when it models the typewriter, or the telephone, or the phonograph, or any of the many other things it can be.

The second reason one might ask the question »what is humanities computing« is in order to distinguish between exemplars of that activity and charlatans (c.f. Tito Orlandi) or pretenders to it. Charlatans are, in Professor Orlandi’s view, people who present as »humanities computing« some body of work that is not that. It may be computer-based (for example, it may be published on the Web), and it may present very engaging content, but if it doesn't have a way to be wrong, if one can't say whether it does or doesn't work, whether it is or isn't internally consistent and logically coherent, then it's something other than humanities computing. The problem with charlatanism is that it undersells the market by providing a quick-and-dirty simulacrum of something that, done right, is expensive, time-consuming, and difficult. Put another way, charlatans trade intellectual self-consistency and internal logical coherence (in what probably ought to be a massive and complicated act of representation) for surface effects, immediate production, and canned conclusions. When one does this, one is competing unfairly with projects that are more thorough and thoughtful, both in their approach to the problem of representation and in their planning and testing of technical and intellectual infrastructure.

The bad news here is that all humanities computing projects today are involved in some degree of charlatanism, even the best of them. But degree matters, and one way in which that degree can be measured is by the interactivity offered to users who wish to frame their own research questions. If there is none offered, and no interactivity, then the project is probably pure charlatanism. If it offers some (say, keyword searching), then it can be taken a bit more seriously. If it offers structured searching, a bit more so. If it offers combinatorial queries, more so. If it allows you to change parameters and values in order to produce new models, it starts to look very much like something that must be built on a thoroughgoing representation. If it lets you introduce new algorithms for calculating the outcomes of changed parameters and values, then it is extremely well designed indeed. And so on. This evaluative scale is not, as it seems to be, based on functional characteristics: it uses those functional characteristics as an index to the infrastructure that is required to support certain kinds of functionality. On this scale of relative charlatanism, no perfectly exemplary project exists, as far as I know. But you see the principle implied by this scale – the more room a resource offers for the exercise of independent imagination and curiosity, the more substantially well thought-out, well-designed, and well-produced a resource it must be.

Finally, and most candidly, one asks the question »what is humanities computing« in order to justify, on the basis of
distinctions like those I have just drawn, new and continuing investments of personal, professional, institutional, and cultural resources. This investment could take the form of a funded project, or a new undergraduate or graduate degree, or a new Center or Institute. At this level, the activity that is humanities computing competes with other intellectual pursuits – history, literary study, religious study, etc. – for the hearts, minds, and purses of the university, and external funding agencies, even though, in practice, the particulars of humanities computing may well – and will likely – call upon and fall into one of its competitors' traditional disciplinary areas of expertise. So, as Willard McCarty has often noted, we have a problem distinguishing between computing in the service of a research agenda framed by the traditional parameters of the humanities, or, on the other hand, the much rarer, more peculiar case where the humanities research agenda itself is framed and formed by what we can do with computers.

So, given that humanities computing isn't general-purpose academic computing – isn't word-processing, email, web-browsing – what is it, and how do you know when you're doing it, or when you might need to learn how to do it? At the opening of this discussion, I said that

> [h]umanities computing is a practice of representation, a form of modeling or [...] mimicry. It is[...] a way of reasoning and a set of ontological commitments, and its representational practice is shaped by the need for efficient computation on the one hand, and for human communication on the other.[3]

I've long believed this, but the terms of these assertions are drawn from Davis, Shrobe, and Szolovits, *What is a Knowledge Representation?* in a 1993 issue of *AI Magazine*. As I unpack these terms, one at a time, I will begin by expanding my quotation of Davis et al. a little bit, stopping on each of six points to look at some examples from the realm of humanities computing, and concluding with some observations about why all of this matters.

**I. Humanities computing as model or mimicry**

Davis et al. use the term »surrogate« instead of »mimicry« or »model«. Here's what they say about surrogates:

> The first question about any surrogate is its intended identity: what is it a surrogate for? There must be some form of correspondence specified between the surrogate and its intended referent in the world; the correspondence is the semantics for the representation. The second question is fidelity: how close is the surrogate to the real thing? What attributes of the original does it capture and make explicit, and which does it omit? Perfect fidelity is in general impossible, both in practice and in principle. It is impossible in principle because any thing other than the thing itself is necessarily different from the thing itself (in location if nothing else). Put the other way around, the only completely
accurate representation of an object is the object itself. All other representations are inaccurate; they inevitably contain simplifying assumptions and possibly artifacts.[4]

I.1 Example

A catalogue record (vs. full-text representation). The catalogue record is obviously not the thing it refers to: it is, nonetheless, a certain kind of surrogate, and it captures and makes explicit certain attributes of the original object – title, author, publication date, number of pages, topical reference. It obviously omits others – the full text of the book, for example. Now, other types of surrogates would capture those features (a full-text transcription, for example) but would leave out still other aspects (illustrations, cover art, binding). You can go on pushing that as far as you like, or until you come up with a surrogate that is only distinguished from the original by not occupying the same space, but the point is all of these surrogates along the way are inaccurate; they inevitably contain simplifying assumptions and possibly artifacts[5] – meaning new features introduced by the process of creating the representation. Humanities computing, as a practice of knowledge representation, grapples with this realization that its representations are surrogates in a very self-conscious way, more self-conscious, I would say, than we generally are in the humanities when we »represent« the objects of our attention in essays, books, and lectures.

II. Humanities computing as a way of reasoning

Actually, what Davis et al. say is that any knowledge representation is a »fragmentary theory of intelligent reasoning,<sup>[6]</sup> and any knowledge representation begins with.

 [...] some insight indicating how people reason intelligently, or [...] some belief about what it means to reason intelligently at all [...] A representation's theory of intelligent reasoning is often implicit, but can be made more evident by examining its three components: (i) the representation's fundamental conception of intelligent inference; (ii) the set of inferences the representation sanctions; and (iii) the set of inferences it recommends. Where the sanctioned inferences indicate what can be inferred at all, the recommended inferences are concerned with what should be inferred. (Guidance is needed because the set of sanctioned inferences is typically far too large to be used indiscriminantly.) Where the ontology we examined earlier tells us how to see, the recommended inferences suggest how to reason. These components can also be seen as the representation's answers to three corresponding fundamental questions: (i) What does it mean to reason intelligently? (ii) What can we infer from what we know? and (iii) What ought we to infer from what we know? Answers to these questions are at the heart of a representation's spirit and mindset; knowing its position on these issues tells us a great deal about it.[7]

Later on, the authors quote a foundational paper by Marvin
Minsky, setting forth the frame theory. Minsky explains:

Whenever one encounters a new situation (or makes a substantial change in one's viewpoint), he selects from memory a structure called a frame; a remembered framework to be adapted to fit reality by changing details as necessary. A frame [...] represents a stereotyped situation, like being in a certain kind of living room, or going to a child's birthday party.\[8\]

And they go on to point out, in this quotation, how reasoning and representation are intertwined – how we think by way of representations.

II.1 Examples

A concordance. (i) the concordance's fundamental conception of intelligent inference? It assumes that verbal patterns in a text are a key to the meaning of that text. (ii) the set of inferences the concordance sanctions? It would support certain kinds of stylistic analysis, because it can report the frequency with which certain words are used in a text, or the frequency with which words of a certain length are used in a text, and it would support the inference that some words are not important, assuming it can use a stop-list, and if it incorporated a lemmatiser, it would support the notion that word-stems are more important than actual word forms, but (iii) the set of inferences it recommends? Most concordancing software makes sorting by frequency and examination of keywords in context much easier than other functions (or forms of inference).

A relational database. Think about how a relational database establishes the grounds of rational inference by establishing fields in records in tables, and think about how it sanctions any sort of question having to do with any combination of the elements in its tables, but actually recommends certain kinds of queries by establishing relationships between elements of different tables.

III. Humanities computing as a set of ontological commitments

On the matter of ontological commitments, Davis et al. say:

[S]electing a representation means making a set of ontological commitments. The commitments are in effect a strong pair of glasses that determine what we can see, bringing some part of the world into sharp focus, at the expense of blurring other parts. These commitments and their focusing/blurring effect are not an incidental side effect of a representation choice; they are of the essence: a KR is a set of ontological commitments. It is unavoidably so because of the inevitable imperfections of representations. It is usefully so because judicious selection of commitments provides the opportunity to focus attention on aspects of the world we believe to be relevant.\[9\]
III.1 Examples

OHCO (Renear, Mylonas, Durand: Refining our Notion of What Text Really Is from 1993 – same year as the Davis article, though to be fair it draws on an earlier piece, S. J. DeRose, D. G. Durand, E. Mylonas, and A. H. Renear (1990), What is Text, Really?). This view of text says that text is an Ordered Hierarchy of Content Objects, which means, for example, that content objects nest – paragraphs occur within chapters, chapters in volumes, and so on. It also means that a language that captures ordered hierarchical relationships and allows content to be carried within its expression of those relationships can capture what matters about text. Hence SGML. But, as Jerry McGann and others have pointed out, this view of text misses certain textual ontologies – metaphor, for example – because they are not hierarchical, or more accurately, they violate hierarchy. Davis et al. would say that’s not a sign of a flaw in SGML (or XML, which shares the same requirement for nesting) or in the OHCO thesis, but a sign that both are true knowledge representations – they bring certain things into focus and blur others, allowing us to pay particular attention to particular aspects of what’s out there.

Deborah Parker’s Dante Project: For a much simpler example, consider Deborah Parker’s SGML edition of Dante’s Inferno (<http://www.iath.virginia.edu/dante> (31.10.2002)). In this edition, Parker has marked up (in the TEI DTD) all of the cantos, stanzas, and lines in Dante’s poem, and then all of the proper names and epithets, distinguishing mythical, historical, biblical, and literary sources, different types of animals, different types of people, regularizing forms of proper names, etc. All of this implies that the form of the poem is important as a kind of substrate for references to proper names, and that by paying attention to the categories in which named things participate, we can learn something important about this poem.

IV. Humanities computing as shaped by the need for efficient computation

Davis et al. explain:

From a purely mechanistic view, reasoning in machines (and somewhat more debatably, in people) is a computational process. Simply put, to use a representation we must compute with it. As a result, questions about computational efficiency are inevitably central to the notion of representation.\[10\]

And later, they point out that different modes of representation have different efficiencies:

Traditional semantic nets facilitate bi-directional propagation by the simple expedient of providing an appropriate set of links, while rule-based systems facilitate plausible inferences by supplying indices from goals to rules whose conclusion matches
IV.1 Examples

*Markup and computation.* The reason for requiring that elements nest properly within a specified hierarchy is to enable efficient computation. In fact, the SGML grammar in its original form was really too flexible to be efficient, which is why certain features permitted in the grammar (like overlapping or concurrent hierarchies) were never implemented in software. XML simplifies out of SGML some of its other expressive possibilities – possibilities that made SGML difficult to write software for – and as a result, suddenly we have lots more software for XML than we ever had for SGML. On the other hand, none of this software is any good at computing things that can't be expressed in neatly nesting hierarchies.

*Latent semantic indexing.* Compare the characteristics of the concordance, and its efficiencies, with those of latent semantic indexing. Like the concordance,

> LSI relies on the constituent terms of a document to suggest the document's semantic content. However, the LSI model views the terms in a document as somewhat unreliable indicators of the concepts contained in the document. It assumes that the variability of word choice partially obscures the semantic structure of the document. By reducing the dimensionality of the term-document space, the underlying, semantic relationships between documents are revealed, and much of the noise (differences in word usage, terms that do not help distinguish documents, etc.) is eliminated. LSI statistically analyses the patterns of word usage across the entire document collection, placing documents with similar word usage patterns near each other in the term-document space, and allowing semantically-related documents to be near each other even though they may not share terms (Letsche and Barry, *Large-Scale Information Retrieval With Latent Semantic Indexing*).[12]

If you really believed that the occurrence of a particular word was the important thing, then you'd want to be working with the efficiencies of the concordance – but if, on the other hand, you believed that meaning was more important than the word chosen to express it, you'd want to be working with the efficiencies of latent semantic indexing.

V. Humanities computing as shaped by the need for human communication

Davis et al. conclude that any efficiency stands opposed in some way to the fullness of expression, and that

> either end of this spectrum seems problematic: we ignore computational considerations at our peril, but we can also be overly concerned with them, producing representations that are
Of course, there is something about the brute facticity of the computer that makes its results – especially when they are fast – seem definitive, so much so that we may overlook the inadequacy of a representation that seems to work well computationally. But eventually, we are likely to recognize inadequacy, and we are more likely to do so if we have not only to use these representations, but also to produce them. On this final point, Davis et al. go on to say:

Knowledge representations are also the means by which we express things about the world, the medium of expression and communication in which we tell the machine (and perhaps another) about the world. […] a medium of expression and communication for use by us. That in turn presents two important sets of questions. One set is familiar: How well does the representation function as a medium of expression? How general is it? How precise? Does it provide expressive adequacy? etc. An important question less often discussed is, How well does it function as a medium of communication? That is, how easy is it for us to »talk« or think in that language? What kinds of things are easily said in the language and what kinds of things are so difficult as to be pragmatically impossible? Note that the questions here are of the form »how easy is it?« rather than »can we?« This is a language we must use, so things that are possible in principle are useful but insufficient; the real question is one of pragmatic utility. If the representation makes things possible but not easy, then as real users we may never know whether we have misunderstood the representation and just do not know how to use it, or it truly cannot express some things we would like to say. A representation is the language in which we communicate, hence we must be able to speak it without heroic effort.

V.1 Example

The difficulty of using markup languages. Ever since we started using markup languages like SGML, one has heard expressed the fear that humanists would never be able to speak it »without heroic effort«. To be fair, good (and with XML, readily available) software removes some of the complexity – for example, by offering you only the elements that can legally be used in a particular point in the hierarchy. But still, you have to be able to grasp the purpose and intent of the DTD in order to use it sensibly, you have to understand the principles of stylesheets, and so on. It would probably be accurate, at this moment in the evolution of humanities computing, to say that markup languages are still problematic as a medium of communication. Experts can »talk« or »think« in these languages, but most of us cannot, and there are many examples out there, in discussions on TEI-L (the TEI users list) for example, where the question at issue is exactly whether one has misunderstood the TEI or whether it really cannot express some of the things we would like to say about literary and linguistic texts.
VI. Humanities Computing and Formal Expression

There is also one other feature of knowledge representations that Davis and his co-authors don't mention, because their discussion takes it for granted. That feature is the formal language in which any such representation must be expressed. This formal language can be any one that is composed of primitive symbols acted on by certain rules of formation (statements concerning the symbols, functions, and sentences allowable in the system) and developed by inference from a set of axioms. The system thus consists of any number of formulas built up through finite combinations of the primitive symbols – combinations that are formed from the axioms in accordance with the stated rules.[15]

For our purposes, what is important about the requirement of formal expression is that it puts humanities computing, or rather the computing humanist, in the position of having to do two things that mostly, in the humanities, we don't do: provide unambiguous expressions of ideas, and provide them according to stated rules. In short, once we begin to express our understanding of, say, a literary text in a language such as XML, a formal grammar that requires us to state the rules according to which we will deploy that grammar in a text or texts, then we find that our representation of the text is subject to verification – for internal consistency, and especially for consistency with the rules we have stated.

Conclusions

Having said what I think humanities computing is, it remains to say what it is good for, or why it matters. Why do we need to worry about whether we can express what we know about the humanities in formal language, in terms that are tractable to computation, in utterances that are internally coherent and consistent with a declared set of rules? Why indeed, when we know that to do this inevitably involves some loss of expressive power, some tradeoff at the expense of nuance, meaning, and significance? – My answer? Navigation and exchange.

We are by now well into a phase of civilization when the terrain to be mapped, explored, and annexed is information space, and what's mapped is not continents, regions, or acres but disciplines, ontologies, and concepts. We need representations in order to navigate this new world, and those representations need to be computable, because the computer mediates our access to this world, and those representations need to be produced at first-hand, by someone who knows the terrain. If, where the humanities should be represented, we in the humanities scrawl, or allow others to scrawl, »Here be dragons«, then we will have failed. We should not refuse to engage in representation simply because we feel no
representation can do justice to all that we know or feel about our territory. That's too fastidious. We ought to understand that maps are always schematic and simplified, but those qualities are what make them useful.

In some form, the semantic web is our future, and it will require formal representations of the human record. Those representations – ontologies, schemas, knowledge representations, call them what you will – should be produced by people trained in the humanities. Producing them is a discipline that requires training in the humanities, but also in elements of mathematics, logic, engineering, and computer science. Up to now, most of the people who have this mix of skills have been self-made, but as we become serious about making the known world computable, we will need to train such people deliberately. There is a great deal of work for such people to do – not all of it technical, by any means. Much of this map-making will be social work, consensus-building, compromise. But even that will need to be done by people who know how consensus can be enabled and embodied in a computational medium.

Consensus-based ontologies (in history, music, archaeology, architecture, literature, etc.) will be necessary, in a computational medium, if we hope to be able to travel across the borders of particular collections, institutions, languages, nations, in order to exchange ideas. Those ontologies will in turn exist in a network of topics, a web of `trading zones`, to use a term that Willard McCarty has used to explain humanities computing, having borrowed that term from a book that itself borrows concepts of anthropology to explain the practice of physics. And as that genealogy of that metaphor suggests, come tomorrow, we will require the rigor of computational methods in the discipline of the humanities not in spite of, but because of, the way that human understanding and human creativity violate containment, exceed representation, and muddle distinctions.

References and Further Readings


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(8. November 2002)

[2] Randall Davis/R. H. Shrobe/P. Szolovits: What is a Knowledge Representation?. In: Al Magazine 14(1) 1993, p.17-33; see the following site
Unsworth: What is Humanities Computing and What is not?

Does Digital Scholarship Have a Future?

By Edward L. Ayers

Twenty years into the transformation initiated by the World Wide Web, we have grown accustomed to a head-spinning pace of technological and social change. Innovations that would have amazed us ten years ago are now merely passing news, as transient as a tweet. Music, video, and journalism have been profoundly altered—and we have grown used to their new forms.
Even the academy, traditionally skeptical of externally generated change, has become blasé about web-induced transformation. Everyone assumes everyone else is on e-mail, is adept with digital library resources, and is electronically connected to professional organizations. Professors fire up Firefox or Skype or Google Earth in class without thinking about using “technology.” These are big changes in higher education, and they have come quickly.

Looking forward to the new century, Robert Darnton reimagined the monograph as a richly layered pyramid of analysis and documentation, of theory and pedagogy, of review and response.¹ During this same time, the Modern Language Association and the American Historical Association encouraged their disciplines to innovate, the Library of Congress and important research libraries fostered ambitious digitization efforts such as American Memory and Chronicling America, the American Council of Learned Societies fostered digital monographs, and the Andrew W. Mellon Foundation and the National Endowment for the Humanities encouraged bold experimentation and the creation of sustainable infrastructure. The pace of capacity-building continues today. Projects such as the Digital Public Library of America and HathiTrust foster exciting collaborations in building infrastructure and content.

The concept of digital scholarship has emerged to describe this activity. Although the phrase sometimes refers to issues surrounding copyright and open access and sometimes to scholarship analyzing the online world, digital scholarship—emanating, perhaps, from digital humanities—most frequently describes discipline-based scholarship produced with digital tools and presented in digital form. The University of Richmond’s Digital Scholarship Lab was established in 2007, and new centers have emerged at Rice, Brown, Emory, Miami, Ohio State, and Case Western...

The articles and books that scholars produce today bear little mark of the digital age in which they are created.
Universities, the Universities of Utah, Oregon, Kansas, and California at Irvine, Haverford College, Indiana University-Purdue University Indianapolis, and other colleges and universities. The tag has been used also for recent conferences and initiatives at Harvard, Yale, Cornell, Duke, and Macalester, as well as in the United Kingdom.

Though the recent popularity of the phrase digital scholarship reflects impressive interdisciplinary ambition and coherence, two crucial elements remain in short supply in the emerging field. First, the number of scholars willing to commit themselves and their careers to digital scholarship has not kept pace with institutional opportunities. Second, today few scholars are trying, as they did earlier in the web’s history, to reimagine the form as well as the substance of scholarship. In some ways, scholarly innovation has been domesticated, with the very ubiquity of the web bringing a lowered sense of excitement, possibility, and urgency. These two deficiencies form a reinforcing cycle: the diminished sense of possibility weakens the incentive for scholars to take risks, and the unwillingness to take risks limits the impact and excitement generated by boldly innovative projects.

To understand this situation, we need to step back for a moment to take a broader view of the scholarly enterprise. At its essence, the modern system of scholarship, regardless of discipline, is built around specialized contributions to scholarly conversations and debates. All forms of research and writing—books, journal articles, research papers, preprints, reviews—in all disciplines are fractals of this monographic orientation, fragments replicating the structures of the whole.

The monographic culture performs hard and essential work by reducing the range of risk in the inherently risky business of original scholarship. Freed by standardized format, annotation, evaluation, and review, scholars can focus on the one kind of innovation their departments and institutions are built to reward: advancing a disciplined and meaningful conversation. Their challenge is to say something different enough to further the conversation but not different enough to fall outside of it. Successful scholars, as reviews routinely repeat, make contributions and fill gaps, sustaining the conversation in ways large and small. Print scholarship follows a deliberate path toward publication, with research, evaluation, and revision being completed before the scholarship appears before the public. Then, another slow process of dissemination follows; it takes years for a book to be widely read, reviewed, comprehended, absorbed, and debated or built upon.

Monographic scholarship, though routinized in many ways, is restlessly creative in argument and perspective. Research universities have evolved in large part to produce, recognize, reward, and sustain this scholarly innovation. The monographic culture has become the universal language of global higher education, transcending boundaries of language and culture, of politics and political regimes. It has survived profound social conflict, violence, and change around the world. The monograph’s very ubiquity, its very invisibility, allows it to endure even when the ideas within it are revolutionary, subversive, or threatening. The form anchors innovative ideas in evidence, in debate, and in accountability—the highest ideals of the academy. As a result, monographic research has never been richer, more wide-ranging, or more inventive than it is today.

Viewing the present-day situation from the perspective of scholarship, we are perhaps not surprised that twenty years into the digital revolution—not so long in the big picture of the scholarly enterprise—the monographic culture feels little pressure or little incentive to change. In fact, the new digital networks have adapted themselves to print culture more than the other way around, with some of the most important digital innovations amplifying and strengthening traditional monographic scholarship. JSTOR and Google Books, for example, make the vast work of prior generations available to a digital audience. Digital publication—such as the online version of this article—permits authors to link to sources, authorities, and related work in helpful and convenient ways without changing a work’s format on paper.

There are examples of acceleration into a full, digital-only environment, of course. Scholars, libraries, and professional organizations in my own field of American history are sustaining innovations in online journals such as Southern Spaces and the Journal of Southern Religion and in digital meeting places such as Common-place and History News Network (HNN). These projects bridge traditional practice and digital possibilities in strategic ways, providing new opportunities without asking scholars to abandon the type of writing and thinking that has served them and us well for generations. Blogs and online conversations advance and deepen scholarly conversations, with their impact measured immediately in the number of downloads, views, forwards, comments, and tweets.
Yet, other aspects of the changing digital environment may not be encouraging digital scholarship. The large and highly visible investments being made in MOOCs, for example, lead some faculty to equate technology with the diminution of hard-won traditions of teaching and scholarship. Using new capacities in bandwidth, MOOCs extend well-established patterns of large lectures to audiences otherwise out of the hearing range of those lectures. Unlike digital scholarship, however, MOOCs make no claim to creating new disciplinary knowledge, to advancing the scholarly conversation, to unifying research and teaching.

On the other hand, MOOCs do show that colleges and universities can mobilize resources to be put into digital initiatives. Digital scholarship needs to make its own claims to these resources: doing so is essential for sustained scholarly progress in a new digital environment.

Digital scholarship, reimagined in bolder ways, is cost-effective, a smart return on investment. By radically extending the audience for a work of scholarship, by reaching students of many ages and backgrounds, by building the identity of the host institution, by attracting and keeping excellent faculty and students, by creating bonds between faculty and the library, and by advancing knowledge across many otherwise disparate disciplines, innovative digital scholarship makes sense. It can pay some of the democratizing dividends claimed for MOOCs at the same time that it can strengthen the time-proven culture of knowledge creation. Digital scholarship is the missing part of the cycle of productivity that we have long believed our investments in information technology would bring to institutions of higher education. Well-designed interactive digital scholarship projects could provide learners with discovery and collaboration tools that MOOCs otherwise do not possess.

In other words, digital scholarship may have greater impact if it takes fuller advantage of the digital medium and innovates more aggressively. Digital books and digital articles that mimic their print counterparts may be efficient, but they do not expand our imagination of what scholarship could be in an era of boundlessness, an era of ubiquity. They do not imagine other forms in which scholarship might live in a time when our audiences can be far more vast and varied than in previous generations.

They do not challenge us to think about keeping alive the best traditions of the academy by adapting those traditions to the possibilities of our own time. They do not encourage new kinds of writing, of seeing, of explaining. And we need all those things.

To have this impact, digital scholarship needs a greater focus and purpose, a greater sense of collective identity. It needs to present itself less as a series of isolated experiments and more as a self-conscious movement across higher education. Digital scholarship can reframe issues of enduring interest with broad arrays of information, it can integrate vast scholarly literature into more useful forms, and it can significantly broaden our temporal or spatial comprehension. In short, digital scholarship needs to do things that simply cannot be done on paper.

How can we advance digital scholarship? By thinking of larger possibilities. Although there is no guarantee that ambitious projects will mobilize support, win attention, or exert large effects, without that ambition large amounts of support will certainly not be forthcoming. Funding agencies have shown themselves willing to back big projects if scholars can imagine compelling efforts that will create templates for other projects in other fields.

Over the last twenty years, we have learned important lessons about what large digital projects might do. Clearly, digital scholarship needs to feature interpretation, explanation, and explication. Early digital projects tended to replicate archives, build tools, or offer proof-of-concept efforts; those projects were not recognized as scholarship because they did not make scholarly arguments. Interpretation must be an integral and explicit part of the fundamental architecture of new efforts. Insisting that colleges and universities broaden their standards and definitions of scholarship to make room for digital scholarship is necessary, but it
is only a partial answer. To be recognized and rewarded as scholarship in the traditional sense, digital scholarship must do the work we have long expected scholarship to do: contribute, in a meaningful and enduring way, to an identifiable collective and cumulative enterprise.

And indeed, digital scholarship has already demonstrated a powerful capacity that print scholarship seldom even attempts: the ability to reach a very large and diverse audience. The first generation of digital projects, despite their technical limitations, demonstrated a surprising and heartening hunger for primary sources, for interactive tools, for exploration, and for compelling evidence. Digital scholarship can meet that desire at the same time that it offers more interpretation and explication than was provided in the early archival projects. Done thoughtfully, digital scholarship can be of great—and free—use for lifelong learners, for K–12 classrooms, for community colleges, and for colleges and universities of all types. Digital scholarship holds out a rare promise of both advancing scholarly conversations and performing a democratic service.

By way of example, the Digital Scholarship Lab at the University of Richmond is attempting to build one model of what this new scholarship might look like. The lab combines various elements of proven strategies while also breaking new ground. With the support of the Andrew W. Mellon Foundation, the historians Robert K. Nelson and Scott Nesbit and their colleagues are creating a digital atlas of American history. The first instantiation of the atlas, Visualizing Emancipation, will soon be followed by an amplified, annotated, and animated digital edition of The Atlas of the Historical Geography of the United States, first published in 1932. Over the next three years, chapters of original and dynamic maps and interpretations will focus on key aspects of the American experience since the nation’s founding. The digital
atlas will allow scholars to see patterns we have never been able to envision before while at the same time it will make available to teachers of all levels visualizations of crucial processes in American history.

The Digital Scholarship Lab atlas will be a part of what we call generative scholarship—scholarship that builds ongoing, ever-growing digital environments even as it is used. Generative scholarship is framed with significant disciplinary questions in mind, offers scholarly interpretation in multiple forms as it is being built, and invites collaborators ranging from undergraduate students to senior researchers to public historians. The atlas, like generative scholarship more broadly, will attempt to enhance the essential aspects of monographic scholarship even as it does things that simply could not be done in print. Generative scholarship does not claim to have the last word but, rather, to be a way to open scholarship to new ideas from many directions.

As we try to foster digital scholarship in the years ahead, we need to begin by understanding the cultural, economic, personal, and institutional world in which the new scholarship will live. That scholarly world defines a problem within a meaningful conversation, it arranges evidence to address the problem, it makes the clearest case for a solution to the problem, and it conveys that case to every relevant audience. Digital scholarship must assume all of those responsibilities if it is to take its place as academic scholarship and if it is to align the core purpose of higher education with the possibilities of our time.

Notes
1. Alan Gross and Joseph Harmon, The Future Is Already Here: The Internet Revolution in Science and Scholarship (forthcoming). The authors may be reached at agross@umn.edu and harmon@anl.gov. I am grateful to them for sharing their impressive work with me.

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DIGITAL_HUMANITIES

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A PORTFOLIO OF CASE STUDIES

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AFTERWORD: NOTES ON PRODUCTION

REFERENCE NETWORKS
WE LIVE in one of those rare moments of opportunity for the humanities, not unlike other great eras of cultural-historical transformation such as the shift from the scroll to the codex, the invention of moveable type, the encounter with the New World, and the Industrial Revolution. Ours is an era in which the humanities have the potential to play a vastly expanded creative role in public life. The present volume puts itself forward in support of a Digital Humanities that asks what it means to be a human being in the networked information age and to participate in fluid communities of practice, asking and answering research questions that cannot be reduced to a single genre, medium, discipline, or institution. Digital Humanities represents a major expansion of the purview of the humanities, precisely because it brings the values, representational and interpretive practices, meaning-making strategies, complexities, and ambiguities of being human into every realm of experience and knowledge of the world. It is a global, trans-historical, and transmedia approach to knowledge and meaning-making.

Yet there remains a chorus of contemporary voices bewailing yet another “definitive” crisis in humanistic culture, yet another sacrifice of quality on the altar of “mere” quantity. Our response is not just a counterargument in favor of new convergences between quality and quantity, but also one in favor of a model of culture embodied by this book itself. We do not think the humanities are in perpetual crisis or imperiled by another battle for legitimacy with the sciences. Instead, we see this moment as marking a fundamental shift in the perception of the core creative activities of being human, in which the values and knowledge of the humanities are seen as crucial for shaping every domain of culture and society.

The model we have created is experimental. It moves design—information design, graphics, typography, formal and rhetorical patterning—to the center of the research questions that it poses. It understands digital and physical making as inextricably and productively intertwined. This model is collaborative and committed to public knowledge. Crafted for a heterogeneous audience with crisscrossing and even contradictory interests and needs, it is meant as a porous multiple construct: a guidebook for the perplexed, a report on the state of the field, a vision statement regarding the future, an encouragement to engage, and a tool for critically positioning new forms of scholarship with respect to contemporary society.

What you are reading is a collaboratively crafted work. Each of the authors contributed to the writing, editing, reworking, and final composition of the whole. Each has brought to this endeavor theoretical and conceptual engagements based upon personal experience, a commitment to experimental forms of scholarship, and expertise working with media, developing digital platforms, and engaging in design practice.
The first three chapters offer synthetic mappings of the field, its emerging methodologies, and its social characteristics. Chapter 1, *Humanities to Digital Humanities*, explores emerging forms of transmedia research and the increasing importance of prototyping, experimentation, and tool and platform development for contemporary scholarship in the humanities. Chapter 2, *Emerging Methods and Genres*, charts new ways of doing things using digital tools and platforms that extend traditional scholarly practices or devise entirely new ones (whether new fields of inquiry or new models of dissemination and practice): the shapes that scholarly knowledge can assume in digital environments, the models of practice that are becoming prevalent, and the units of argument of which they are composed. Chapter 3, *The Social Life of the Digital Humanities*, analyzes the real and potential roles that Digital Humanities projects are playing in contemporary society, the purposes they serve, the communities engaged by them, and the values they affirm.

Chapter 4, *Provocations*, builds from the synoptic to offer a series of propositions regarding what the future might hold for the Digital Humanities specifically and the humanities generally. The conclusions are speculative, raising thorny questions whose answers necessarily lie beyond the scope of present knowledge.

In addition to the main chapters, there are two other components to this book. At the end of Chapter 2, we offer *A Portfolio of Case Studies* for launching Digital Humanities projects into the world. To avoid forming an inadvertent canon, we have chosen not to pick from the host of exemplary Digital Humanities projects that already exist, many of long-standing impact and significance. Instead, we chose to aggregate and synthesize their defining features in the form of speculative case studies, fictions that delineate emerging methods and genres informed by present capabilities and resonant with the lessons gleaned from several decades of pioneering work. Our goal here and elsewhere in this book is to provide a concrete framework for the creation of generative scholarship. The case studies provide models for building teams, assembling necessary technical resources, and situating the projects within cross-disciplinary and multi-institutional configurations.

Following Chapter 4, we present *A Short Guide to the Digital Humanities*. Here we condense the arguments in the book into three sets of questions & answers that serve both the initiated and the novice alike. We provide a short overview of the fundamentals of the Digital Humanities, answer why projects are the basic unit for Digital Humanities scholarship, and describe the institutional relationships that grow out of and contribute to Digital Humanities work. Understanding how and according to what criteria these modes can be evaluated have become matters of institutional urgency. To this end, *A Short Guide* identifies five areas in which Digital Humanities
Humanities work is currently being produced and assessed, translating each of them into a checklist of items referred to as **SPECIFICATIONS**. The specifications outline the ethics, values, methods, and best practices for student and faculty researchers, staff, administrative officials, faculty committees, and others involved in the production, oversight, or review of digital projects. They are intended as guides for parties interested in designing and fostering project-based scholarship, determining core competencies and methods, adopting assessment criteria for digital work, measuring outcomes, and engaging in advocacy for the Digital Humanities. We are openly distributing a **SHORT GUIDE** on the Web and via social media as we hope that this compact form will serve to bring colleagues and students up to speed, and offer support to those who are charged with evaluating emerging Digital Humanities work within existing institutional frameworks.

**AFTERWORD: NOTES ON PRODUCTION** details how the book’s collaborative authoring and design process evolved, and what lessons it might offer to others interested in pursuing new modes of knowledge formation. Finally, **REFERENCE NETWORKS** points outward, linking this book to the discourses and practices of this dynamically changing field.

The attentive reader will already have noticed that *Digital_Humanities* is not a standard-format academic work. It is not a collection of individually authored scholarly papers or research reports on the history of, or critical engagement with, the Digital Humanities. Neither is it a textbook from which to teach the discipline’s foundations nor a manual of technical specifications, much less a discussion of every facet of the field, its protagonists, successes and failures, and defining moments. In lieu of a bibliography, it includes a “reference network” and list of works cited.

That is because the Digital Humanities remains at its core a profoundly collaborative enterprise. Over the decades, a diverse array of individuals, projects, and organizations has built the field of Digital Humanities as it exists today. We cite some of these precursors and colleagues in our text, while many more of them inform the book’s ideas and arguments. In shaping this volume, we have striven not to privilege one lineage or another within the Digital Humanities, seeking instead an encompassing yet polemical voice that speaks both inside and outside the walls of the academy. Accordingly, our case studies are fictional, our quotations of specific figures and theorists sparing, and our language direct.

This book is a compact work composed by a group of practitioners from a variety of humanities disciplines and fields, including design. For all their diversity, the authors share a core conviction that informs every page of the book. This core conviction is embodied in the title of our book, *Digital_Humanities*. The underscore
between the two words references the white space between them as a vital yoke and shifting signifier, one that presents the two concepts in a productive tension, without either becoming absorbed into the other. The underscore is not merely a graphical notation; rather, it is used deliberately as an overdetermined marker of the critical nexus between “digital” and “humanities.” It references the precarious, experimental, and undefined future of the humanities in a world fundamentally transformed by everything digital. Although we do not use the underscore throughout the text, it remains the subject of every page of this book. And while it may seem paradoxical to write a book called *Digital_Humanities*, the very act demonstrates the continuities that link current practice to long-standing traditions.

We graciously acknowledge the support of the Andrew W. Mellon Foundation and the UCLA-based Andrew W. Mellon Foundation Grant for Transformational Support in the Humanities led by Ali Behdad and Timothy Stowell as well as participants in the 2008-09 seminar “What is(n’t) Digital Humanities?”

Earlier versions of some of the ideas in this book were expressed in the UCLA white paper “The Promise of Digital Humanities,” co-authored by Todd Presner and Chris Johanson, as well as the proposals for the UCLA Digital Humanities minor and graduate certificate, co-authored with Johanna Drucker, Diane Favro, Chris Johanson, Todd Presner, Janice Reiff, and Willeke Wendrich. The authors also thank David Shepard and Miriam Posner for their critical feedback.

The specification “How to Evaluate Digital Scholarship” includes contributions and language provided by John Dagenais, Diane Favro, and Willeke Wendrich.

We thank the graduate program in Media Design Practices at Art Center College of Design for providing space and resources, and in particular, for the fresh perspective of graduate research interns Brooklyn Brown, Bora Shin, Matthew Manos, and Jayne Vidheecharoen.

Orli Low’s copy-editing not only cleaned up our prose, but her questions sharpened our thoughts. Thanks to Doug Sery, our editor at the MIT Press, who has long championed the intersections of academic inquiry and generative practice.
1. HUMANITIES TO DIGITAL HUMANITIES
Digital Humanities is born of the encounter between traditional humanities and computational methods.

With the migration of cultural materials into networked environments, questions regarding the production, availability, validity, and stewardship of these materials present new challenges and opportunities for humanists. In contrast with most traditional forms of scholarship, digital approaches are conspicuously collaborative and generative, even as they remain grounded in the traditions of humanistic inquiry. This changes the culture of humanities work as well as the questions that can be asked of the materials and objects that comprise the humanistic corpus.
CONFRONTING the massive transformation of knowledge, society, and culture that is underway in the digital age, this book takes stock of this new world as well as anticipates future developments in the Digital Humanities. Building on earlier generations of computational approaches to humanities research—with emphasis on the creation, preservation, and interpretation of the cultural record—the Digital Humanities has greatly expanded the potential power and reach of the humanities disciplines, both within the academy, and, just as importantly, outside its walls.

Even though we recognize the game-changing implications of the adjective “digital,” it is on the “humanities” that our attention is concentrated in this chapter. As they developed from their classical and early modern precursors, the disciplines that make up the modern humanities—including, but not limited to, literature, philosophy, classics, rhetoric, history, and studies of art, music, and design—have sought to define culture and help us gain a greater understanding of the human experience. The humanities are siblings of the sciences in their embrace of intellectual rigor and free inquiry. But while the humanities do not shun empirical methods, they have rarely been characterized by the strictest forms of empiricism. Within their fold there has not only been room but also a sense of urgency regarding the need to confront questions of worth, cultural significance, and deeper meaning. Humanists engage with questions of value and interpretation, with the realms of rhetoric as well as logic, with subjective judgment alongside attention to verifiable truths. The spectrum of humanistic thought, like that of scientific investigation, encompasses the gamut of beliefs regarding the nature of knowledge, the world, and the human ability to establish understanding with various degrees of certainty. Digital capabilities have challenged the humanist to make explicit many of the premises on which those understandings are based in order to make them operative in computational environments.

This chapter opens with a discussion of what precisely we mean by the humanities in the broadest sense and then moves on to a historical account of the earliest attempts to meld humanistic inquiry with digital technologies. In moving past the first generations of Digital Humanities practice, we shift to outlining the implications of design, and specifically design for transmedia modes of argumentation, as a model for contemporary work. The emphasis on design depends on robust technological environments in order to manifest across media, so we discuss
how the basics of computation and processing affect the design and implementation of Digital Humanities projects. These projects engage with any number of different methodologies and approaches, but here we concentrate on four: curation, analysis, editing, and modeling as central to contemporary humanistic inquiry. These intertwinings of scholarly method, computational capacity, and new modes of knowledge formation combine to make possible what we term the Generative Humanities, a mode of practice that depends on rapid cycles of prototyping and testing, a willingness to embrace productive failure, and the realization that any “solutions” generated within the Digital Humanities will spawn new “problems”—and that this is all to the good. Finally, we conclude this chapter by making the argument that the Digital Humanities may well function as a core curriculum for the 21st century.

From Humanism to the Humanities

While the foundations of humanistic inquiry and the liberal arts can be traced back in the West to the medieval trivium and quadrivium, the modern human sciences are rooted in the Renaissance shift from a medieval, church-dominated, theocratic worldview to a human-centered one. The philosophical systems of Renaissance thought, mirrored in the graphical structure of monocular perspective, had human subjects at their core. The gradual transformation of early humanism into the disciplines that make up the humanities today was profoundly shaped by the editorial practices involved in the recovery of the corpus of works from classical antiquity, many preserved in Greek and Arabic manuscripts in Byzantine and Islamic centers of learning. As the first universities were established in the High Middle Ages and monastic scriptoria were joined by university-based scribal shops working under the pecia system as well as by courtly scriptoria, a publishing industry arose that fostered a reading public interested in secular as well as scientific and literary matters. The development of vernacular languages and literary forms further expanded the compass of humanistic expression, with the poetry of Dante, Petrarch, and Chaucer as well as the translations of texts from Latin, Greek, Old English, Norse, French, German, and other languages finding their place alongside the classical canon. The wellsprings of humanism were fed by many sources, but the meticulous (and, sometimes, not-so-meticulous) transcription, translation, editing, and annotation of texts
were their legacy. The printing press enabled the standardization and dissemination of humanistic cultural corpora while promoting the further development and refinement of editorial techniques. Along with many other scholars, we suggest that the migration of cultural materials into digital media is a process analogous to the flowering of Renaissance and post-Renaissance print culture.

The shift from humanism to the institutionally sanctioned disciplinary practices and protocols that we associate with the humanities today is best described as a gradual process of subdivision and specialization. Carried out in the course of the modernization of the medieval university, the process was powerfully inflected by the rise of princely academies in the 16th and 17th centuries, and, in their wake, of learned societies and national academies in the 18th and 19th centuries. Each of these had their own licenses on knowledge, as well as professional rituals, meetings, and publications. By the second half of the 19th century, with industrialization in full swing and the building of public school systems and public universities underway in Europe and the United States, the humanities began to assume their contemporary guise. This is the era in which the study of literature, philosophy, and classics was split off from the natural and physical sciences, even as “history” and the historical disciplines came to be understood as expressions of *Wissenschaft* in the double sense of a “science” and a discipline endowed with a distinctive toolkit for grappling with the cultural record.

Within this universe, the edifice of the humanities was firmly anchored in classical philology with fields such as archaeology, art history, and linguistics emerging only gradually from the shadow of textual studies. At the turn of the 20th century, in the Anglophone context, departments of literature began to be established as departments of, first, medieval and Renaissance and, later, modern philology. Focused primarily on the study of language and rhetoric, they soon became organized by national literature groupings and by media. Though their roots reach back to Goethian notions of *Weltliteratur* and to 19th century departments of comparative philology, comparative literature departments begin to emerge on the worldwide stage during the interwar period, in the midst of political upheaval, resurgent nationalism, and the threat of totalitarianism. A key moment in this history is marked by the post-World War II diaspora that saw classically trained philologists such as Erich Auerbach, Leo Spitzer, and René Wellek cross the Atlantic to take up positions in leading American universities.
Significantly, text-based disciplines and studies (classics, literature, philosophy, the history of ideas), make up, from the very start, the core of both the humanities and of the Great Books curricula instituted in the 1920s and 1930s. (For all their importance to the history of civilization, “Great Dance Performances” or “Great Architecture” never formed the basis of liberal arts curricula.) In other words, modern concepts of humanistic knowledge were built on authoring, narrative, and textual models specific to the medium of print, with the monograph gradually supplanting commentaries and critical editions as the inviolable touchstone of scholarly knowledge and achievement. Such models were, and still are, deemed to provide essential skills in rhetoric and analysis considered crucial in training for the professions of law, clergy, military, and statesmanship. By the mid-20th century, the modern research university assumed its present form, with segmented humanities departments separated from the natural and social sciences as well as from vocational and professional schools. Digital work challenges many of these separations, promoting dialogue not only across established disciplinary lines but also across the pure/applied, qualitative/quantitative, and theoretical/practical divides.

But to make the argument for why the humanities remain more necessary than ever, we have to go beyond mere bromides celebrating the inherent value of cultural tradition or the inherent value of a familiarity with certain achievements from the cultural-historical past. No matter how imperiled by vocationalism, cost-cutting administrators, or the self-inflicted wounds of internecine battles, the humanities must survive because they embody distinctive modes of producing knowledge and distinctive models of knowledge itself. We refuse to take the default position that the humanities are in “crisis,” in part because this very rhetoric of crisis has persisted for well over a century, however many mutations it has undergone. Jeremiads regarding the decline of educational standards, the failure of students and faculty alike to adequately embrace humanistic ideals, and the demise of tradition may well be inherent to the process of education itself. Digital_Humanities adopts a different view: It envisages the present era as one of exceptional promise for the renewal of humanistic scholarship and sets out to demonstrate the contributions of contemporary humanities scholarship to new modes of knowledge formation enabled by networked, digital environments.
Beginnings of Digitization

The first waves of the humanities’ engagement with networks and computation embraced pioneering work from the late 1940s and the models that inspired archival projects at Oxford in the early 1970s. Over subsequent decades, the humanities continued to imagine the digital as a way of extending the toolkits of traditional scholarship and opening up archives and databases to wider audiences of users. These activities typically focused on corpus building, on creating standards for text encoding, and on building databases that could facilitate work on humanistic corpora, as librarians and information specialists developed machine-readable records, file formats, and systems that could support these ventures.

Gathering momentum from the late 1980s through the start of the 21st century, a first wave of Digital Humanities developed, critiqued, and disseminated ways of structuring humanities data to dialogue effectively with computation. Database tools provided the foundation of the first Digital Humanities projects that were seeded around the world. Though this work was varied in nature, there were common, salient features: a concern with textual analysis and cataloging, the study of linguistic features, an emphasis on pedagogical supports and learning environments, and research questions driven by analyzing structured data. The migration of materials into digital forms and the extension of traditional methods of editing and analysis, enhanced by automation, took precedence. Important initiatives included the Perseus project, which converted the corpus of classical literature into digital form; the Women Writers Project, which created archives in which famous and obscure writers could coexist alongside an apparatus of cross references to their publications and textual borrowings; and The Valley of the Shadow, which posed questions about the role of primary documents in the work of cultural historians. Scholars then expanded and began to devise collaborative, multi-authored, cross-platform work on topics within their areas of specialization as well as to engage with emerging forms of digital culture. In this they were like the contemporary artists, poets, and musicians making imaginative use of algorithms to generate new works and taking advantage of communications networks to craft telematic projects or works in cross-media formats.

The advent of the Web in the early 1990s accelerated the transition in digital scholarship from processing to networking. The need for standards and conventions took on urgency, just as the need for a uniform gauge of rail or a point-size
system for the casting of metal type or a common telegraphic code had in earlier moments of technological development. The graphical user interface introduced new possibilities and expectations. Games, entertainment, and immersive virtual environments all migrated online. Expectations about the quality of graphics rose as bandwidth opportunities exploded. The development of innovative, multimedia expressions of humanistic research in digital environments had to mature alongside these advancements. New tools and methods, new ways of thinking and working—what might be called “theory in practice”—all needed time to move beyond text-based models and immerse themselves in the multidimensional world of the Web. Scholars began to wrestle with the methods of mass-media art, corporate platforms, and entertainment, wondering if they should ignore them, make use of them, or counter them. The struggle is still underway.

In the late 1990s, projects began to appear that harnessed the digital to create visualizations, geospatial representations, simulated spaces, and network analyses of complex systems. For example, repository development on a massive scale, such as that undertaken by Europeana, engages multiple partners and stakeholders to make cultural legacy available to broad publics for a wide range of purposes. Questions about how to infuse the technological underpinnings of these approaches with humanistic methods and values remain. Challenges lie everywhere and, with them, opportunities to once again make explicit the value of humanistic modes of inquiry, thought, and creativity. How might the history of ancient scroll design and late medieval page layouts reshape our imaginings of the expressive possibilities of digital scrolling or digital page units? Can computational and digital environments be designed to capture the fluidity of an intercultural dialogue between diasporic peoples? What lessons can be carried over from successful forms of interactive media into the world of teaching or into the communication of research and historical knowledge to the public-at-large? What media forms and modalities of engagement might a critical edition of an audio recording assume? We see such questions and the many others that accompany them as harbingers of renewal, signs that this is a galvanizing moment to be a humanist involved in devising, designing, and deploying new tools; in opening expanded modes of inquiry unthinkable under pre-digital conditions; and in forging innovative, multimodal approaches to traditional questions (about authorship, influence, dissemination patterns) through the as-yet-unrealized possibilities of digital platforms.
Transmedia Modes of Argumentation

Printed books and humanistic scholarship have a shared history. For centuries, humanists have worked with formats—the printed page, the bound codex—that have remained essentially consistent. But communication in digital environments has required the invention of new forms, tools, and schemata. The lack of conventions and the opportunity to imagine formats with very different affordances than print have not only brought about recognition of the socio-cultural construction and cognitive implications of standard print formats, but have also highlighted the role of design in communication. Modeling knowledge in digital environments requires the perspectives of humanists, designers, and technologists.

In the 21st century, we communicate in media significantly more varied, extensible, and multiplicative than linear text. From scalable databases to information visualizations, from video lectures to multiuser virtual platforms, serious content and rigorous argumentation take shape across multiple platforms and media. The best Digital Humanities pedagogy and research projects train students both in “reading” and “writing” these emergent rhetorics and in understanding how they reshape and remodel humanistic knowledge. This means developing critically informed literacies expansive enough to include graphic design, visual narrative, time-based media, and the development of interfaces (rather than the rote acceptance of them as off-the-shelf products). The second half of the 20th century saw the development of such literacies in fits and starts. They now move front and center inasmuch as the advent of Digital Humanities implies a reinterpretation of the humanities as a generative enterprise: one in which students and faculty alike are making things as they study and perform research, generating not just texts (in the form of analysis, commentary, narration, critique) but also images, interactions, cross-media corpora, software, and platforms.

Because Digital Humanities is a generative practice, it demands an additive pedagogy. Students still have to be trained in the persuasive use of language, to write effectively in long forms, but they also need to be able to craft what Roman rhetoricians called the multum in parvo—the aphorism, the short form, that which distills the long and the large into compact form. This is not only to address the (perhaps apocryphal) short length of the contemporary attention span—was there ever a golden age of rapt audiences with limitless patience? rhetorical treatises from classical antiquity suggest that there wasn’t—but also the realities of a wired
world in which the “real estate” available for text and images is ever-shifting and in which argumentation must be able to expand and contract as a function of shifting constraints and technological affordances. Roman teachers of rhetoric would have no difficulty in understanding this challenge, but they might well wonder about our devaluation of the oral component of their ancient art. In the era of pervasive personal broadcasting, the art of oratory must be rediscovered. This is because digital networks and media have brought orality back into the mainstream of argumentation after a half-millennium in which it was mostly cast in a supporting role vis-à-vis print. YouTube lectures, podcasts, audio books, and the ubiquity of what is sometimes referred to as “demo culture” in the Digital Humanities all contribute to the resurgence of voice, of gesture, of extemporaneous speaking, of embodied performances of argument. But unlike in the past, such performances can be recorded, disseminated, and remixed, thereby becoming units of polymorphous exchange and productive mutation.

Digital Humanities necessarily partakes in and contributes to the “screen culture” of the 21st century. From stationary computer monitors to mobile tablets, postage stamp sized-LCDs on communication devices to dynamic, building-sized imagescapes, screens have become pervasive in contemporary life. What this means is that the visual becomes ever more fundamental to the Digital Humanities, in ways that complement, enhance, and sometimes are in tension with the textual. There is no either/or, no simple interchangeability between language and the visual, no strict subordination of the one to the other. Words are themselves visual but other kinds of visual constructs do different things. The question is how to use each to its best effect and to devise meaningful intertwinglings, to use Theodor Nelson’s ludic neologism. The visual does not necessarily represent an advance over the capabilities of text. It is simply a different, distinct medium for thinking, communicating, and working, with its own rigor and histories, its own skill-sets and language, and its own freedoms and constraints.

The suite of expressive forms now encompasses the use of sound, motion graphics, animation, screen capture, video, audio, and the appropriation and remixing of code that underlies game engines. This expanded range of communicative tools requires those who are engaged in Digital Humanities work to familiarize themselves with issues, discussions, and debates in design fields, especially communication and interaction design. Like their print predecessors, format conventions in screen environments can become naturalized all too quickly, with the result that
the thinking that informed their design goes unperceived. Though there is no “natural” way to interweave text, images, sound and moving images, there exists a range of available genre models from experiments unique to the digital realm to ones that draw upon prior moments in the history of print and cinematic conventions. Digital design expresses concepts by means of the multitude of ways in which it layers media, structures information, and articulates navigational strategies. Though not every project requires a custom approach or platform, attention to the design of arguments is a fundamental feature of Digital Humanities research.

Designing Digital Humanities

Like the word “writing,” the word “design” encompasses an array of activities from the everyday to the highly specialized. “Big D” design ranges from the business plans and systems of “design thinking” to the “design sciences,” which include engineering and human-computer interaction, to the cultural critique and speculative provocations of “critical design.” In between are myriad professional specializations and academic domains. Digital Humanities projects most closely involve communication/graphic/visual designers who are concerned with the symbolic representation of language, the graphical expression of concepts, and questions of style and identity. Interaction/user experience designers, with their focus on interface, behavior, and digital systems, and media designers who combine communication and interaction also bring expertise that is critical to the design of operations and environments that structure the ways in which ideas come into being.

In generative mode, these designers shape structural logics, rhetorical schemata, information hierarchies, experiential qualities, cultural positioning, and narrative strategies. When working analytically, their task is to visually interpret, remap or reframe, reveal patterns, deconstruct, reconstruct, situate, and critique.

To design new structures of argumentation is an entirely different activity than to form argumentation within existing structures that have been codified and variously naturalized. All forms of design share a propositional orientation that is well-suited to the challenges that come with designing new structures, for design asks: “What if?” Each design iteration plays out an answer to the question: “What happens when...?” In a world with fluid contours, humanists, designers and technologists working together can move beyond considering what can be done with the tools at hand to ask: “What can we imagine doing that may not yet be possible?”
For digital humanists, design is a creative practice harnessing cultural, social, economic, and technological constraints in order to bring systems and objects into the world. Design in dialogue with research is simply a technique, but when used to pose and frame questions about knowledge, design becomes an intellectual method. In the hundred-plus years during which a self-conscious practice of design has existed, the field has successfully exploited technology for cultural production, either as useful design technologies in and of themselves, or by shaping the culture’s technological imaginary. As Digital Humanities both shapes and interprets this imaginary, its engagement with design as a method of thinking-through-practice is indispensable. Digital Humanities is a production-based endeavor in which theoretical issues get tested in the design of implementations, and implementations are loci of theoretical reflection and elaboration.

In addition to modeling the platforms, tools, databases, and other information structures on which digital projects are built, designers understand the possibilities and limitations of each of the specific media forms employed in such projects. Digital humanists have much to learn from communication and media design about how to juxtapose and integrate words and images, create hierarchies of reading, forge pathways of understanding, deploy grids and templates to best effect, and develop navigational schemata that guide and produce meaningful interactions. Not every digital humanist will become a designer, but every good digital humanist has to be able to “read” and appreciate that which design has to offer, to build the shared vocabulary and mutual respect that can lead to fruitful collaborations. Understanding the rhetoric of design, its persuasive force and central role in the shaping of arguments, is a critical tool for digital work in all disciplines. But rhetoric is a distinctly humanist skill, one that ventures out into new directions in a digital environment that the humanist of the 21st century is called upon to master.

A number of influential 20th century media culture experiments that combine the visual and the verbal in equal measure provide a glimpse at the potential of collaborations between design and the humanities. The confluence of Marshall McLuhan’s words with Quentin Fiore’s images and book design in *The Medium is the Massage* could be seen as a precursor to contemporary Digital Humanities work, both for the form of its argument and for its collaborative production, orchestrated by producer Jerome Agel. Similarly, John Berger’s book *Ways of Seeing* is meant to be both viewed and read in what could be considered a prototypical transmedia project. The book was originally a BBC television series. And while graphic novels
and comics are by definition a combination of words and pictures, Scott McCloud’s *Understanding Comics* is a noteworthy graphic nonfiction essay: it enacts an analysis of the interplay between text and image in spatialized sequential narratives through the use of text and image in a spatialized sequential narrative.

Each of these projects brought new forms of argumentation to the static page. But the screen culture of Digital Humanities is often dynamic and time-based, drawing on a multitude of traditions of media practice. Here, the aesthetics and technics of film and video are particularly relevant. Being able to block out sequences and actions, light and frame shots, edit for sense and rhythm, and compose and produce music and sound—this and more comprise the fundamentals of moving image production. Techniques for editing shots to create scenes, narratives, or emotional effects, mixing in sound, virtual simulations, and other special effects to create a cohesive whole are the essence of what is referred to as “post-production.”

One need only consider the subtle and tightly controlled interplay among words, sound, and images of films such as Chris Marker’s *Sans Soleil* or Errol Morris’ *Fast Cheap & Out of Control* to understand that these techniques are—as with design—about more than simply production: They are the means with which to investigate and articulate an idea.

The addition of other graphic supports such as charts, graphs, and animations, which are often essential in making a Digital Humanities argument, tend to extend the process even beyond the classical structures of film and television aesthetics into the hybridized realms of the motion graphic or information visualization. An early example of this mixing is Charles and Ray Eames’s short film *Powers of Ten* which combined a filmic first person perspective with didactic narration and information graphics to create a complete work whose sum is greater than its parts—what designers refer to as the gestalt. Now, distributed digital systems make it possible to combine live data streams and interactive systems in which real-time input can be displayed on maps, projection systems, and immersive 3-D environments, animated by means of a rich array of “born digital” visual effects. Processing embedded sensor input or engaging with feeds from social media challenges the very concept of the archive which has now come to encompass the realm of live, unfolding events. The design of each of these dynamic aspects is not simply a display or interface “problem” to be “solved”—it is, as with *Powers of Ten*, the embodiment of a project’s argument and methodology.
Digital media have become the meta-medium par excellence, able to absorb and re-mediate all previous forms in a fluid environment in which remixing and culture jamming are the common currency. In the realm of Digital Humanities practice, designing the cultural record is an act of thinking, and design processes become multivalent. This openness, an outgrowth of the iterative and (almost) infinitely mutable and expansive nature of digital media, stands in contrast to inherited notions of “writing” or “picture-making” or “printing”—all of which are stabilizing practices with slow refresh rates. If texts in their broadest sense can be thought of as “media scripts,” then the specific medium that instantiates that script can change, evolve, morph, and even turn back upon itself. The rewritable substrate of digital media enables iterative work to hitherto unprecedented degrees, introducing the software term “version” into units of scholarly production.

The field of Digital Humanities may see the emergence of polymaths who can “do it all”: who can research, write, shoot, edit, code, model, design, network, and dialogue with users. But there is also ample room for specialization and, particularly, for collaboration. The generation now cursed with the label “digital natives” will surely develop the capacity to become comprehensive digital humanists. The fact that digital projects of any substantial scale benefit from and, indeed, often require team-based approaches troubles traditional concepts of authorship in the humanities, which are still fixated, by and large, on single-authored achievements. The academic world has developed sophisticated (though hardly perfect) modes in the sciences to credit multiple authors, but colleges and universities now need to develop ways of acknowledging intellectual contributions in team environments for digital humanists, a micro-credit and a macro-credit system for intellectual labor that functions as a viable form of capital in a reputation economy as well as in a scholarly world. Technical imagination and expertise partner with discipline-specific forms of knowledge in Digital Humanities projects: projects in which each contributor plays a vital role in setting the research agenda, and in which contributors build big mosaics out of tesserae consisting of specialized skills and expert knowledge.

One caveat is worth noting. The positive demand for expanded skill-sets could have profoundly negative effects on scholarship if it becomes the academic equivalent of a neo-liberal speedup in which ever more quantitative metrics are used to push “education workers” into acquiring technological skills without commensurate pay, skills which they are then held accountable for, both within and outside of tenure tracks. Likewise, the continuing resistance within post-secondary
educational institutions to recognize Digital Humanities work as equivalent to long-established forms of scholarship could translate into an expectation that certain disciplines devoted to the study of the contemporary, such as media and visual studies, become Digital Humanities departments, irrespective of whether the most promising research questions within the field are well-suited to such a framing. The fact of the matter is that Digital Humanities bears no privileged relation to modern or contemporary cultural corpora; on the contrary, it is indifferent as to whether its objects of study are performance videos from the 1960s or pottery shards from a Mycenaean archaeological site from the 2nd millennium BCE. Digital Humanities is an extension of traditional knowledge skills and methods, not a replacement for them. Its distinctive contributions do not obliterate the insights of the past, but add and supplement the humanities' long-standing commitment to scholarly interpretation, informed research, structured argument, and dialogue within communities of practice.

In this rapidly changing research environment, it is necessary to acknowledge the new shapes that knowledge production is assuming, to set reasonable and flexible expectations regarding experimentation and innovation, and to devise a reward structure for team-based collaboration that includes recognition of the value and skills of participants in accord with the significance of their contributions. Older “service-based” models of staff conceived in contrast to scholars qua auteurs are being challenged and rightly so. The cultural politics of academic institutions are shifting, indeed, but we must be attentive to inadvertent consequences. Projects that are dependent on deliverables as their only measure of success are likely to be at odds with a research mission that supports innovation and imaginative, risk-taking work. Intellectual challenges, not technical ones or metrics based on the mere on-time delivery of products, have always driven and will continue to drive the development of the Digital Humanities.

Computational Activities in Digital Humanities

Digital Humanities projects can be described by sketching their structure at several levels. These begin with basic computation (programming, processing, protocols) and extend through the levels of organization and output that form the basis of most users’ experience (interface, devices, networks). The foundational layer, computation, relies on principles that are, on the surface, at odds with humanistic methods. Specifically, computation depends on disambiguation at every level, from
encoding to the structuring of information. Explicit step-by-step procedures form the basis of computational activity. However, ambiguity and implicit assumptions are crucial to the humanities. In the intersection between these two domains, humanists have given in to the demands of a process that requires that they work in accord with its methods. What is less-often noted is that computational methods have been altered in significant ways by humanist approaches. Indeed, this is a challenge for the development of the Digital Humanities, namely the ways in which ambiguity, interpretation, contingency, positionality, and differential approaches can be embodied in computation.

The second level involves processing in ways that conform to computational capacities, and these were explored in the first generation of digital scholarship in stylometrics, concordance development, and indexing. This processing activity takes advantage of the ability of computers to automate certain tasks useful in answering the sorts of research questions that were initially being asked by humanities scholars. In the first phase of digital activity, sorting, searching, calculating, and matching were basic operations performed on texts or data. The introduction of structured data for analysis and display in the family of what are known as markup languages added a dimension to this activity, introducing interpretation into the digitized stream of keyboarded characters. The insertion of these “tags” allowed manipulation of the content and the performance of an interpretive act.

Both computational foundations and processing activities have endured, but other platforms, tools, and infrastructures have also developed to support curation, analysis, editing, and modeling. These depend upon the basic building blocks of digital activity: digitization, classification, description, and metadata, organization, and navigation. Designing and building digital projects depend on knowledge of these fundamentals and on a nuanced understanding of the networked environments in which the projects will develop and variously reside.

Curation, Analysis, Editing, Modeling

Curation, analysis, editing, and modeling comprise fundamental activities at the core of Digital Humanities. Involving archives, collections, repositories, and other aggregations of materials, curation is the selection and organization of materials in an interpretive framework, argument, or exhibit. The capacity with digital media to create enhanced forms of curation brings humanistic values into play in ways that
were difficult to achieve in traditional museum or library settings. Rather than being viewed as autonomous or self-evident, artifacts can be seen being shaped by and shaping complex networks of influence, production, dissemination, and reception, animated by multilayered debates and historical forces.

**Analysis** refers to the processing of text or data: Statistical and quantitative methods of analysis have brought close reading of texts (stylometrics and genre analysis, collation, comparison of versions for author attribution or usage patterns) into dialogue with distant reading (the crunching of large quantities of information across a corpus of textual data or its metadata). Analysis is often conjugated with visualization in order to give graphical legibility to analytical results. Many of the tools for visualization are still adopted wholesale from business graphics or from the social and natural sciences, but this is beginning to change as data visualization assumes an evermore central role in Digital Humanities scholarship. The recent surge of interest among digital humanists in mapping, for example, is indicative of a trend that recognizes the importance of developing geo-temporal visualizations and mapping platforms to analyze complex social, cultural, and historical dynamics.

**Editing** has been revived with the advent of digital media and the Web, and will continue to be an integral activity in textual as well as time-based formats. The parsing of the cultural record in terms of questions of authenticity, origin, transmission, or production is one of the foundation stones of humanistic scholarship upon which all other interpretive work depends. But editing is also productive and generative, and it is the suite of rhetorical devices that make a work. Editing is the creative, imaginative activity of making, and as such, design can be also seen as a kind of editing: It is the means by which an argument takes shape and is given form. Genetic editions, in which variants, versions, pentimenti, and amendments can be incorporated into a display or trail of evidence have been the dream of literary scholars since the rise of scientific philology in the 19th century. Tools for the realization of such complex forms of intellectual gamesmanship are changing and improving rapidly. The potential for their full realization even beyond the confines of the textual record will revitalize long-standing traditions of humanistic work and allow humanists to re-approach these traditions in innovative ways with new research questions and tools.

**Modeling** highlights the notion of content models—shapes of argument expressed in information structures and their design. A digital project is always an expression of assumptions about knowledge: usually domain-specific knowledge
given an explicit form by the model in which it is designed. Thus a project dedicated to analyzing the correspondence of a famous artist might assume a chronological shape, which is one model of a human life. Or it might be organized around correspondents and relationships, another way of weighting the data. Or it could be structured by place of origin and receipt, as a geospatial network. The building blocks of digital work will each be molded by the model of knowledge which they need to serve. Even basic questions about file formats, image resolution, metadata, and classification schemes to structure the digital materials are intimately bound to the argument made by what is referred to here as a “content model.” The phrase means just what it appears to mean: a model by means of which shape is conferred upon a given set of cultural contents. Do we organize music files by playlists or by artist? By performer or composer? The playlist model fixes files in an order that makes searching for a particular artist difficult, and classical music might be more logically organized by composer than by performing artist. Each of these represents a distinctive information model that privileges one or another feature of the content.

The organization of information in a file or data system does not have to conform to its display within an interface. At the level of interface, one might well create a design that is based on the behaviors that end-users might plausibly display with respect to the information. Do they want to search (look for a particular thing) or browse (wander about in a collection to see what might be of interest)? Such distinctions are the bedrock upon which interaction design is built. The knowledge for carrying out the implementation of these designs comes from computer science, information studies, graphic and media design, human–computer-interaction, and cognitive studies. The form that knowledge takes in digital environments and the arguments it expresses in its information structures can be deeply infused with humanistic values, but only if humanists are involved. If simply handed off to technologists or left to functionaries or commercial interests, many basic requirements for humanist scholarship and pedagogy will be lost. The misguided collector annoyed by the mass of handwritten annotations created by readers in the margins of medieval manuscripts and incunabula who elects to erase them eliminates forever the commentary of famous and insignificant figures alike. In a digital world, choices about what remains and what is eliminated, what is made accessible, how and in what form, are just as enduring and just as potentially enhancing or damaging.

Additionally, modeling carries a specific meaning in the creation of simulated and virtual environments. Rendering immersive models of historical sites,
archaeological projects, cultural monuments, or imagined worlds in fly-through, multidimensional forms are vivid possibilities of the digital environment. So are the multiplayer worlds of games in which participants make virtual real estate and its contents, creating systems of value, social relations, and lived experiences in avatar-inhabited landscapes. Humanities work in such environments allows questions of uncertainty and analysis to enter into play. The role of speculation in the use of fragmentary evidence mustered for virtual reconstruction gets amplified through the capacities of digital media. Digital humanists engage with these environments not only because of their pedagogical and research values, but also because humanist sensibilities are needed to challenge the seductive force of seamless presentation and to inject criticality and skeptical faculties into otherwise “naturalized” unnatural constructs.

The graphical user interface, still common in a world of distributed and embedded computing platforms, has put tremendous pressure on this generation of scholars and teachers to be attuned to sophisticated visual literacy. Even the most text-centric academic will admit the existence of visual rhetoric, but the skills to read interfaces, databases, and other content models are still very underdeveloped. Understanding the way one structures the relationships among data, the ways in which users input and access information, and the physical and conceptual design of such systems all-too-often slips away into the abstraction. Yet graphical interfaces have been central to the humanities for centuries. What, after all, are indexes, tables of contents, and foot- and endnotes if not information storage and retrieval strategies? The classification systems that scholars and librarians have evolved over the centuries and their direct relationship to the arrangement of physical book stacks, not to mention whether those stacks are open or closed, are all evidence of the design of information and its access as central concerns of the humanities. Yet with computers and networks, these same issues of information and access may be perceived as mere technical concerns, and the benefit of a humanist perspective is lost. Navigation and organization are interdependent; creating digital wayfinding, like environmental signage, calls on a combination of intellectual and design skills.

Each of these areas of activity—curation, analysis, editing, and modeling—is supported by the basic building blocks of digital activity. But they also depend upon networks and infrastructure that are cultural and institutional as well as technical. Servers, software, and systems administration are key elements of any project design. Compatibility and interoperability are essential for sustainable
work. The cultural dimensions of infrastructure are also factors to be considered. Museums, libraries, archives, and other institutional settings each have their own agendas, their own customs and conventions. Cultural differences can arise with partnering institutions, as well as across national and international communities of participants. Digital work takes place in the real world, and humanists once accustomed to isolated or individualized modes of production must now grapple with complex partnerships and with insuring the long-term availability and viability of their scholarship.

Prototyping and Versioning: Generative Humanities Ahead

The capacity for the rapid creation, testing, and reworking of Digital Humanities projects goes hand-in-hand with the flexibility, mutability, and extensibility of digital media. But with the development of more Digital Humanities projects comes a new, normative center in which tool sets are stabilizing. Curation, collection, and data management are cohering around shared standards, while concrete rationales for the production and deployment of Digital Humanities methodologies have emerged in the academy. This normalization points, in part, to the maturation of the Digital Humanities. However, one of the strongest attributes of the field is that the iterative versioning of digital projects fosters experimentation, risk-taking, redefinition, and sometimes failure. It is important that we do not short-circuit this experimental process in the rush to normalize practices, standardize methodologies, and define evaluative metrics.

Whereas the first generation of Digital Humanities tended to specialize in discrete one-offs, digital humanists can now use networks and interoperable file-sharing standards and protocols to test new approaches with distributed users and developers at a time-and-distance scale previously unimaginable. Digital Humanities infrastructures encourage prototyping, generating new projects, beta-testing them with audiences both sympathetic and skeptical, and then actually looking at the results. Building on a key aspect of design innovation, Digital Humanities must have, and even encourages, failures. Outside the normative core, there is space to iterate and test, to create precarious experiments that are speculative, ludic, or even impossible. That research can benefit from failure should not be any sort of surprise—stress-testing metals and other materials is what gives us bridges that don’t collapse and buildings that stay up—but so too can the classroom
benefit from an academic culture that welcomes frequent (productive) failure. The methodologies of Digital Humanities are robust precisely because they place lasting pedagogical value in the creative, generative, and experimental processes of design-based research. Process is favored over product; versioning and extensibility are favored over definitive editions and research silos. The Digital Humanities capacity to ask, design, and model new research questions opens new possibilities for those who are willing to take risks. Too often in established cultural discourse, the experimental is absent or hastily erased, the dialogue already so well-established that new approaches are incremental at best. But it is not an experiment if it cannot fail.

Many of the most promising areas of the Digital Humanities have ample room for such risky undertakings. The key is to create the contexts that allow failing to be seen as something other than defeat. In the entrepreneurial culture of Silicon Valley, for example, failure is not only tolerated, it is massively funded—because the risks are worth it. Industry leaders factor the costs of failure into labor, resources, talent, and investment as a necessary part of their undertakings, recognizing the need for experimentation with uncertain outcomes. As Bill Coleman, who has had many wins but even more losses over the decades in the high-tech industry, notes, “You learn not just about failure and how to make things work, you learn the psychology of failure and how you react to it.”

Accepting the psychology of failure is part of the life cycle of innovation. Yet when the academic culture of peer review and promotion runs up against budget realities and resource scarcity, skittishness about failure arises. Digital Humanities work embraces the iterative, in which experiments are run over time and become objects open to constant revision. Critical design discourse is moving away from a strict problem-solving approach that seeks to find a final answer: Each new design opens up new problems and—productively—creates new questions. Digital humanists take these matters as core tenets, knowing that the field we are engaged in is still in its early stages, both enabled and constrained by encounters with the techniques of computation. We are driven by the need to extend the reach and impact of that technology to forge ahead; when we arrive at the place where humanistic methods regularly inform computational approaches, we will have passed another exponential milestone.
Generative Humanities as the New Core

The uptake of digital tools and platforms does not “solve” long-standing problems in the academy as much as offer what engineers refer to as “work-arounds,” provisional improvisations that allow whole systems to move forward without demanding perfection from every part. The iterative nature of the Digital Humanities is what makes this a once-in-a-generation moment to reinvigorate the idea of a core curriculum for undergraduates: to make them active participants and stakeholders in the creation and preservation of cultural materials. Why would the Digital Humanities want to wade into what feels like a never-ending academic culture war? In the United States in particular, we have never settled on what constitutes the “basic” things an educated person should know, and how that knowledge in turn develops the informed citizenry a democracy needs to thrive.

The last 50 years saw the growth of increasing discomfort with inherited curricula, which were rightly seen as constrained by issues of race, class, gender, and first-world biases rooted in Eurocentric traditions. An important battle took place—to open reading lists and discussion sections to a wider range of voices. Yet this call for openness and expansion dovetailed with the silo-ization of knowledge in the humanities as the baby boom generation hit the newly expanded higher education sector in the 1960s. Students clamored for relevance; activists demanded inclusion; and scholars responded by opening up their syllabi while at the same time narrowing their teaching to reflect and feed their specializations. Figures and movements formerly ignored precisely because of their supposedly “marginal” status became new objects of study. Perhaps more significantly, the perspectives of these once-excluded materials carried with them alterative methodologies and different value systems that shattered any illusion of a single belief system within humanistic thought.

The wars over the core have had two unexpected results. The first is that rather than replacing a restrictive body of knowledge with a more expansive one, the very idea of sharing common references or approaches waned. The wars over the core in the humanities have contributed to a malaise in which the humanities are widely perceived as “irrelevant,” lacking the practicality of business, law, or medicine. Another effect has been to add ammunition to the forces that want to de-college the American populace, shunting as many students as possible into vocational tracks, in order to reserve higher education for elites. Yet the reality is that
graduates of whatever level will need to call upon more than vocational training if they are to steer their democracy through the challenges and opportunities that this highly networked, globalized, mobile, and ecologically fragile century offers. More than ever, we need the critical insights, creative designs, speculative imagination, and methods of comparative, historically informed study that shape humanistic modes of inquiry. Imagination and informed critical thought foster ways of thinking beyond received positions and claims to absolute authority. Digital, polyvocal expression can support a genuine multiverse in which no single point of view can claim the center. The principles of relativist approaches to knowledge, rooted in historically situated understanding, remain fundamental to (digital) humanism.

The phrase *Digital Humanities* thus describes not just a collective singular but also the humanities in the plural, able to address and engage disparate subject matters across media, language, location, and history. But, however heterogeneous, the Digital Humanities is unified by its emphasis on making, connecting, interpreting, and collaborating. This concentration on process and method might in fact be the way to develop a work-around for the creation of a core curriculum, a process which bogs down precisely on what appears to its varied partisans to be a zero-sum game. An Afro-Caribbean female novelist joining the syllabus means an English male metaphysical poet exits. In the eight semesters of the hypothetical student's college career, there are only so many class sessions. But the networked academy's very *allatonceness*—to use Marshall McLuhan's suggestive term referring to simultaneity and connectivity—offers a glimpse of a more elastic notion of curricula, one that extends past the walls of the academy and the time limits of degree programs. At the very same time that the battles over the core raged on, the entertainment and information industries flourished. The disconnect between methods of pedagogy inherited from cloisters and seminar rooms and those of a massively mediated culture is real. Digital humanists strive to bridge that gap.

The digital environment offers expanded possibilities for exploring multiple approaches to what constitutes knowledge and what methods qualify as valid for its production. This implies that the 8-page essay and the 25-page research paper will have to make room for the game design, the multi-player narrative, the video mash-up, the online exhibit and other new forms and formats as pedagogical exercises. Playful, imaginative, participatory work is not the enemy of education, but its exuberant and vital engine. New standards of assessment will be necessary as skills
change. We struggle less to remember facts than we do to remember where and how to find them—and how to assess their validity.

Ubiquitous networks have led and will continue to lead to evolutions in pedagogy precisely because they involve the outsourcing of memory. Writing transformed traditional modes of oral training; print technologies standardized everything from spelling to what constituted a “proper” copy of a text. We would be ignoring precedent completely if we assumed that the allatonceness of a vast and increasing digital archive accessible anywhere at any time will not affect the way that we learn. The best core curricula—whether or not based on classical models—strive to create students, and thereby citizens, who think with imagination, who manifest their thoughts as creative action, and whose analysis can lead to inventive, although hardly definitive, syntheses. These are precisely the goals that a digitally driven, generative humanities core espouses.

The technological aspects of the digital turn are not yet so normative that we can ignore the tools, interfaces, and the hard-, soft-, and wet-wares of this moment. But the generative humanities are emphatically not about training for a market. They are, instead, like all great pedagogies that preceded them, education for an environment. The social, political, and ecological challenges of the 21st century demand significantly more than textual analysis or recitations of inherited content. These problems (and opportunities) will need people trained to create synthetic responses, rich with meaning and purpose, and capable of communicating in a range of appropriate media, including but not limited to print. The exact content of the generative humanities qua core curriculum will always be a matter of negotiation and debate; and well it should be, for core curricula have always been in greater flux than their adversaries or diehard advocates care to admit. Some traditionalists will rankle at the idea that the humanist spirit—rather than humanities texts—will become the “core” of a generative humanities curriculum, but this century’s explosion of a deep, rich, and meaningful digital culture is already proving them wrong. That spirit, as suggested throughout this chapter, consists of methods as well as content, with approaches that tolerate relativism and diversity in thinking, orders of experience, and, yes, fundamental values.

The generative aspects of Digital Humanities thus go a long way to addressing the much-lamented atomization and irrelevance of scholarship—that critique from all parts of the ideological spectrum that teaching and research are at
odds with one another, that scholarship itself has become relentlessly focused on the professional advancement of the scholar and is addressed only to others in an ever-shrinking pool of the like-minded and credentialed. Digital Humanities scholarship, on the other hand, promises to expand the constituency of serious scholarship and engage in a dialogue with the world at large. Even as it models ever-newer forms of professional expertise, Digital Humanities employs the best crowd-sourcing techniques to process, analyze, and publish materials that document and engage with the variance of the human cultural record. It promotes platforms for informed amateur scholarship, and it serves to make humanities research into something of a new multi-player online game with global reach and relevance. In its distributed form, Digital Humanities arrives through cellphone and other mobile applications as a deepening enhancement of daily experience, providing an interpretation of a public monument or work of cultural legacy, bringing the richness of scholarly expertise into new and decidedly public forms of use. In the world of current events and unfolding occurrences in the political or cultural sphere, rapid communication on digital platforms alters perception, opinion, values, and outcomes.

The digitization of the world’s knowledge and its movement across global networks, no matter how incomplete or incompletely free, have transformed what we understand by and how we approach the humanities in the 21st century. We are continually creating new ways of accessing and assessing this new cultural production, which continually open up important new spaces for exploring humanity’s cultural heritage and for imagining future possibilities using the transmedia methods and genres of the digital present. It is to these methods and genres that we now turn.
2. EMERGING METHODS AND GENRES
HUMANITIES KNOWLEDGE USED TO HAVE A RECOGNIZABLE FORM.

WE KNEW IT WHEN WE SAW IT BECAUSE IT HAD LOOKED THE SAME FOR CENTURIES: PRINTED PAGES WITH LINEAR PROSE AND A BIBLIOGRAPHIC APPARATUS WRITTEN BY AN AUTHOR AND PUBLISHED IN THE FORM OF AN ARTICLE OR BOOK. THOUGH THE FORMAT COULD VARY WIDELY, FROM MATERIALS TO LAYOUT, SUCH DESIGN DECISIONS WERE RARELY CARRIED OUT BY THE SCHOLARS WHO CREATED THE CONTENT. WITH FEW EXCEPTIONS, THE HUMANITIES HAVE ADOPTED HOMOGENEOUS APPROACHES TO PRODUCING SCHOLARLY RESEARCH. YET ARTIFACTS CREATED BY DIGITAL TECHNOLOGIES THAT “LIVE” IN DIGITAL ENVIRONMENTS ARE COMPARATIVELY DIFFERENT—IN TERMS OF MATERIAL COMPOSITION, AUTHORSHIP, MEANING-MAKING, CIRCULATION, READING, VIEWING, NAVIGATION, EMBODIMENT, INTERACTIVITY, AND EXPRESSIVITY—FROM ARTIFACTS CREATED BY THE WORLD OF PRINT.
are not more “evolved” than print media nor are books obsolete; but the multiplicity of media and the varied processes of mediation and remediation in the formation of cultural knowledge and humanistic inquiry require close attention. We strongly believe that humanists need to apply the same kind of rigorous media-specific, social, cultural, and economic analyses that we have honed to study print culture to understand the specificity and affordances of digital culture and to interrogate the status of knowledge, the concept of culture, and the redefinition of the social in our global information age. We also believe that humanists must actively engage with, design, create, critique, and, finally, hack the environments and technologies that facilitate this research as we render this world-as-a-world to help us produce knowledge about who we are, where we live, and what that means.

The purpose of this chapter is to provide a field map of the experimental forms and different “knowledge models” emerging in the Digital Humanities. This is not meant to be an exhaustive or definitive list of new methods and genres but rather a conceptual and theoretical introduction to emergent practices of scholarly inquiry. We move from examining the impact of technology on the most established of humanistic practices—the decisions about what constitutes a text and its variants—to positing that enhanced critical curation of those texts makes possible augmented editions and fluid textualities that rely on the affordances of digital environments. This fluidity allows digital humanists to play with scale, both in terms of how they approach data and how they model their results. Toggling between distant and close, macro and micro, and surface and depth becomes the norm. Here, we focus on the importance of visualization to the Digital Humanities before moving on to other, though often related, genres and methods such as locative investigation, thick mapping, animated archives, database documentaries, platform studies, and emergent practices like cultural analytics, data-mining, and humanities gaming. All of these are then situated within a technological matrix that almost demands the repurposing and remixing of cultural content. We conclude this chapter by considering the utopian prospect that the massive spread of shared knowledge across networks could give rise to a state of “ubiquitous scholarship,” of ever-more interconnected, publicly engaged, participant citizens.

It is a tremendously exciting time for the humanities, as knowledge not only looks and sounds markedly different than it once did, but also feels different because it is experienced in new contexts and environments and created in collaborative spaces that involve communities who rarely, if ever, had the chance previously to participate in the scholarly enterprise.
The chapter is divided into emerging areas of experimentation, as represented in the index below. A Portfolio of Case Studies follows, providing concrete examples of these emerging genres and methods in application. Through linkages both graphical and conceptual, they combine to provide a lively and practical demonstration of Digital Humanities theory in practice.

ENHANCED CRITICAL CURATION

AUGMENTED EDITIONS AND FLUID TEXTUALITY

SCALE: THE LAW OF LARGE NUMBERS

DISTANT/CLOSE, MACRO/MICRO, SURFACE/DEPTH

CULTURAL ANALYTICS, AGGREGATION, AND DATA-MINING

VISUALIZATION AND DATA DESIGN

LOCATIVE INVESTIGATION AND THICK MAPPING

THE ANIMATED ARCHIVE

DISTRIBUTED KNOWLEDGE PRODUCTION AND PERFORMATIVE ACCESS

HUMANITIES GAMING

CODE, SOFTWARE, AND PLATFORM STUDIES

DATABASE DOCUMENTARIES

REPURPOSABLE CONTENT AND REMIX CULTURE

PERVASIVE INFRASTRUCTURE

UBIQUITOUS SCHOLARSHIP

EMERGING METHODS AND GENRES
Collection-building and curation have always defined humanistic learning; so much so that even the most ancient literary forms adopt listing, cataloging, and inventoring as key features of poetic communication. Inventories abound in Hesiod, Aeschylus, Sophocles, and Euripides. The epigrammatist Callimachus composed the 120 tablets of the *Pinakes* in which the entire holdings of the Alexandrian Library were enumerated. Apollonius of Rhodes opens the lead section of his *Argonautica* with a panoramic listing of the Argonauts. And the sheer proliferation of catalogs in the Homeric epics shows how cataloging can put into play a vivid mode of representation that is neither that of the laundry list with its skeletal seriatim organization nor that of an exhaustive, didactically intentioned inventory, but rather a composition that treads along the boundary line between verbal and visual figuration in the pursuit of informational concision and compactness. A poem within the poem, a condensation of names, actions, and things, the catalog is an art of memory that is also an art of data compression and of performance. In short, *katalégein* designates poetic composition as a compression algorithm and audience reception as a decompression tool some 26 centuries before the word “digital” began to refer to 0’s and 1’s.

Awareness of this historical background is crucial in order to understand how collection-building and curation have remained constants of humanistic knowledge production from remote antiquity through early modern courts to the academies of the Baroque era to late 19th century universities where chairs were typically associated with the research collections. These domains became disjoined from the mainstream of scholarly practice only during the late print era, and are once again becoming integral to many forms of Digital Humanities practice.

The accumulation and care of knowledge were paramount within classical, pre-modern, and early modern regimes of data scarcity. In those eras, bits of information were valuable *a priori* and therefore either preserved, relayed, or reused, irrespective of whether they could be integrated into a cohesive structure or system of belief. Copiousness and copying were understood as inherently good under such circumstances, and collecting served the project of gathering, conservation, and retrieval. With the spread of print and the rise of modern institutions of memory (with their systematic approaches to collection and conservation), a new regime arises within which there exist such proliferations of historical information and
cultural material that data from the past can no longer be assumed to possess \textit{a priori} value. They become supports for the production of knowledge, knowledge's precondition but not its substance.

Informed critical judgments regarding the relationship between originals and copies, the greater or lesser authority of a given object or set of objects, and the work’s meaning all become far more significant than the mere fact of accumulation. Following in the footsteps of the courtly patrons and collectors of the early modern period, new professional figures emerge alongside scholars by the end of the 19th century, entrusted with guardianship over the remains of the past and armed with a battery of scientific and analytical techniques: archivists, museum curators, catalogers and librarians. The division between these figures and professional scholars is never absolute (as evidenced, for instance, by the role of attribution studies in art history and critical editions in the evolution of literary studies). But two parallel institutional worlds emerge that the digital revolution is reconnecting under transformed circumstances.

The reconnection assumes multiple forms: digital collection-building and curation on the part of individual scholars within and outside existing digital repositories as a form of scholarly practice; multimedia modes of argumentation that are object-based rather than discursive; conjugations of visible or audible digital media with physical objects in experiential exhibition spaces; the expanded publication of interpretive research results flanked by the archival documents and data sets that support them; large-scale collaborations that result in geospatially organized scholarly work; and critical editions of media artifacts that surround a primary object with multimedia objects rather than adopting only a text-based annotation system. It is nourished by the drive for research innovation; by the vastly expanded range of cultural materials now being produced and collected by institutions of memory, as well as by individuals and corporations; by the enhanced accessibility of these collections to both specialists and non-specialists alike thanks to their dissemination in digital form via the Internet; and by the crisis of print-based scholarly publishing and the potential for print-plus and post-print models that operate on scales unthinkable under the regime of print. \textit{see Case Study 2 \rightarrow 64 | 65; Case Study 3 \rightarrow 66 | 67; Case Study 5 \rightarrow 70 | 71}

The Library of Alexandria is said to have held roughly half a million scrolls, representing works numbering in the tens of thousands. Twenty centuries later, Google Books has scanned, to date, around 14 million of the estimated 130 million printed books housed in physical libraries worldwide. What this means is that a
contemporary scholar has at his or her fingertips access to 500 times the entire corpus of knowledge seemingly available in the ancient world without even consulting a second literary database or scanning the stacks of a major research library. The figure expands exponentially when we turn our attention away from “books” or “works” to other categories: print artifacts, letters, sound recordings, paintings, photographs, objects, telegrams, Web pages, email messages, blogs, tweets….

The scale and scope of these “collections,” not to mention the accelerating creation of multimedia document collections in the present, so far exceeds the capabilities of traditional institutions of memory, not to mention the potential reach of scientific conservation methods, that enormous backlogs have become the norm. Despite sometimes heroic efforts to contain them, the amount of unprocessed or inaccessible materials in basements or off-site storage facilities are certain to grow within a setting in which information overload, the need to sift through and navigate vast data sets, and the proliferation of data trash are all givens. Critical curation is an essential scholarly practice in the print-plus and post-print world.

In common parlance, curation refers to the supervision and organization of preserved or exhibited physical items, although the term has origins in the theological domain, as in curates of the church who helped care for the souls of the dead. The term has exploded onto the contemporary scene, even invading business parlance: Slogans such as “ours is the age of curation” or “why calling yourself a curator is the new power move” are proclaimed in business blogs and reviews. What they are pointing to is the same urge animating the work of digital humanists: that the mere existence of vast quantities of data, artifacts, or products is no guarantee of impact or quality. To curate is to filter, organize, craft, and, ultimately, care for a story composed out of—even rescued from—the infinite array of potential tales, relics, and voices. In the Digital Humanities, curation refers to a wide range of practices of organizing and re-presenting the cultural record of humankind in order to create value, impact, and quality.
AUGMENTED EDITIONS AND FLUID TEXTUALITY

Critical editions—accurate and reliable versions of a text with an apparatus that presents and analyzes the evidence and source material to reconstruct and explain the original—have been a central part of the humanities for centuries. Some of the earliest critical editions were produced for the Hebrew Bible and the New Testament and aimed to become definitive editions for a wide readership. As the genre emerged and textual criticism matured, critical editions sought to foreground instabilities and uncertainties in the reconstructive process, providing ample room for commentary and annotation, the collation of textual variants, stemmatics, and studies of authorship, editing, transcribing, and translation practices.

Digital environments provide the ability to pull together many versions of a single work, tracking its development, noting its variants, and presenting the whole comparative array of witnesses. The basic tools for migrating texts into a digital environment are well-suited to such editorial tasks. The use of structured and/or tagged approaches to identify persons, themes, places, or features of a text provides a way to maximize the intellectual investigation of documents and to display these interpretations. As standards for mark-up (the tagging process used in transcriptions) have extended and improved, many nuances in textual analysis have become part of the set of interpretive elements. Not only can we identify what something is, but we can characterize its relation to other elements or entities (part of, derived from, a cousin of, a version of, and so forth). Under digital conditions, the very same procedures may now be extended to other categories of cultural objects, such as sound recordings, video, and film. see CASE STUDY 2 → 64 | 65

Fluid textuality refers to the mutability of texts in variants and versions whether these are produced through authorial changes, editing, transcription, translation, or print production. In a fundamental sense, then, texts have always been fluid and modular. But the advent of word processing drew intensified attention to this aspect of textuality. Writers were thrilled with the experiences of cutting and pasting whole portions of texts without retyping. The notion of transforming a work by changing its format and typographic font with the strokes of a few keyboard commands excited critical and creative imaginations. When it first appeared, hypertext was a foreign and intriguing concept, with nodes, links, and forking paths structured to create a multifaceted text in ways that had been tried in print formats but that took on an aura of novelty and promise in new media.
New dimensions of fluidity allowing for manipulation and machine processing of textual elements were introduced through natural language processing (NLP) and other tools for textual analysis. Global changes, searches, substitutions, counting, listing, reordering—these and other activities can be carried out through commands that treat a text as an object on which to perform operations that are somewhat at variance with conventional reading. In its most fluid state, a text file can be used to generate a nonverbal outcome. An ASCII string, or keyboarded text, can be turned into output in musical or visual form, or used to make a three-dimensional print, a pattern, or a design that serves as a template for another project in a medium far from that of verbal language. Texts are constantly flowed and reflowed, repurposed and reworked for different output streams and audiences.

With the increased fluidity of texts we see a corresponding change in authorial identity. We are witnessing a shift from the age of the individual voice to that of the collaborative, collective, and aggregated voice of the fluid text. Work in digital media frequently involves a composite warp and woof whose choral “textuality” reconnects the term with its origins in the world of textures and textiles.

With the emergence of the augmented edition, the fields of analysis and editing have grown and skills for creating scholarly editions are in increasing demand. The corpus of texts and other artifacts that comprise the record of human thought and culture is migrating from print and manuscript into digital forms, and, as that process advances, the need for editing and the opportunities for critical analysis continue to expand. Imagine that the surface of the screen becomes a deep space, and what appears at first to be a single page of a text or object extends through a multiplicity of embedded layers, each displaying a different facet of an argument or history of a work’s production. Reader-viewers tier down and tier out, sifting through and engaging with, for example, a single word usage throughout a text, across a corpus, and across every book published in a given year. see CASE STUDY 2 → 64 | 65

The editing practices that extend into the augmented edition add other dimensions as well, allowing for a work to be understood within its larger field of cultural production; placed into the constellation of other productions and publications or artifacts of material culture; or situated within the documented events of an era. An augmented edition supports an array of arguments, with materials marshaled in demonstration of interpretations from a range of viewpoints or along a host of different lines of thought. The organization of argument in digital space creates new modes of content that are relational in their rhetoric. Sequence, juxtaposition, ordering, navigating, and analyzing are all features of the augmented edition. see CASE STUDY 1 → 62 | 63; CASE STUDY 3 → 66 | 67
Although the Internet (meaning the technological infrastructure for transferring data over a distributed network of computers) is barely half a century old and the World Wide Web (meaning hyperlinked, hypertextual documents viewable in browsers) has only been around since the 1990s, it is striking to ponder the sheer volume of data they have “produced.” Statistics vary. Some sources suggest there are more than 21 billion indexed Web pages, but the number of URLs indexed by Google is over one trillion; Google has scanned, cataloged, and made searchable more than 14 million books; Technorati has indexed well over a hundred million blog records since 2002, according to its annual report on the “state of the blogosphere”; JSTOR has over 7 million articles from more than 1,000 publishers; Facebook’s repository is growing at a rate of 5 billion pieces of content per week, ranging from photographs and videos to news stories and blog posts; Twitter users produce, according to cofounder Biz Stone, one billion tweets per week. And these statistics do not even take into consideration the scope of other content produced and shared on the Web, such as email, not to mention content produced through participation in online community forums, chat groups, Instant Messaging, multiplayer gaming, and mixed reality environments such as Second Life. We are producing, sharing, consuming, and storing exponentially more cultural material—including texts, images, audio, and time-based data—than ever before. We are producing data at a rate that already outstrips our ability to store them and outpaces our ability to catalog, analyze, and archive these data in meaningful ways.

The humanities have historically been the province of close analysis of limited data sets: a literary study of a novel or poem, an art history monograph about a painter’s œuvre, an architectural critique of a Peruvian village’s building styles. There have long been, of course, historical, generic, and stylistic studies with a broad scope. But for the most part there is a significant divide between the ways in which the humanities approach subject matter and the ways that more quantitatively inclined disciplines approach data. In the sciences, one of the key determinants is the law of large numbers, which states that the more times a researcher repeats a given experiment, the closer that researcher comes to determining an average value that defines the results of that experiment. Translated, this is simply a way of expressing confidence that ever-larger data sets will offer ever-more verifiable conclusions. Certain physical sciences deal with extremely large numbers such as atmospheric concentrations of carbon dioxide for climatology or genetic sequencing in biology. Until recently, such was rarely the case in the humanities.
When digital technologies allow for the storage and analysis of millions of books, billions of tweets, and hundreds of billions of interactions, the ways in which we can query and comprehend the cultural record explodes. Concepts, trends, actions, and the flow of human communication come into view at a macro scale. For instance, when huge numbers of related images can be parsed by machine, and the images themselves carry massive amounts of metadata, new questions can be asked about our relationships to the visual world. How do markets set the value of images? How do images in free circulation differ from those that carry price tags? Can we detect global patterns and regional differences in the ways that societies absorb and regenerate visual culture?

To answer such questions, we will have to design and employ new tools to thoughtfully and meaningfully sift through, analyze, visualize, map, and evaluate the deluge of data and cultural material that the digital age has unleashed: tasks that will require humanists to contend with text-mining tools, machine reading, and various kinds of algorithmic analyses. One way of navigating this process is through distant reading, a form of analysis that focuses on larger units and fewer elements in order to reveal patterns and interconnections through shapes, relations, models, and structures. It is a term that is specifically arrayed against the deep hermeneutics of extracting meaning from a text through ever-closer, microscopic readings. But, beyond distant reading, the time has come to entertain the possibility of machine reading, in which trends, correlations, and relationships are extracted through computational methods. Because information is being produced on a scale that far exceeds the faculties of human comprehension, it has become impossible to read, comprehend, and analyze the digital cultural record without the assistance of digital tools and methods.

To cite an example whose ethical stakes are high: What would it mean to subject the 52,000 Holocaust video testimonies in the USC Shoah Foundation Institute archives to machine reading and algorithmic analyses? Averaging two hours apiece, it would take a person 24 years to watch them all, assuming he or she watched 12 hours every day of the year. There is simply no way we can process and make sense of the volume of cultural data—including traditional printed materials—without the help of a computer to process, index, select, and cluster data on a comprehensible scale. But what are the implications of turning Holocaust testimonies into units of data, statistical analyses, and compact visualizations? Does this sort of quantitative analysis not inevitably, or perhaps by definition, subject the victims to further objectification, another dehumanizing process? Might there be an “ethics
of the algorithm” that could mediate between the ethical demands of listening to individual Holocaust testimonies and the macrocosmic view enabled by a statistical representation of the total event? It is here that we need digital humanists to bring together the tools of technological analysis and the values, critical skills, and historical knowledge that animate the humanities disciplines.

**DISTANT / CLOSE, MACRO / MICRO, SURFACE / DEPTH**

Within the humanities, close reading has been a central practice that is premised on careful attention to features contained in a text, as well as its variations, history, transmission, possible meanings, and range of nuances. Close reading has its roots in the philological traditions of the humanities, but for more than a generation has often been equated with deep hermeneutics and exegesis, techniques in which interpretations are “excavated” from a text through ever-closer readings of textual evidence, references, word choices, semantics, and registers. The growth in size and accessibility of digital databases and concurrent advances in text-mining and what Lev Manovich has called cultural analytics have opened up new ways of creating meaning through distant reading. In the Digital Humanities, distant reading explicitly ignores the specific features of any individual text that close reading concentrates on in favor of gleaning larger trends and patterns from a corpus of texts. Distant reading is therefore not just a “digitization” or “quickener” of classic humanities methodologies. It is, rather, a new way of doing research wherein computational methods allow for novel sets of questions to be posed about the history of ideas, language use, cultural values and their dissemination, and the processes by which culture is made. Distant reading is almost not reading at all, but rather engages the abilities of natural language processing to extract the gist of a whole mass of texts and summarize them for a human reader in ways that allow researchers to detect large-scale trends, patterns, and relationships that are not discernable from a single text or detailed analysis. see **CASE STUDY 2** → 64 | 65

Rather than pitting distant reading against close reading, what we are seeing is the emergence of new conjunctions between the macro and the micro, general surface trends and deep hermeneutic inquiry, the global view from above and the local view on the ground. The digital humanist is capable of “toggling” between views of the data, zooming in and out, searching for large-scale patterns and then focusing in on fine-grained analysis. While distant reading may be “new” insofar as computational techniques are involved in sifting through, organizing, and visualizing
multitudes of data, it is worth remembering that humanities scholarship has long oscillated between and sometimes even conjoined these two approaches. After all, census data provide an overall statistical picture of demographics but tell nothing of the individuals who live in a given census tract; it is the task of oral histories, biographies, and psychological analyses to delve into the depths of the self. Similarly, a view from above in Google Earth allows a researcher to quickly pan over large regions of the Earth in order to discern surface structures of the built and natural environment, as well as overlay imagery and data sets such as National Oceanic and Atmospheric Administration satellite photographs of areas affected by storms, geographic information system (GIS) data relating to demographics, traffic trend data, and so forth. But these data become more meaningful when yoked with the stories of the people who actually live and have lived there, allowing researchers to not only “skim over” the surface of the Earth but also “drill down” into the micro-level temporal layers comprising the histories of every neighborhood, block, and home. Radically innovative approaches to mapping could emerge from within the Digital Humanities to create environments for exploring differential geographies and delving into heterogeneous geospatial representations, beyond simply registering the phenomenological aspects of space on conventional maps. It remains a challenge how to conceive, design, and implement such platforms. see CASE STUDY 1 → 62|63; CASE STUDY 2 → 64|65

The field of cultural analytics has emerged over the past few years, utilizing the tools of high-end computational analysis and data visualization to dissect large-scale cultural data sets. Such data sets might include historical data that have been digitized, such as every shot in the films of Vertov or Eisenstein, the covers and content of every magazine published in the United States in the 20th century, or the collected works of Milton, not to mention contemporary, real-time data flows such as tweets, SMS text messages, or search trends. Based on assumptions that meaning, argumentation, and interpretive work are not limited to the “insides” of texts or necessarily even require “close” readings, cultural analytics proposes that computational tools be used to enhance literary and historical scholarship. But creating models, visualizations, maps, and semantic webs of data that are simply too large to read or comprehend using unaided human faculties brings other questions. What parameters are used to incorporate cultural artifacts into data sets? Any
conclusions based on these techniques are necessarily shaped, even determined, by these initial choices (e.g. if the gender categories for a census are only male and female, then how can we assess the percentage of transgendered populations?). Cultural analytics does not analyze cultural artifacts, but operates on the level of digital models of these materials in aggregate. Again, the point is not to pit “close” hermeneutic readings against “distant” data mappings, but rather to appreciate the synergistic possibilities and tensions that exist between a hyper-localized, deep analysis and a macrocosmic view.

Cultural analytics also broadens the canon of objects and cultural material under consideration by humanities scholars: Traditionally thought-of cultural objects are now digitized, marked-up, accessible, and shareable in multiple formats and on a variety of platforms, while “born digital” objects—whether tweets, blogs, videos, Web pages, music, maps, photographs, or hypermedia artifacts that combine many different media types—provide data for analysis and populate new forms of knowledge creation and curation. The “data” of cultural analytics are exponentially expanding in terms of volume, data type, production and reception platform, and analytic strategy, making it all-the-more important that humanists are engaged with the design of algorithms, mining and visualization tools, and archiving techniques that foreground questions of value, interpretation, and meaning.

Aggregation of large-scale amounts of information allows data or files to be merged and then outputted into displays that highlight distinctive features such as data points, clusters, and trends. Structured data lend themselves to this processing, since one might easily take dates, places, quantitative information, names, or other elements from a set of files and create an analysis of its contents. Tracking network traffic, or money flows, or resource depletion, or economic trends works well in aggregate. In text processing, looking at word frequency and use (the n-gram approach) is a way of aggregating information and data. The aggregate subsumes individual instances, extracting information from the whole. Cultural mash-ups often aggregate materials in novel ways that allow digital manipulation to repurpose the sources.

Composite analysis preserves individual elements but uses the patterns among them to show something about the whole set of discrete elements. The information and data remain linked to the individual instance rather than being extracted from it into a larger whole. The affordances of large-scale displays, in which thousands of individual images or artifacts can be shown and accessed creates a composite environment. Use of computational methods to discern patterns among such large corpora is essential, though figuring out what the particular purposes or research
questions are that can be answered by such techniques necessarily depends upon recognizing that analysis and processing follow from the fundamental decisions about what constitutes the data and the ways in which these data are structured.

Finally, data-mining is a term that covers a host of techniques for analyzing digital material by “parameterizing” some feature of information and extracting it. This means that any element of a file or collection of files that can be given explicit specifications, or parameters, can be extracted from those files for analysis. The “mining” of these data often depends on creating a display of the results as statistics, texts, or in an information graphic known as a data visualization. Understanding the rhetoric of graphics is another essential skill, therefore, in working at a scale where individual objects are lost in the mass of processed information and data. To date, much humanities data-mining has merely involved counting. Much more sophisticated statistical methods and use of probability will be needed for humanists to absorb the lessons of the social sciences into their methods. See CASE STUDY 2 → 64 | 65

In recent years humanists have become increasingly involved in what is often referred to as the “visual turn” in scholarship, sometimes correlated with the “spatial turn” that has favored mapping. As digital tools have become prevalent, the interest in “reading” the visual has extended to “authoring” the visual—using visual means to express intellectual concepts. What might it mean to make a visual argument, for instance, or to shape a concept through graphical means?

Currently, visualization in the humanities uses techniques drawn largely from the social sciences, business applications, and the natural sciences, all of which require self-conscious criticality in their adoption. Such visual displays, including graphs and charts, may present themselves as objective or even unmediated views of reality, rather than as rhetorical constructs. Much could be learned from the visual languages and semiotic critiques of art, architecture, and design. Visual special effects, which add more to spectacle than to legibility, are suspect, and information graphics conceived without some professional competence in their design are often unintentionally misleading. By the same token, visualizations designed to specifically address the communication needs of humanities research will only be created if humanists become actively engaged in their design.
The visualization identified here refers primarily to graphical or rendered visual interpretations rather than photographs or films, which have their own unique history and rhetorical qualities. Visualization is intellectually distinct from illustration, the employment of a graphical feature, photograph, map, or other representational device to elucidate, explain, or show something in a text. In the latter case, the text still assumes priority, and the illustration is meant to summarize an argument, provide a reference point, or corroborate the text. While visualizations may illustrate data through processes of aggregation and distillation, visualization in the Digital Humanities takes several different forms, all of which are arguments in themselves and must be evaluated in terms of the rhetorics of information design and display.

The use of graphs, charts, diagrams, and other visualization techniques is often associated with data visualization, the expression of quantifiable or quantitative information in graphic form. But the models of statistical expression, such as bar and pie charts, came from the world of 18th century “political arithmetic” and provided a rich and much developed legacy that extended the vocabulary of much older visual forms of diagrams, grids, and trees. Business, governments, and administrative organizations all made use of these forms to express quantitative analyses in legible formats. Informational and statistical visualizations engender the rhetoric of clarity, precision, and fact, though they are, of course, constructed interpretations. When done well, they can make persuasive visual arguments, allow something new to emerge, or even be subverted for poetic effect.

Visualizations of data that are produced computationally tend to be derived from large-scale data sets such as social networks, digitized corpora, and demographic data. The visualizations, either custom-built (e.g. network analysis diagrams) or created for use in an online environment (e.g. Many Eyes), may be used as analytical and interpretive tools—to reveal patterns or anomalies or concurrences—or they may be produced to illustrate findings or serve as the distillation of an argument. Of course, the structures of the data and the questions that are asked of them will, inevitably, determine the visualization produced and the answers obtained. Perhaps it is of little surprise, then, that data visualizations tend to take the established forms mentioned earlier—charts, diagrams, grids, or trees—although we are increasingly immersed in a world of graphical possibilities that have yet to be realized. see CASE STUDY 3 → 66 | 67

Mapping is a distinct form of visualization built on the history of cartography; ideologies of discovery, ownership, and control; levels of abstraction; scale; relations between the real and representation; symbology; visual signposting; perspective;
and coordinate systems. Mapping in the humanities ranges from historical mapping of “time-layers” to memory maps, conceptual mapping, community-based maps, and forms of counter-mapping that attempt to un-ontologize cartography and imagine new worlds. In the 1950s, the members of the experimental Situationist group developed an approach to experiencing urban spaces that they termed “psychogeography.” The immersive and experiential wandering advocated by the approach gave rise to a handful of maps that suggested flows and movement through space as a ludic, exploratory exercise that could result in a new critical awareness of urban environments. Similarly speculative, cognitive maps are used to model experience in many domains of human life where qualitative properties are given dimension and formal value in visual form without any need to ground them in quantitative information. see Case Study 1 → 62|63

A human life may have many such experiential dimensions in which affective properties shape the intellectual argument and give rise to a graphic form that shows the size, scale, proportions, orientation, direction, or figurative shape of knowledge unfolding over time. Maps, animations, and visual images from the vast inventory of human imaginings have much to offer to contemporary scholars re-imagining their own concepts of intellectual argument. The pictorial conventions of visual representation may well be repurposed, just as the organization of cabinets of curiosity, antiquated libraries, personal spaces of study, commonplace books, or other instruments of memory, argument, and rhetoric are finding their place again within the broader understanding of how we produce and represent intellectual arguments and model knowledge.

Experiential visualization uses movement through the time and space of a three-dimensional world as the primary mode of engagement. Historical simulation environments can take a viewer into an immersive environment (or, at least a virtual one), creating the experience of walking through, for example, a Chinese farming village during the Han dynasty or the Roman Forum in late antiquity. Historical simulation environments don’t represent the past “as it really was”; instead, they foreground interpretation, analysis, and experimentation, allowing new research questions to be asked and hypotheses to be tested using a wide range of variables. For instance, one may employ time-sliders to visualize when and where certain buildings came into existence or to investigate kinetic aspects of events in time-space environments, such as parades, funeral processions, orations, and protests. Experiential visualization is not a simple mimesis or positivistic reconstruction of a historical reality, nor is it a simple augmentation of a real-world site, but rather an investigation of a state of knowledge. see Case Study 4 → 68|69
Visualization can be used in many other ways to sketch out an argument or to map its constituent parts or even to model its initial formulation. Visualization has the power to unleash imaginative and conceptual potential. By identifying elements of a system and thinking about how they relate to each other sequentially, or hierarchically, or relationally, humanists discover ways of modeling knowledge that were not part of their textual training. As with so many aspects of digital work, the strengths of these techniques are amplified when they are in dialogue with, rather than opposed to or exclusive of, traditional methods. The use of visualization or distant reading, for example, in concert with attention to individual texts, or aggregation techniques in dialogue with studies of outliers and anomalies can provide valuable contributions to the discussion of meaning-production that could not be obtained using only one or the other method. Knowing what to read and visualize as well as how to read and visualize forms is at the basis of digital literacy and the assessment of meaning in these new formats. see case study 5 → 70 | 71

**LOCATIVE INVESTIGATION AND THICK MAPPING**

Traditional scholarship in the humanities moved among a few select sites for research and teaching: the library, the archive, and the classroom. The “holdings” of the library were just that: holdings held for the initiated who had the privilege of access and use. Scholars made pilgrimages to special collections to view artifacts or read rare books, often examining these objects under guarded conditions that were established to limit access and thereby preserve the safety—and aura—of the original. The seminar room or the lecture hall was the primary site for the transmission of knowledge mostly in a single direction: professors professed knowledge and students consumed it.

Today, the boundaries of the library, the archive, and the classroom have become more porous, interconnected, and globally extensible. Countless new sites for knowledge creation and dissemination have emerged, bringing scholarship into communities and communities into the academy. Libraries have allowed millions of their volumes to be digitized and have opened up their collections via Web services, making them available to the digitally enfranchised public. Some archives are following suit, removing physical and virtual walls that once restricted use. The traditional learning space of the classroom has been rethought in ways that promote interactivity, discovery, and co-creation, often through real-time feedback
mediated by social technologies that blend physical and virtual spaces. Courses have been taught, for example, in virtual worlds with avatars participating from around the globe, connecting the physical space of the classroom with the infinitely expansive and fluid realms of cyberspace. Webcast or web-linked teaching is now commonplace.

But a few caveats are in order. The networked world is a patchwork, very much marked by social and economic inequalities; access and participation are hardly open to everyone. Different zones are governed by distinct attitudes toward cultural property, licensing, and pressures of sustainability. Cost-recovery models exist even in the most elite sectors while many individuals and communities have limited connectivity. Just as in the realm of bricks-and-mortar education, inequities abound. Diverse and competing interests will continue the struggle for control.

As the contours of scholarship are undergoing a fundamental remapping through collaborations in which researchers can curate, narrate, annotate, and augment physical landscapes, the boundaries of inside and outside have become fluid. The interior realm where curators make arguments in space through the meticulous staging of physical objects, supported by labels, wall text, and installation architectures can now be enriched by media that draw the outside world into the gallery. Likewise, visitor itineraries can now be extended out into the surrounding landscape in ways that apply traditional curatorial skills to the shaping of paths through the physical world. Data landscapes can be curated in the physical space of a city, allowing a user with a GPS-enabled mobile device, for example, to listen to geo-coordinated soundscapes curated by musicians while walking down a sidewalk or to follow in the footsteps of the dead and hear stories told by generations of immigrants about a neighborhood. Such locative investigations bring together the analytical tools of geographic information systems (GIS), the structuring and querying capacities of geo-temporal databases, and the delivery interfaces on GPS-enabled mobile devices.

This attention to place has resulted in the emergence of a significant sub-field of the Digital Humanities variously called “Digital Cultural Mapping” or “Spatial Humanities.” It is here that geographic analysis, digital mapping platforms, and interpretive historical practices come together to form richly textured, multidimensional investigations of place. Unlike conventional approaches to mapping, which tend to be positivistic and mimetic, these practices of thick mapping in the Digital Humanities place a primacy on experiential navigation, epistemologies of representation, and the rhetorics of visualization. After all, a map is a visualization or
representation of a group of relations (and structuring assumptions) that present a state of knowledge. The map may or may not have a referent in the “real world,” but it does make an argument, and in the digital realm it becomes an interactive site for creating, representing, and navigating knowledge. Digital maps are essentially navigable layers of spatial data rendered visually, ranging, for example, from demographic and census data to location-specific video histories, Twitter streams, and historical map layers.

Such maps are not meant to be static representations or accurate reflections of a physical reality; instead, they function as stacked representations in which one representation is linked or keyed to another. Within a dynamic, ever-changing environment, new data sets can be overlaid, new annotations can be added, new relationships among maps can be discovered, and, perhaps most importantly, missing voices can be returned to specific locations through “writerly” projects of memory that the participatory architecture of Web 2.0 applications has made possible. Thick mapping thus enables an unbounded multiplicity of participatory modes of storytelling and counter-mapping in which users create and delve into cumulative layers of site-specific meaning. Far from the Apollonian eye looking down from a transcendent view, thick maps betray the contingency of looking, the groundedness of any perspective, and the embodied relationality inherent to any locative investigation.

see CASE STUDY | 62 | 63

THE ANIMATED ARCHIVE
user communities permeable walls active engagement bottom-up curation multiplied access participatory content creation

Derived from ancient Greek ἀρχεῖον (government) and the late Latin word archivum, the English derivative archive now refers not just to public administrative records but also to the entire corpus of material remains that the past, whether distant or close, has bequeathed to the present: artifacts, writings, books, works of art, personal documents, and the like. Its semantic field also encompasses the institutions that house and preserve such remains. In all of these meanings, archive connotes a past that has severed its ties with the present and has entered the crypt of history only to resurface under conditions of restricted access.

The Digital Humanities offers new challenges and possibilities for institutions of memory such as archives, libraries, and museums: process-based concepts of “living” archives of the present; approaches to conservation and preservation based upon multiplying (rather than restricting) access to the remains of the past; participatory
models of content production, research, and curatorship bringing together professional and citizen scholars in team-based projects that interpret the cultural patrimony as a public good; augmented approaches to programming and informal education that promise to expand traditional library and museum audiences and bring scholarship into public view; and enhanced means for vivifying and promoting active or experientially augmented modes of engagement with both the past and the present. Of course, the past was never really past; it always already belonged to the present. And digital toolkits and the expanded compass of humanistic scholarship provide some distinctive avenues for investing the present’s stewardship of the past with the attributes of life. They hold out the promise of animating the archive.

Accumulation is no longer enough to ensure the survival of the cultural patrimony. Objects that sit in storage, though they may have a potential afterlife, disappear into the ever-expanding heap of cultural remains, entering a limbo that in no essential way differs from being lost. So the “animation” of archives stands for a series of strategies for launching that afterlife from the very moment of archival processing. This implies a user-centered approach to the construction of archives that builds a multiplicity of use-scenarios into the very architecture of the archive; breaks down partitions between collections and bricks-and-mortar institutions (through, for example, open application programming interfaces); engages real or potential user communities from the outset (in processing, tagging, and metadata development); and integrates curatorial and content-production tools into access portals.

Embedded within the constellation of possibilities just evoked is a sort of Copernican revolution with respect to the roles performed by libraries and museums in the modern era. New conjugations of inside and outside, scholar and citizen, curator and viewer are emerging, with social technologies challenging conventional ideas of ownership, restricted use, storage and display, content creation, and curatorial control. With the shift in focus from data retrieval—essentially “top-down billboarding”—to bottom-up working and reworking of content, whether in the form of texts, still or moving images, audio, or other media, every library and museum becomes adjacent to a public square as big or as small as they choose. It also marks the beginning of an inversion which some will welcome and others will decry. Whereas the virtual was once subordinated to and cast in a supporting role with respect to the physical, we are now seeing new couplings in which an institution’s virtual footprint may exceed its physical edifice and the community that it serves may be worldwide, overlapping only in small part with potential or actual physical visitor/user populations. This is one of the great opportunity spaces that
the Digital Humanities opens up, giving archivists, librarians, and curators a chance to not simply enlarge but completely re-envision their communities, publics, and missions. Every public institution has already been transformed into a glocal enterprise, local and global at the same time. Glocalization will only accelerate over the coming decades. see CASE STUDY 4 → 68 | 69

In sum, the memory palaces of the 21st century will have much more permeable walls than their 19th and 20th century predecessors. This is also to say that they will be much bigger both from the standpoint of the physical territory that they cover and the corpora of information that they harbor. For example, the Digital Humanities harnesses the expressive power of worlds like Google Earth and three-dimensional virtual environments, and deploys the ever-increasing availability of wireless bandwidth to interact with ubiquitous computing devices equipped with GPS technologies that can calculate and annotate embodied, physical locations within inches. This is the future of knowledge, where culture and social and political practice will emphasize embeddings of the virtual within the real, where actual physical landscapes will be curated just as if they were an art gallery, and where we will be surrounded and enveloped by the collaborative and distributed building of annotations on, and overlays of, the physical world. This is a future that is already with us. The challenge for scholarship and institutions? To build platforms and collections out into these and other domains of intersection between the virtual and the physical in ways that reinforce not only access and outreach but also establish new models of imagination, quality, and rigor.

**DISTRIBUTED KNOWLEDGE PRODUCTION AND PERFORMATIVE ACCESS**

The myth of the humanities as the terrain of the solitary genius, laboring alone on a creative work, which, when completed, would be remarkable for its singularity—a philosophical text, a definitive historical study, a paradigm-shifting work of literary criticism—is, of course, a myth. Genius does exist, but knowledge has always been produced and accessed in ways that are fundamentally distributed, although today this is true more than ever. It is not uncommon for dozens of people to work on a Digital Humanities project, each contributing domain-specific expertise that enables a research question to be conceptualized, answered, and then re-conceptualized and re-answered. A team of database developers and data management experts may come from a school of information sciences, while interface designers
may come from the arts, content developers may come from history departments, and coders may come from the computational sciences. Each member of the team works with the technical lead and project director who collaboratively articulate the technical and functional specifications for the project. In the end, when a project is deployed, there may be dozens of “authors”—ranging from professors and librarians to student programmers, interns, staff, and community members—who contributed to its development. Some long-term projects are the work of generations of students and scholars. Distributed knowledge production means that a single person cannot possibly conceive of and carry out all facets of a project.

Analogously, distributed access means that the audience for the project can engage with its content via multiple access points and platforms. In fact, every engagement is a performative instantiation of knowledge. With the surge of mobile devices and distributed computing, ambient networks present new possibilities for accessing information and interacting with knowledge. While we access most digital information on a screen, the means by which information circulates to find its connection to those screens is distributed across wired and wireless networks, with data shuttled seamlessly between the cloud and our local machines. Though our perception of them is limited to display devices, data streams fill the air. Their presence in and among the many other features of the physical environment makes their integration into lived experience a possibility. Human and cultural knowledge will interpenetrate the natural and built environments with increasing degrees of saturation. Access to interpretive materials, cultural history, geographical and geological knowledge, historical dimensions, narrative facts, biographical information, and the stories of events lived and experienced in our shared spaces will be a way to enhance the engagement with the real. Or, in other instances, they may provide solace, consolation, companionship, and fellowship through communicative exchange. What is certain is that knowledge production, access, and dissemination are becoming ever-more distributed processes across high-speed, mobile networks that operate seamlessly at all levels.

When knowledge exists in iterative form across global networks and local access points, with many versions and expressions of cultural information taking shape in a process whose life cycle is ongoing, then any access to that knowledge is a performance, an instantiation. Just as any reading of a book or a script or any viewing of a film or any playing of a score is a performance of that work, the same is true of digital works. In fact, every use of a file is different; no two files are ever the same, and the very act of opening and displaying a file is a performance of a work,
Imagine being on the streets of a South African township as it explodes in violence after the apartheid-era government switched the language of education from English to Afrikaans. This is the experience Hamilton College students have when they play the immersive game Soweto '76, one that deepens empathy and enlivens class discussions of race, power, and education. At Dartmouth, students compete furiously against each other to tag the materials they find in online archives. When these students play Metadata Games, they are encountering an open-source project that uses the affordances of gaming to build more robust archival data systems. King’s College London students create avatars in Second Life and then reconstruct historical stages from the classical Roman Theater of Pompey to Shakespeare’s Globe Theatre in London. At Duke and other participating universities, students play “Virtual Peace,” a collaborative simulation game in which players analyze complex situations posed by international crises in order to learn how to make effective decisions. Digital Humanities gaming has begun to successfully engage with historical simulation, virtuous cycles of competition, and the virtual construction of learning environments.

But games of any type have never been held in high repute by academia. Relegated either to athletic departments as mere sports, or to the realm of leisure time as diversions, they have only recently begun to be taken seriously as both an object of study and a career for which to be trained. Gaming demonstrates a capacity that could transform Digital Humanities pedagogy. This is due to many factors, but two in particular stand out. The first is the explosion of processing power and connectivity. Not only are game-world simulations compelling visually and interactively,
they are also capable of functioning in real time with multiple participants spread around the world. This braiding of capacity and reach, made possible by ever-increasing processing speeds, the ubiquity of networks, and mobile connectivity, yields highly engaging forms of immersion and simulation. This rich interaction can be yoked to any content, from the expected adrenaline thrills of first-person shooters like Halo to detailed alternate reality games (ARGs) like World of Warcraft. Given the fungibility of content and the consistency of user engagement with well-designed games, “humane” and “serious” games are likely to keep pace with technological advancement. The second fact to consider here is the acculturation of a generation of students who have literally grown up gaming. They value interactive programs that engage their attention while at the same time deepening their understanding of meaningful subject matter.

But what exactly do such students expect and what constitutes a successful educational game? Games are rule-based. They offer copious feedback. They are essentially voluntary, running on enthusiasm and begging for engagement. Games are also quintessential delayers of gratification: Give players the freedom to achieve their goals in the quickest, most rational way and satisfying game play withers. It is the obstacles overcome and the levels mastered, the reward for tasks accomplished and the rules obeyed which constitute the satisfaction of play.

Recent developments in new-media studies and narratology have removed some of the stigma that was once attached to gaming within the academy, but digital games are still considered by many in the humanities as frivolous (and monstrously violent to boot). It becomes harder to maintain this perspective as the narrative complexity, play strategy, and game “feel” (as developers call the gestalt of gamer-and-game interaction) become more developed, culturally significant, and even world-enriching. As we have seen, games in the Digital Humanities already exist that are exploring interactive models of learning and ways of critically grappling with the human experience. The challenge for the future is to take the gamesmanship of humanities research—its pursuits and pleasures, competitive drive, and seductive engagements—as the basis for games of scholarship.
CODE, SOFTWARE, AND PLATFORM STUDIES

Code studies, along with the related study of software and platforms, bring humanistic close-reading practices into dialogue with computational methods. The operations of computational media are created through the interaction of hardware and software. These work according to protocols structured into their organization as code. The study of code is driven by an interest in exposing the ways constraints make certain things possible, and exclude others. But is code a text? If so, what kind of text? Should we assess the aesthetic properties of code the same way we discern the value of any other artistic composition? Or should we condemn code work as mere craft or technique? Debates are heated, with passionate partisans on all sides. The alphanumeric system is already a code, so the heralding of a “new” field of code studies may seem inflated.

Code and software scholars begin their study with the history of encoding practices, in particular those methods that make an operation happen, such as the punch cards used to set the patterns of weaving on Jacquard looms or the programs in early computers enabled by stacks of cards whose punched openings allowed circuits to be blocked or completed. The basic binary language of digital media is the foundation of all programming code, but software and computer languages have their own history as forms with grammar and syntax. The study of software traces developments from switch settings on mid-20th century mainframe computers to the creation of the assembly and compiling languages that underpin many of the scripting languages and much of the object-oriented software written today. The layers of software between the operations of a machine and the instructions given it by an operator offer a fascinating archaeological study, with cultural conventions often holding as much weight as technological advantage.

Scholars fascinated by the encoded protocols and instructions that constitute the language of software also look at the cultural contexts in which business, defense, or communications industries fueled the development of increasingly sophisticated approaches to encoding. The algorithm, a set of step-by-step instructions, is the heart of software programs, but these instructions have to be translated into a binary language that the computing hardware understands. The organization of processing units, the workflow cycle through circuits and transistors, the use of active buffers and parallel processors—all of these pieces of hardware interact with software in particular ways that have affordances and hindrances that vary from platform to platform. Critical approaches allow understanding of these elements as objects of study, almost as if one were reading them as text.
A particular fascination with game engines and their narrative structures fuels one area of code studies. The analysis of narrative and multi-player activities in a complex set of chained and interdependent interactions requires chunking of game elements at critical nodes or decision points. The ways this is achieved is itself a complex process—a game of sorts—in which the skills of narratology meet the worlds of probability and possibility in a combinatoric universe that must move seamlessly from one moment of illusion to another. The way this is engineered and designed elicits a fascination akin to that of expertly constructed aesthetic artifacts in any other era, such as novels or plays. Likewise, the engagement of a substantial literary community with the poetics of code has created a body of critical work that addresses the aesthetics of programming in its own right. All of these approaches offer analytic engagement with computational processes as forms of composition, exposing their complexity through careful reading, construction, and attention to structure. see CASE STUDY 5 → 70 | 71

DATABASE DOCUMENTARIES

Digital Humanities genres include multimedia critical editions; interpretive work with expanded data sets published alongside their interpretive outcomes; conjugations of the digital and the physical, the desktop and the streets; and expanded definitions of knowledge that exercise not just sight, but the entire human sensorium. Within this set of emerging composite forms, the database documentary occupies a central position. It is a genre that has continued to evolve in dialogue with shifts in the technology of interactive media.

Cinematic documentaries work with image and sound materials that, however mediated or massaged, claim an indexical relation to the world. That is to say that they work with “real-world” materials captured, filtered, and threaded into a linear narrative artifact in the medium of film. In order to craft such a linear narrative, large amounts of footage must be shot as part of the research and development process. By necessity, most of this footage must be thrown out or reduced to a few choice sequences, given that a small core of materials must make up the story’s backbone. Only one story can be told well, even when the intended single “story” turns out to be a densely wound skein of stories, each overlapping with the next.

The database documentary also works with materials of documentary value, but on an expanded scale. Database documentaries are modular and combinatoric, branching and hypertextual, often structured more like a multimedia prose piece than
a film. Consisting of a series of tracks through an actual or virtual database, the documentary can be built out of a wide range of media types: not just film and video, but also sound, static image, text, animation, actual documents (or their digital equivalents), even live or dynamic feeds from the World Wide Web. Database documentaries are multilinear. They are not watched, but rather performed by a reader/viewer who is provided with a series of guided paths; and, unlike the cinematic documentary, which is free-standing, database documentaries may be built on multiple, overlapping databases. Or they may even consist only of pointers that send out calls, through open APIs, that retrieve materials hosted externally. The paths are reversible, allowing for trackbacks to the sources from which individual documents are drawn and/or to external resources. Inclusions as well as exclusions can be exposed to view, thereby creating an experience that is dynamic, active, and user-centered. Temporal sequence, duration, and sound levels, as well as the presence or absence of elements of the critical apparatus are firmly in the reader/viewer's control. see CASE STUDY 4→ 68|69

The multilinear character of database documentaries creates a different series of opportunities and challenges with respect to cinematic documentaries. Given that multiple intersecting story lines are present in database documentaries and that they are user-activated, a far greater fluidity of movement and pacing must always be presumed, much as in the case of visitation paths through physical exhibits. Conferring unity upon such a variable experience can be difficult, as can the building of cohesive story lines. This said, the possibility of marshaling crisscrossing sets of data to tell interrelated stories offers powerful new modalities of scholarly argument as well as imaginative expression. The database documentary remains one of the most venerable of new media forms, with early expressions such as the Interactive Cinema Group at MIT in the late 1980s, the Labyrinth project at the University of Southern California, and the pioneering work of United Kingdom-based Blast Theory group in the field of so-called “live” documentaries.

**REPURPOSABLE CONTENT AND REMIX CULTURE**

The ease with which content can be repurposed in digital form extends the capacities of the medium to function as a meta-medium. Photography has that property, with its ability to record and reproduce drawing, painting, printmaking, and other visual formats. Now, the digital environment serves as the simulation machine that is able to re-create and imitate other formats. But it also allows content to be
migrated from platform to platform, to be used in a variety of outputs and for a range of readers and forums. Figuring out how to write texts in a modular manner that will allow them to be recombined for different levels of interest and readership as well as different degrees of detail and granularities of argument (not to mention output and display device) is still a challenge—and represents another fertile field for the Digital Humanities to explore. The realization that print on-demand and online access are complementary modes to traditional print rather than competitive ones is already well-recognized by the publishing community as well as readers and authors. Artists also engage opportunistically with the possibilities of different venues and formats, so that their range of expression might include gallery works that are unique, printed versions for larger distribution, and online exhibits of the same work to reach yet another audience. The work is a distributed effect of each and all of these aspects rather than being limited to any single part of this continuum. see CASE STUDY 5 → 70 | 71

Remix culture is a hallmark of the participatory, programmable Web in which a “read-only” ethos has been surpassed by one of “read/write/rewrite.” In much the same way that early textual scholarship used citations and annotations to extend authority on copied manuscripts, remix culture uses digital sampling and collage techniques to create derivative original works with a complex trail of associations, inter-textual references, and critical trajectories. Authorship is multiplicative and dissemination happens across the Web as others add to, borrow, remix, and republish the work. Best known in music, remix culture extends to photography, film, graphic design, software development, data curation, and many other realms. In essence, with the tools of both production and consumption in the hands of the public, an ever-expanding space of design and curation allows bits of data and intellectual property to move and be remixed in creative ways. see CASE STUDY 4 → 68 | 69

The university, however, still places a primacy on the singular nature of originality of scholarship and on clear lines of demarcation for authorship. In fact, the institutional structures for generating, evaluating, and legitimizing knowledge have barely embraced repurposeable and remixable intellectual culture. Perhaps this is because the institutional frameworks in which this knowledge is produced and evaluated have hardly changed over the past century. What if departments could be remixed as easily as digital music samples? What if curricula had life cycles like software? What would an open-source humanities division look like? For one thing, disciplines, departments, and administrative structures would receive date stamps and would need to innovate in order to survive.
The objections are, of course, easy to mount: Without the long-term stability of a department, how can we prepare students for a field? How can we be sure that they have learned “the content” of a discipline, and how can we possibly credential students with degrees if they are participating in departments that will no longer exist in a matter of years? These objections, we believe, are based on assumptions that have traditionally valued “the what” (a determinate and relatively static set of knowledge objects or canon of artifacts) over “the how” (a flexible—even nimble—mode of thinking that privileges design, experimentation, risk-taking, and creative problem-solving). This is not to say that knowledge in a field is irrelevant, for the contrary is true. It is to say, however, that universities will serve their students best by credentialing the skills necessary to creatively conceptualize and solve problems: a knowledge base grounded in making and experimentation, and a social disposition that fosters collaboration with diverse partners. It is here that the core values of the humanities and the generative potential of the digital come together in the poiesis of world-making.

**Pervasive Infrastructure**

With the emergence of standards-compliant Web services and dynamic cloud computing, massive data sets can be shared and accessed across networks. Web services are essentially machine-to-machine communications that allow various types of data to be accessed through specific queries. For example, a map Web service might allow a user to access census data or historical maps stored on one server from any computer able to send the appropriate query to the service; users will not receive the “actual” maps or entire copies of the data but rather access to the maps and data through calls to the service provider. The data can, then, be rendered and viewed in various interfaces, such as on a Web page, in a geo-browser, or in another visualization application. Cloud computing provides an (almost infinitely) extensible framework for massive data storage, access, and retrieval from any computer connected to the network. The metaphor of the cloud signifies the seemingly ethereal data that can be pushed and pulled through the sky, but in reality it translates into mega data centers, storage systems, and networked Web architecture to facilitate data exchange.

What does this mean for the Digital Humanities? Foremost, it means that it is now possible to share the entire data sets of research with the scholarly community and the public—at-large. In disciplines such as anthropology, archaeology, and classics,
researchers may produce millions of discrete data points over the course of a project, ranging from survey and excavation data to fieldwork documentation through integrated geographic information systems. Rather than summarizing the results of a project and drawing conclusions, researchers can make the entire data set available online, enabling other users to test hypotheses and even to add to and edit the “original” data set and accompanying metadata. Openness has benefits, but caveats about validity of data, privacy, misappropriation, and other ethical concerns are also in order. Secondly, through polymorphous browsing, users can access, manipulate, and analyze massively heterogeneous data streams, following trails of association that lead out and go deep. What this means in practice is that search and discovery tools are able to identify, aggregate, and integrate data from completely disparate sources across archives, libraries, and repositories and present these data in ways that are customizable for the needs of a given researcher. One can expand and contract, tier out and drill down through a portal that can access the world’s information regardless of where it resides. For scholars of literature, for example, it means having access to every word in every edition of every book ever published and customizing a search to answer a research question that, recursively, becomes part of the data of the system itself. see CASE STUDY 3 → 66 | 67; CASE STUDY 4 → 68 | 69

UBIQUITOUS SCHOLARSHIP

augmented reality  web of things  pervasive surveillance and tracking  ubiquitous computing
deterritorialization of humanistic practice

As these emergent genres and methods illuminate, the forms that knowledge assumes can no longer be considered givens. The tools of humanistic inquiry have become as much objects of research and experimentation as have the modes of production and dissemination of knowledge. Statistical methods press against one edge of the qualitative human sciences; graphic and information design press up against another. Real time, massively participatory role-playing games create another force field exerting influence from the arts and gaming worlds. Laboratories arise with a collaborative, team-based ethos, embracing a triangulation of arts practice, critique, and outreach as they merge research, pedagogy, publication, and generative practices. The once-firm boundary lines among libraries, museums, archives, and classrooms have become increasingly porous as scholarship, no longer limited to print and the lecture hall, has started to shuttle back-and-forth between the stacks and the streets.

Location-aware smartphones and other mobile devices have a key role to play in this deterritorialization of humanistic practice. Thanks to their ubiquity, it has
become possible to couple Web-based knowledge resources to physical locations in ways that would have been hard to imagine only a decade ago. This means that scholarship in fields such as history, urban studies, architecture, art, design, and literature can now curate, narrate, annotate, and augment the physical landscape with a multitude of Web-based archival sources. Such scholarship speaks to multiple audiences and leads multiple lives. A website may be remixed as an electronic publication for use on location-aware mobile devices and later become a print artifact; the website and mobile “edition” can be built for further curation and extension on the part of end-users who can embed data scans anywhere, at anytime. Augmented reality applications allow mobile devices to combine geolocation information and enhanced imagery in a layered, site-specific presentation of events and interpretations. Imagine a time-machine application that shows your neighborhood in a fast-forward sequence from Jurassic times to the present; or think of sensors in a natural environment that expose the geological and industrial processes that formed what is before your eyes; or consider simultaneous and automatic translation applications that remove linguistic barriers to signage and information in a foreign script; or imagine the “web of things,” in which every physical entity—from the book in your hands to your hands themselves—is connected to and part of a deeply recursive information network. The growth of telecommunication and information technologies has transformed the tactical strategies for activism, protest maneuvers, community-building, and relating in the public sphere; and, at the same time, it has also transformed how we know the world, interact with one another, and generate what counts, at a given moment, as knowledge. The natural, social, and cultural worlds are interpenetrated by ever-denser technological systems and data landscapes. We live intensely intermediated lives. see CASE STUDY 5 → 70 | 71

Ubiquitous computing, as visionary Xerox PARC researcher Mark Weiser argued, is computing that has essentially gone “invisible” precisely because it has embedded itself “in the woodwork everywhere.” Ubiquitous computing—everywhere, at anytime, in everything—is possible only when high-speed networking capacities and interoperable standards allow for constant, seamless, and infinitely deep levels of information-sharing among data centers, computers, mobile devices, physical objects, and people. Nothing exists in isolation but rather in ever-denser networks of interconnection. Of course, ubiquity has a dark side: pervasive surveillance and tracking, the colonization of everyday life by information technologies, the quantification of the biopolitical sphere into ever-smaller units of analysis and monitoring, the inability or incapacity to “de-link” or “opt-out” of these technologies.
But ubiquity also allows for the massive expansion of the scholarly enterprise through a wealth of networks, information streams, and emergent communities of practice that produce and share knowledge and culture in ways that open up opportunities for participation, dissension, and freedom. Ubiquitous scholarship is marked by an ethic of collaboration and interconnection on levels that move (almost effortlessly) between the global and the local, the library and the public square, the pen and the smartphone, the millennia-long histories of humankind and the real-time feeds of the now.
The fictional case studies that follow draw from existing projects, but are themselves imaginary, offered as descriptive rather than prescriptive models for building teams, assembling the necessary resources, and launching Digital Humanities projects into the world. The case studies provide a framework for grappling with these new domains of humanistic practice.

**A PORTFOLIO OF CASE STUDIES**

CASE STUDY 1
MAPPING DIFFERENTIAL GEOGRAPHIES

CASE STUDY 2
EXPANDED PUBLICATION OF A TEXTUAL CORPUS

CASE STUDY 3
AUGMENTED OBJECTS & SPACES

CASE STUDY 4
VIRTUAL RECONSTRUCTION

CASE STUDY 5
MULTI-AUTHORED LOCATIVE INVESTIGATION
In this cartographic project, techniques of thick mapping are used in combination with text analysis, data-mining, and large-corpus natural language processing. The extended project uses a participatory architecture to support annotation, debate, and repurposing of the cartographic representations and the text visualizations. Microcosmic views of the nomenclature for different geographical features are complemented by macro-cosmic views of shifts in the understanding of the shape and boundaries of geographical regions.

Scholarly attitudes toward indigenous concepts of space and geography have changed dramatically in the last two decades through the influence of post-colonial theory. The traditional narratives of “discovery” have been interrogated, qualified, and largely abandoned. Perspectives of indigenous peoples now register within the literature, but little exists of their mapping techniques, world views, and epistemologies. Many Native American techniques for understanding geography were passed on in oral description, in myths of origin and ownership, or were indicated graphically in the most ephemeral tracings of sticks in sand or dirt. Approaches to cartography have undergone their own changes during these decades, away from what historian John Rennie Short characterizes as the story of “increasing scientific rationality” and toward maps as “social constructions, stories marked by purposeful erasures and silences.”

We can now map the encounter of indigenous peoples and Europeans from different cultural perspectives, surveying incommensurate or differential geographies, explicating fundamentally distinct views of land, space, and place. This “mapping” requires careful textual analysis of the production, reception, and critical discourse around key documents in which the dialogue between indigenous and European peoples is evident. It also requires a way to produce simulations and models of a differential geography, one that would arise from the contrast of basic assumptions. For native peoples, rivers and roads were one continuous transportation route, while Europeans thought of them as land features. Europeans were focused on edges and inroads, the coastlines, harbors, bays, and means of penetrating the unknown interior. Indigenous peoples thought of land in terms of extension and activity, seasonal and tribal movements and occupation, with margins determined by social order and priority rather than physical metrics.

This project takes up the question of how, with the meager evidence before us, we can model the contrast between indigenous and European concepts of mapping at the time of early contact. Can digital means be put to the creation of an alternative view of geography and land, of spatial experience, without taking Western perspectives, epistemologies, and coordinate systems as normative? A combination of textual analysis and comparative, critical cartography will be used to explore the concept of differential geography—a mapping of space that exposes incommensurate views—and to model the changes in the historical understanding of the spaces of discovery that became the “New World.”

The project focuses on several key narratives of discovery linked to European maps, some of which relied heavily on indigenous sources of information. The texts to be used include: Christopher Columbus’ letters to the king and queen of Spain, accounts of Jacques Cartier’s journeys into the Gulf of St. Lawrence in the 1530s, Sir Walter Raleigh’s maps and accounts of Guiana from 1595, John Smith’s accounts of his capture in 1607 and the map he made in 1612 of Virginia, the Codex Nuttall, Philippe Buache’s Carte Physique de
Terreins les plus élevés de la Partie Occidentale du Canada, printed in 1754, and Aaron Arrowsmith's 1802 map of North America, which was heavily dependent on and acknowledged Native American sources.

These primary texts will be analyzed for their use of indigenous accounts and terminology. We will create a searchable corpus that will allow text analysis of key terms whose use and meaning can be tracked through the reception history of these primary documents in the critical literature. Many of these texts are already in digital form, but they have not been analyzed for this purpose. We propose to track and visualize the changing nomenclature around a cluster of crucial concepts such as space, land, mapping, discovery, contact, nativeness, and other terms to understand how the discourse of indigenous spatial understanding contrasts with that of the Europeans. We realize that the materials for authentic indigenous voices are scant, and almost all are recorded within European texts and documents. This is not a project to recover a lost authenticity, but to analyze the shape of discursive formation.

Methods
Structured mark-up, particularly the textual analysis of terms in context, will produce a study of nomenclature shifts from first contact to the present. The reception history, citation, reuse, and repositioning of Raleigh and Nuttall within the critical literature will be used as case studies since they are long, vertical studies across several centuries of use and discussion. We will also do a lateral analysis of their presence across a corpus of crucial documents, tracking usage and changing characterizations of peoples and vocabularies.

The project poses a number of technical and conceptual challenges. While some of the primary materials are in digital form, others are handwritten manuscripts whose transcription requires specialized knowledge and skill. Nonstandard spellings, shifts in language use, and errors in Optical Character Recognition will need to be checked. The question of context as a determiner of meaning for vocabulary will need to be addressed using natural language processing (NLP) in combination with structured mark-up as a method of analysis. The NLP approach will be used to identify context-dependent features of writing while the mark-up will focus on controlled vocabulary and identifiable terminology. Both can be semi-automated, and will be complemented by the use of other digital text analysis tools that can be run on the larger corpus of secondary materials to track reception history for changing terminology and nomenclature. The scale of this second phase of textual analysis would preclude analog reading methods from being used, while the first phase of textual processing answers the demands of digital technology to make explicit the judgments of the human designers of the project. Data-mining, distant reading, and close reading will all contribute to the project.

Differential cartography will be based on contrasts among European maps, verbal descriptions and terminology that can be extracted from these as having indigenous sources, and those few sources of indigenous cartography (verbal or visual) that exist in the record (e.g. Codex Nuttall is a pre-Conquest map). The task is to create cartographic simulations of an alternative worldview that does not reference European geospatial systems but has a consistent system grounded in indigenous experience, and then put these into contrast with the existing cartographic record of the “discovery” of the “new” world. Thick mapping techniques that layer historical materials in contrasting cartographic representations will allow us to present different views of the New World as a literal, as well as metaphorlic, space of cross-cultural encounters. We are interested in imagining differential spatial systems and visualizations rooted in the worldviews and notions of proximity and distance, memory and community, duration and extension specific to indigenous cartographies. These are radically incommensurate with the projection and coordinate systems that are now naturalized features of standard mapping and GIS applications.

Work plan
- Identify sources for texts and maps
- Obtain permissions and digital versions
- Test the natural language processing analysis
- Create xml schema for indigenous vocabulary and nomenclature and for European geographical terms
- Mark texts and contrast search results with NLP analysis
- Search reception history corpus for usage change in terminology and vocabulary
- Create a list of cartographic fundamentals from indigenous perspectives
- Create simulations from these fundamentals
- Contrast with European maps of encounter
- Analyze the “differential” in these geographical and temporal attitudes and map them using a geo-temporal database that charts changes in attitude as shifting conceptions of space

Dissemination and participation
Poster and panel sessions at national professional meetings, postings on GeoBlog and cultural geography sites; invited response from senior figures in cultural geography and historical mapping; virtual roundtables organized as classroom events. The ongoing project will be supported by a participatory architecture that allows the mappings to be annotated extensively and also repurposed. Build on this material but extend to larger digitized gazetteer and cartography collections with emphasis on place names and cultural differences in geospatial features. Finally, develop prototypes for geospatial visualization engine that is conceptualized and structured according to the differential geographies embodied in indigenous worldviews.

Assessment
Peer review of data structure, credit for simulations, course evaluations from students on comparativist approaches in class and ease of use of analytic tools; scale of participation; ability to reveal both the limits and possibilities of interoperability with existing geospatial databases and other geo-browsers.
CASE STUDY 2
EXPANDED PUBLICATION
OF A TEXTUAL CORPUS
OF PAPYRUS FRAGMENTS
FROM THE ALEXANDRIA
LIBRARY

This textual corpus project will build a collection that links to existing repositories, makes use of certain text-based annotation platforms for debate about textual variants, performs some probabilistic natural language processing, uses a collation tool to study those variations, and creates an augmented critical edition of these fragments. Several different traditional and expanded publication models will be used to allow scholars with different profiles and agendas to present their findings in an appropriate fashion.

A new cache of papyrus fragments has been discovered in Alexandria, Egypt. Though considerably damaged by neglect and wear, these fragments promise to answer some long-standing questions about the spread of the Phoenician script and dates of its adoption across North Africa, particularly the coastal regions to the west, and its possible dissemination along trade routes into India. Some surprising features of these papyri make clear that they were recycled several times in the course of their use. Many are palimpsests, and some have several layers of script in varying degrees of legibility.

A host of different imaging technologies and digital platforms for integrating the data collected from the papyri are currently available. One major part of this project will be to repurpose some of the techniques that have been used successfully in other projects in Western Semitic epigraphy. However, the language in these papyri is not limited to Semitic tongues, and to the surprise of the librarians involved in the discovery, several as-yet unidentified languages seem to have been making use of scripts whose use and spread had been thought to be well-documented. One scholar has suggested the presence of Indo-European roots in the organization of the linguistic structure, which would suggest earlier contact with the Indian subcontinent and more dramatic cultural diffusion and influence than has previously been thought. Before any natural language processing can be done on the texts, they have to be deciphered (because of their poor condition). NLP techniques for ancient languages are in experimental stages, especially with fragmentary sample sets. Some speculative and probabilistic readings of the papyri and of the texts will be used.

The research problem is to identify the language groups represented in these papyri, match the script forms and use with the known corpus of Semitic epigraphy, and track the variants in a database that can support data-mining and text analysis across versions, translations, and script forms. A side benefit will be the creation of a digitized corpus of the papyri. One of the difficulties is that a major figure in early Indo-European languages is elderly, ill, and unable to travel so that his input will have to be done entirely on digital surrogates. A platform for annotating and tracking his contributions will have to be built or repurposed from existing platforms. This is an incentive for involving a team of mid-career and younger scholars whose formulation of problems of linguistic change and diffusion will also be essential. They are demanding an augmented publication format that will allow their work to be published rapidly, with a short peer-review cycle and with various scales of intellectual contribution, links to other existing corpora and repositories, and even an agonistic spirit of gamesmanship.
Methods
To do this project effectively, some crowd-sourcing of the translations, decipherment, and editing of the documents seems like a viable possibility. Statistical methods for doing large corpus analysis and comparison will also be essential. Thus, both close-reading and distant-reading techniques need to be involved in the study of the texts, the artifacts, and the scripts. The first phase of the project will require extensive integration of the imaging and digitization, with all uncertain signs or graphic elements marked so that the guesswork part of the project is conspicuously noted. Using the cultural analytics platform for display of large numbers of artifacts as well as pattern recognition software, similarities in script forms will be used to pinpoint linguistic similarities. The text translations will remain fluid, with variants and disputed elements conspicuously marked. Publishing these bits and pieces on a regular basis will be essential if any crowd-sourced work is going to occur. The senior scholar has asked that his interpretations be given a separate layer for presentation online so that his work can stand alone and be scraped off for later publication in print format.

Work plan
- Identify imaging techniques and sources of equipment
- Establish partnerships for shared access
- Create image files and test integration and comparison techniques
- Test probabilistic methods of text analysis for fragmentary data sets
- Identify translations of source texts where appropriate
- Link to existing repositories and online translations
- Test annotation and version-control platforms
- Test the cultural analytics and pattern-recognition software
- Put peer-review system into place for short-cycle contributions
- Create a platform of publishing and crowd-sourcing translation, editing, and decipherment
- Continue iterative process of imaging, translation, and decipherment
- Do sequential publishing of the findings in the form of an augmented edition that contains links, comparisons with existing corpora, and other versions of the texts

Dissemination and participation
Create a Twitter feed and RSS feed to publicize the project and engage participants; publish a beta version of the project in a print-plus mode online and establish a workflow to repurpose this content for traditional publication; crowd-source the translation and comparisons as well as the decipherment; augment the edition on an ongoing basis as scholars in the field indicate points of connection or comparison with other existing papyri, texts, or fragments of ancient scripts and languages. The project will be linked to major repositories in the Near and Middle East, Europe, and the United States by using an aggregation engine to allow for a larger statistical sample for investigation and comparison. The bridging of traditional and new modes of scholarly engagement through distributed knowledge production approaches will allow the senior scholar to work effectively with younger scholars and allow for crowd-sourced input without collocation.

Assessment
The technical, intellectual, and cultural/institutional aspects of scholarship are interdependent. Success will be gauged in part by the extent to which the decipherment is completed and legibility for various layers established with credibility through the imaging and textual analysis. Another measure of success will be the number of contributions that enable links to existing digitized fragments and/or translations of ancient scripts.
CASE STUDY 3
AUGMENTED OBJECTS & SPACES: JEWISH RITUAL OBJECTS IN DIASPORA

A university museum has an extensive collection of costumes, ritual objects, and recordings of ceremonies from Jewish families in Poland. These were obtained across several generations and do not all have fully documented provenance. Some were the work of early 20th century anthropologists who brought objects, photographs, and artifacts back from the field. Some are materials that were part of a large collection developed by a mid-century alumnus who donated them to the museum on the condition that the materials be used for teaching and public education about Jewish art and culture. Other materials were acquired through a fund established for the promotion of the study of the Jewish diaspora and were bought at auction or through reputable dealers by the museum curator. But some materials are of uncertain origin, and have been the subject of controversy, since they may have been looted, stolen, or smuggled out of the countries of origin, possibly as the result of Nazi appropriation. The museum has started a major initiative to make use of its Jewish ritual object collection and create a series of public programs, research opportunities, and curricular initiatives, as well as produce some permanent exhibits. In order to do this effectively, the director has determined that a digital approach based on augmenting the objects with multifaceted information displays will be the most effective way of addressing the ethical and intellectual dimensions of this cultural legacy.

While much of this material has been cataloged, not all of the descriptive information about the works has been put into digital form. Some of the earliest material was entered into the registrar’s ledgers in handwritten form, while the most recent metadata conforms to the Getty’s standards for Cataloging Cultural Objects. While the museum staff would like to standardize metadata for the purposes of managing the collection, they do not want to lose the important record of earlier approaches to the classification of artifacts. The idea of displaying different sub-collections within the larger whole also suggests some interesting historical narratives about the development of diasporic anthropology and cultural studies of ritual objects. Finding an effective way to display different interpretive approaches is crucial.

The artifacts in the collections range in size and scale from tiny mezuzot to tefilin, prayer shawls, Torah coverings and a fully rebuilt antique ark and bimah. Photographing these works for digital presentation also poses some challenges. Thinking through the organization of images to show multiple views, to facilitate detailed as well as overall study of the objects, and to allow for research as well as interpretive exhibits will take some serious repository building and design. The curators want to avoid any kitsch or special-effects approaches and also do not wish to create fictional spaces for actual artifacts.

This project in critical curation and the augmentation of objects with commentary will resituate religious objects through a multi-modal approach that captures ritual practices across the time and space of diaspora. Spearheaded by a museum, the goal of this project is to produce an animated archive of cultural materials attuned to questions of provenance, use, and scholarly interpretation.
One part of this collection came from a synagogue in Poland that was destroyed in World War II. But the site has been excavated, and there are extensive field notes and site photography to accompany the artifacts. These objects could be recontextualized through the narrative of the dig and accompanied by a story of the excavation. Other objects are of dubious provenance, and so need to be presented in a manner that allows serious scholarly engagement with their history and forms. A significant number of artifacts are known to be stolen, and finding descendants of survivors who can claim them is important and will be a part of the outreach supported by distributed access to the collections. Descendants of survivors will need to show appropriate credentials and be vetted before they can search and annotate the archives and repositories. Display of these materials may need to be limited, but research on them needs to be supported digitally so that some of the scholars best positioned to do this detective work can access them. The museum will collaborate with restitution groups which provide legal expertise and advocacy on behalf of survivors and their families.

Perhaps the most challenging materials among the collections are recordings of ritual practices that were never meant for public display. Some of these recordings were obtained surreptitiously. Others were obtained under very carefully worked out privacy agreements and intellectual property negotiations. Creating an environment that respects these agreements or goes further in using the museum environment to educate the public about the restraints on viewing seems essential in today’s critical frameworks.

The digitization of these collections and creation of critical exhibits for public programming, education, and research is the focus of this project. The goal is to create exhibits that augment the objects and artifacts by exploring these many intellectual, critical, ethical, and political dimensions. Relating the artifacts to the geo-temporal history of diaspora is one component of the exhibit. But community testimony and archival materials that provide demographic data are also crucial contributions from which to generate display. The ultimate goal is to present the history of diaspora told through the movement of things and the rituals around their use. Creating a network analysis and information visualization will be one part of this presentation. Another will be the attempt to situate all of the artifacts within practices. Thus an artifact will never appear as a single thing on display. No artifact will be an autonomous object with a single text label. Instead, all objects will be accompanied by a digital matrix that exposes provenance questions, communities of use, and historical information about each as well as information on its acquisition, transmission, and debates about the ways it should be displayed and interpreted. In other words, the display of augmented objects will refract them along multiple lines of inquiry and interpretation that invite scholarly and critical engagement with an animated archive of materials.

**Work plan**

- Inventory the objects and artifacts
- Do an assessment of the metadata and cataloging protocols
- Create a set of crosswalks and schemes for description of the objects
- Address the multiple representations of the objects in existence and those to be created through the process of photographing or scanning
- Identify a content management system appropriate for museum management
- Test various network analysis tools and visualizations to display the movement of objects through time and space
- Modify the system so that it is customized for appropriate workflow and use
- Consider the administrative issues of permissions, access, and use of digital materials
- Consult appropriate scholars and authorities on legal and ethical issues around these materials
- Create an academic and community advisory board for ongoing review of ethical practices
- Create proof of concept demonstrations of augmented object displays that contain multiple viewpoints and artifactual histories
- Develop an appropriate permissions system and demonstrate the ability to create tiered levels of access and use for various audiences
- Design a method for processing input from professional and amateur scholars
- Consider the ways to engage stakeholders in the larger questions of cultural ownership

**Dissemination and assessment**

Create text labels, commentary, and debate that carry an author attribute; design a system of searching and indexing according to author; record and display relevant debate trails generated by objects; create a public forum in which these debates are edited or represented for study; engineer an app for mobile devices that allows input from contemporary sources.
Case Study 4
Virtual Reconstruction of an Afghan Refugee Camp as a Site for Cultural Memory

This project repurposes the technology of online multiplayer games to create a virtual community of testimony, witness, recovery, and social bonding. A spirit of joy and community-building is present as the shared repository of memories—photographs, some video materials and audio tapes, as well as letters, diaries, journals, and other materials—is being used by a younger generation to create a shared history through a series of mash-ups in which nuclear family histories become the common property of extended “families” through database documentaries and remix storytelling. This shared history may promote political activism, but also may become a target of unintended surveillance. Use of avatars and assumed identities is standard practice, and sensitive materials are likely to be part of the repository.

A professor specializing in politics, one in architectural history, and another in performance studies have been gathering material for a collaborative research project that would allow them to create a virtual model of one of the largest refugee camps that came into being after the Soviet invasion of Afghanistan in 1979. Interest in the site and its inhabitants has been spawned by recent events, including the pullout of American troops. Many of the children born in that camp grew up outside of Afghanistan—in Pakistan, Iran, India, and elsewhere throughout the region and beyond. An international organization interested in “virtual” repatriation is looking at patterns of diaspora, assimilation, and cultural memory. The idea of using a virtual reconstruction of the camp as a point of shared experience touches many nerves. The site itself, though still in existence, is in sensitive territory, difficult to access. But photographs taken by a U.S. soldier have been smuggled to the organization, Jalozai International, and offered to the U.S. academic team. A mobile phone application that repurposes these photographs to create an augmented reality experience of the original site has gone viral.

The site needs to be re-created virtually, but should be as accurate as possible with respect to the layout of the original camp. The group is working with a refugee community organization, which is in touch with a worldwide diasporic network of displaced persons and refugees. This community organization is eager to participate, as much as possible, in the creation of a virtual environment that could serve as a theater of reconciliation, testimony, memory, and commemoration. The United Nations High Commissioner for Refugees helped with repatriation, while the Pakistanis issued ID cards to all Afghani people living within their borders. For political reasons, many persons slipped through these official programs.

Much research has been done, and hundreds of hours of interviews have been logged. Descriptions of the camp from firsthand accounts, and from photographic and drawn images, have been gathered. The reproduction of everyday life in the camp would be made in virtual form in a simulation lab. The integration of the stories and eyewitness accounts and the creation of a fully immersive environment represent the next phases of research for this project. The questions surrounding the use of the environment and the quasi-game-like virtual world it suggests are all beginning to raise some concerns in the university and in the community. Creating a way to allow active participation and contributions from the community without trivializing the trauma of those who experienced the camp firsthand is one problem. Keeping fake testimony and malicious content from appearing is another. Protecting sources is yet another. However, all involved are interested in using theater and performance art as a way of engaging with recent history. They want to treat the camp not only as a historical site, but as a living memory that has to be engaged directly through imaginative experience if it is to be fully understood. Members of
the younger generation are engaging in the creation of remix narratives and role-playing games based on materials in the repository.

The goals of this project are to create the immersive simulation that allows for performance of recent trauma in an environment that may or may not be able to be controlled. Some simulations and predictive models are being built into the system, particularly those that use complex adaptive systems modeling techniques, and these will be used in dialogue with live user contributions to monitor emerging trends in the environment. However, any hint of surveillance or control will have disastrous results, and the simulations need to be fully transparent to all participants. The performance studies professor has been working with the interface designers to produce some avatar representations and thumbnail theaters that show possible scenes and probable story lines among live participants. Creating an interface that allows multiple users to participate actively in a multi-person performance while also making use of historical materials and documents will require careful scripting and guidelines. A polymorphous browser that displays materials differently depending on how parameters identifying the user are set is in beta.

Methods
Identify the available software for creation of a virtual site with social media and participatory capabilities, or consider making this site in Second Life or another virtual world application. Get information on issues of security and privacy if a third-party platform is used. Make sure the site can be used with mobile apps as many of the participants will not have cable connections, but will access the materials through their cellphones.

Work plan
- Establish communication with appropriate international organizations
- Develop collaboration with the refugee groups and their leadership
- Create a beta version of the virtual site
- Invite a small group for user testing
- Perform iterative user testing based on initial results
- Build out the virtual environment
- Create a public forum for input
- Create avatars to protect privacy and identity as appropriate
- Document use and participation
- Create cross-referencing tools for tracking shared information and memory

Dissemination and participation
Engagement of the UNHCR and dialogue with the Jalozai International leadership is crucial, as is ongoing support of the university where the project is housed; plans for a small working group to meet in Iraq and another in Pakistan will facilitate direct contact with academic team members; YouTube presentations and virtual encounters are also planned, as is a series of performances in the virtual environment. These will be publicized as real-time events in the virtual space. Scholarly publication of findings will take various forms, including but not limited to traditional conference presentations and publications supplemented by digital collections and archives of the project and its materials deposited in the university library.

Assessment
Assessment will be ongoing; monitoring the participation and reaction of participants will be crucial to safeguarding privacy and gauging comfort levels as well as the effectiveness of debate, dialogue, and documentation; getting solid documentation of the contributions and testimonies is essential.
An archive of documents from the Zenon Corporation, whose headquarters occupied a historical building designed by Louis Sullivan, was discovered during recent restoration work. Stored in a safe in the basement of the building, the documents have now been moved to the University of Illinois, Chicago, where they have become the focus of interdisciplinary study. The archive contains copies of business correspondence, internal memos, meeting notes, drafts, minutes, calendars, and personal notes. Some are handwritten, some are in shorthand, and some are hand-edited drafts. Others are typewritten documents, many on letterhead featuring the building with its original facade elements, including downspouts and decorative features that were removed in the 1970s. The documents are from the 15-year period (1945-1960) during which Zenon, contracting with UIC, was developing a secret project for the U.S. military to build a distributed computing system for defense that many cultural historians believe was an early version of the networked computer.

The cast of characters is colorful. Zenon’s president was a Harvard-educated scion of an old Chicago family, and the Sullivan building had originally been built for the home offices of his grandfather’s insurance business. Plans for the project were leaked by his secretary and mistress, whose connections to gangland South Side mobsters seemed to hark back to Depression-era speak-easies. Scandal and intrigue dogged the Zenon project, and the secretary’s body was found at the bottom of an elevator shaft, a crime concealed for a half decade. The documents also open up a window into the culture of the corporation and the research university during those years as well as the relationships among employees as mediated by the writing technologies of the time (pen and paper, stenographic machines, typewriters, shorthand).

An interdisciplinary team of scholars is working on the reconstruction of the Zenon project within a “history of the future” framework. It seeks to publish a “multidimensional essay” built around a core set of archival documents—the correspondence between an executive and his secretary—in order to explore a novel publishing model that allows for the building of connections across media, as well as across digital/physical boundary lines. One team member is a cultural historian of organizations; another is an expert on the history of network architectures. A third is interested in the “gendering” of spaces and forms in corporate architecture and, working with the team, seeks to develop an augmented reality app to reconstruct the original Zenon building at its site. Her work is funded by the Chicago Architectural Association and the Chamber of Commerce, both of which wish to integrate scholarly content into tours of the city’s sites available on mobile devices. She proposes structuring the interpretive work being carried out, as well as the Zenon archive itself, as a function of the building’s layout and spatial organization such that the site visitors are able to “see” events unfold at set points in the entry, lobby, elevators, and hallways, thereby fulfilling the needs of both funders. But the project must also
be designed so that off-site visitors can experience the full interplay of archival materials, interpretive research, and architectural features.

Working alongside the team of scholars is a technical team comprised of an interface designer who specializes in digital corpora, a computer science doctoral student working on information structures and knowledge models, a designer who is an expert in CAD systems, modeling, and architectural rendering, and an adjunct professor who spends half his time as a technology developer creating tablet apps. They will play the lead role in creating an application that allows: a) on-site users to move and rotate their tablet devices to navigate 3-D models of Sullivan’s building framed by and animated by texts, annotations, commentary, and archival documents; and b) off-site users to replicate this experience on their own tablet devices in clear and meaningful ways. This prototype will allow scholars from across the humanities to test the viability of multidimensional formats as publishing platforms.

The software challenge is three-fold: First, to create a content management system that allows the three scholars to collaboratively generate texts, metadata, annotations, and images; interweave them with the Zenon archive; and embed them in the architectural models. Second, to create an intuitive, user-controlled navigational interface that supports both on- and off-site movement through the combined content governed by the spatial structure of the building, semantic features of the content, the user’s prior navigational choices, and user settings regarding the density of data layers and frames. Third, to build richly textured digital representations of the interiors and exterior of the Sullivan building that are appropriately keyed to the various data layers that make up the research project.

**Dissemination and participation**

The application will be made available for download from online stores at no charge. Its availability will be broadcast through social media and will be promoted by the supporting institutions in a version that is “tuned” for nonspecialist audiences. The project website will continue to be a site of conversation in the hope that other teams of scholars might contract with the technical team to undertake new and extended versions of the project. The results of the project, including user feedback, will be documented, analyzed, and shared through conventional venues, such as conferences and journals, from each of the team member’s fields.

**Assessment**

Assessment will be built upon three points of engagement. On-site and off-site user testing from the standpoint of human-computer interaction will be a part of the development process. User metrics will be generated through social media rankings, online store rankings, number of downloads, and direct feedback. Critics and scholars will be asked to review the application from a variety of vantage points: as a model for scholarly publishing and for the merits of the scholarship of the three contributors.

**Work plan**

- The entire team works together to develop the information architecture and content schema
- The developer customizes or creates a bespoke content management system to be used in the writing of the three intertwined “essays”
- The scholars generate the writing, annotations, diagrams, images, and other content, along with metadata and links
- The technical team devises a database architecture for the selected portion of the Zenon archive that will work seamlessly with the content management system and the augmented reality app and its architectural models
- The designer and developer iterate and test interface designs, user interaction, and navigation for both on-site and off-site access
- The team goes back and forth between scholars generating material and the designer and developer demonstrating the application until an alpha version is ready for user testing
- Alpha testing with users both for the performance of the application but also for the reading and interpretation of the content
- Develop a website for feedback and user participation
- Iterate a beta version based on feedback and refine for public release
3. THE SOCIAL LIFE OF THE DIGITAL HUMANITIES
DIGITAL HUMANITIES ENGAGES A WORLD OF LINKED AND LIVED EXPERIENCES.

Because networks connect us, they are social technologies. As scholarship moves from the library and the lecture hall to digital communication networks, it takes on expanded social roles and raises new questions. New modes of knowledge formation in the digital humanities are dynamically linked to communities vastly larger and more diverse than those to which the academy has been accustomed. These communities increasingly demand and delight in sociable intellectual interactions, in which critique manifests as versioning, and thinking, making, and doing form iterative feedback loops.
A division emerged over the course of the 20th century that separated humanities knowledge into study and analysis on the one hand, and practice and application on the other. The former is characterized by criticism, hermeneutics, and close reading, almost exclusively undertaken by a single author who works to articulate a highly defined problem in a specific discipline. The latter is rooted in design, collaboration, and performance, often stretching across media and involving multiple agents, producers, and authors. Thus, the creative energies of the arts come to be seen as distinct from the “serious” practices of criticism, analysis, theory, and history. In other words, the process of “how” became separated from the content of “what.”

This division helps us understand the ways in which the diversity of humanities knowledge is regularly (and not always unfairly) stereotyped as a dry, rarified, canonized set of objects, disciplinary practices, and media forms. The “how” requires attention to design, format, medium, materiality, platform, dissemination, authorship, and audience, things that are all taken for granted or assumed to be implicit, value-neutral, secondary, or even irrelevant when scholars turn over their manuscripts to a university press. But there is nothing neutral, objective, or necessary about the format of a book, the space taken by a page, the medium of paper, or the institution of a press. In fact, the “what” is shaped by the “how” in a profoundly recursive, process-oriented manner. When print artifacts are no longer the primary medium for knowledge production in the humanities, norms begin to change and the “how” of design reasserts itself at the core of every “what.” In embracing such a transformation, the Digital Humanities not only takes on a new set of disciplinary and technological tasks, but also a world of linked and lived experiences that are at once social and epistemological in character.

This chapter focuses on the social aspects and societal impact of the Digital Humanities. It begins by analyzing the economies in which humanistic knowledge was created in the past before turning to how open-source models, information technologies, and social media have reshaped contemporary practice, promoting social transformations that affect the reach and relevance of humanities work. One such impact is the invigoration of collaborative authorship and the growing significance, in turn, of what will be referred to as the “curation of knowledge.” Publishing, always a social act, becomes ever more so in the Digital Humanities, challenging academic presses and university libraries to stay true to their mission of promoting...
excellence while reaching out to expanded publics. The chapter concludes with a description of the *hedgefox*: the new type of student that a Digital Humanities education could and should produce.

Open-Source Knowledge Economies

In order to understand the transformation of scholarship and scholarly practice in the Digital Humanities, we can contrast two different economies: The first is that of the Industrial Revolution which shaped the establishment of modern humanities disciplines and departments within Western universities; the second is the globalized economy of the networked information age, the economy of the Digital Humanities. It is here that we can discern a critical difference between an economy of knowledge production tending towards scarcity, centralized control, hierarchy, division of labor, property, and proprietary systems versus an economy of knowledge production tending towards abundance, decentralization, peer creation, creative commons, and open-source models.

The fact that, by its nature, Digital Humanities encompasses both an academic and a social life expands the discussion well beyond the technological. Central to the transformations of the 21st century is the movement from closed- to open-source cultural production. Open-source culture possesses a multitude of facets and definitions, comprising many of the attributes already discussed: collaborative authoring, multiple versioning, flexible attitudes toward intellectual property, peer contributions, access to multiple and multiplying communities, and overall patterns of distributed knowledge production, review, and use. Open-source cultural concepts had their origins in the software development community decades ago, when dedicated independent programmers revolted against the decision by computer manufacturers to sell software where the source code was “closed,” meaning it was impossible to change, improve, or adapt to the user’s needs. The free and open-source movements started to create alternate operating systems and programs that users could contribute to, improve, and send back out to the developer and user communities. Richard Stallman, one of the leading lights of the free software movement, once referred to open-source projects as “technical means to a social end.”

The growth of networks facilitated and accelerated open-source production, allowing the globally connected to ship code from developer to developer,
upload new versions, and check for flaws and improve performance. Proof soon came in the form of the wildly popular open-source Linux system, originally developed by a Finnish university student named Linus Torvalds and then expanded by a vast community of like-minded programmers around the word. The maxim of open-source software developers—“given enough eyeballs, all bugs are shallow”—was a fresh way of thinking about how robust, stable systems could be the product of multiple, autonomous hands rather than of centralized, top-down, proprietary models of development.

As Stallman anticipated, what began as technical became social, and ideas of free and open cultural production began to percolate through society. What this meant was that users wanted to be able to mine networks and systems for parts and even wholes that they would then be free to refashion, remix, and re-create according to their wants and needs. This was, and remains, a utopian prospect, in large part because open-source runs up against inherited notions, values, and rules regarding intellectual property. For if code—or any cultural product—is produced by a distributed network of sometimes unknown creators, how is it to be regulated? Who is held accountable? Who owns it?

Open-source has come under attack from centers of power because it challenges the very intellectual property rights that sustain many dominant players within the global economy. Open-source also encounters opposition from communities and institutions that are committed to limited, calibrated, or stratified forms of access to cultural knowledge. Indeed, it seems more than legitimate to critique open-source’s utopian universalism inasmuch as all knowledge or cultural materials cannot be shared on equal terms. Tracking the provenance of materials that reside in a given cultural institution can expose histories of violence, plunder, or genocide just as well as it can expose heroic acts of rescue and preservation. So it is incumbent upon contemporary humanists to embrace a thoughtful, critical attitude toward open-source resources. No single or rigid approach to cultural property suffices. Digital diversity means recognizing fundamental differences as regards technological platforms and the uses to which materials are put.

To fully understand the specificities of our current moment and the prospects for the future, we need remember the social life of information in the industrial era, when worth tended to be defined by scarcity. Trade secrets were feverishly guarded; access to the means of production—not to mention media and
information technologies—was controlled; participation was limited by decidedly hierarchical functions and divisions of labor; and property was owned, protected, and sold in an economy that reduces value to supply and demand. Though there were notable exceptions to this model of scarcity—the establishment of public education from kindergarten through graduate schools, the great philanthropic initiatives, the building of public library systems—much of our legal and economic system is still predicated on scarcity and narrow definitions of ownership as a driving force. By contrast, the networked information economy, at its best, promises openness, sharing, and common platforms for information exchange. Access to the means of production in the information economy is dramatically opened up, rendering the bar for participation low enough for nearly everyone connected to the Internet. Peer-to-peer sharing and open-source models of production transform “property” into something created, edited, and monitored by the ever-expanding public but ultimately owned by no one. Many defining aspects of the networked information economy are based on abundance and the copiousness of the digital copy, which in turn is based on the cooperation and openness that characterized the early years of network development.

No clean break exists between these two economies and elements of complexity and contradiction appear within each. But forces are sure to continue to vie for control in an era of (seemingly) seamless networks, open platforms, and global exchange. For Duke University Law School’s James Boyle, the real danger to the “commons of the mind” is not unauthorized file-sharing but “failed sharing.” Rather than participating in the corporate panic about intellectual property theft, Boyle argues that we should be concerned instead about the enclosures and strictures placed upon the world of the creative commons. This is a debate that rages on, and digital humanists will increasingly be called upon to provide intellectual capital in the struggle with the monetary capital of some corporate titans as they wage a legal and cultural battle to regulate, protect, and monetize the intellectual property set free by the World Wide Web, the global merging of networks, interactive technologies, and digital cultural production.
Social Transformations and Technologies

As we have seen, the industrial economy which typified production and defined social relations over the past two centuries has been transformed over the last two or three decades into what Yochai Benkler terms the “wealth of networks” that characterize the decentralized and open information economy. With the growth of the participatory Web and social media technologies—what many have called “Web 2.0”—we have seen the emergence of an economy defined by social structures, modes of production, and cultural formations that alter the way information is produced and exchanged, enabling a global and networked world of decentralized sharing, collaboration, and diffusion, with the caveat that it also creates the conditions for violent backlash and newer forms of surveillance and control.

What makes social technologies different from unidirectional technologies like broadcasting? First, the bar to entry for using contemporary social technologies is remarkably low. Provided access to the Internet (which, to be sure, is not a given), anyone can tweet messages, upload pictures and/or video, post blogs, and download a wide range of media content. Secondly, social technologies are indeed “social,” which means that they are communal, community-generated and community-generating. To socialize is to follow, to participate in, and to associate with—a structurally different way of conceiving of technologies than, say, instrumental uses to “do” certain tasks, which was the original model of the personal computing revolution, or private uses of technologies to “limit” access, as in the commercial obsession with intellectual property rights. Social technologies create social communities and public cultures that complicate and often transcend boundaries based on geography, age, class, ethnicity, gender, and so forth. And thirdly, social technologies have histories that parallel, influence, and give shape to human social structures and societies: Writing qua writing is a social technology; the postal system is a social technology; telephones, email, and IM are social technologies, precisely because they create interconnections and networks of communication, dialogue, and interaction that enable and give rise to relations that form the basis of societies.

Nowadays, it is common to celebrate the democratizing and decentralizing possibilities of social technologies, but we need to consider social media—like all technologies—from the standpoint of the dialectic: They enable broad-based participation; the bar to participate is remarkably low; and they produce global diffusions of
information, often through precarious portals that would otherwise squelch voices. Would Egypt’s triumphant Tahrir Square have turned out like China’s Tiananmen Square had the last two decades not seen the proliferation of cellphones, Twitter, and Facebook? At the same time, social technologies are also beholden to an array of political and corporate interests which have amassed large and complex data sets relating to every aspect of our behavior in order to create perfect consumer profiles, track identities, and enable ever-greater forms of surveillance and population control.

All over the world, authoritarian regimes have turned social media to their advantage much as they manipulated prior media. By intercepting postings and passwords, by asking users to agree to new security certificates and engaging in other coercive techniques, and by passing off propaganda as “spontaneous” participatory content, governments or partisan groups can amass troves of data to identify dissidents, abuse power, or create smoke screens regarding public opinion. We raise these issues with respect to the Digital Humanities to underscore the fact that social media not only enable democratic ends but can also make possible domination and subjugation. So, as much as we celebrate the global proliferation of networking, it is important to bear in mind that network technologies do not inherently promote democratic values and community-building. They also create the conditions of possibility for violent backlash, community surveillance, and possibly even genocide. After all, the railway system—the paradigmatic networking and social technology of the 19th century—not only enabled transnational movement and the birth of the global industrial economy, but also provided the technical means for efficiently deporting whole populations to face their murder in the 20th century.

The socialization of interior life and the restructuring of individual subjectivity in the face of constant communication exchange may yet produce long-lasting changes in the concepts of public and private space, security and privacy, identity and community. Swarm behavior and collective absorption into real-time activities have already created new models of rapidly organized and mediated communities. The interpellation of interior life into the networked environment is unprecedented, and the fate of the individual voice hangs in the balance. At the sci-fi end of speculation, collective thought forms seem to lurk on the edges of our horizon.
Reach and Relevance

What does all this mean for the Digital Humanities? First of all, the humanities are one of the key places to which we naturally turn to understand, analyze, and evaluate the social and cultural significance of any technology, to interpret its value, its dangers, and its possibilities. This, we contend, makes the work of the humanities more critical than ever as new social structures, economic models, cultural forms, value systems, and forms of selfhood emerge, rendering the “human being” decidedly more motile, diffuse, and even fragile. Broadly speaking, since the Digital Humanities studies and explicates what it means to be human in the networked information age, it expands the reach and relevance of the humanities far beyond small groups of specialists locked in hermetically sealed conversation. The scope and scale of the Digital Humanities encompass a vast archipelago of specialized domains of expertise and conversation, but also open up the prospect of a conversation extending far beyond the walls of the ivory tower that connects universities to cultural institutions, libraries, museums, and community organizations.

In fact, the notion of the university as ivory tower no longer makes sense, if it ever did. Instead, our ideal is that of the university as nodal point within a fluid, porous, and dynamic landscape. (Even medieval universities gave rise to their own networks of social life and publishing, albeit on a different scale and with manuscript copies and lectures as their defining media.) The social life of the Digital Humanities builds upon that landscape by making possible a networked information economy characterized by collaborative authorship and design, the social production and dissemination of knowledge, writerly authorship models predicated on multiplicity and versioning, participation in the expanded public sphere, and institutional and non-institutional venues for designing, sharing, commenting on, critiquing, and—perhaps most important of all—engaging with this knowledge.

Altered Modes of Authorship

“What is an author?” is a question that has long been central to humanities scholarship. Traditionally conceived, authors are individuals who compose on their own but write in dialogue with a community of peers and a received tradition. They—poets, philosophers, historians, novelists, dramatists, and so forth—create worlds through the written word. As Aristotle’s distinction goes: We read historians to know the world, to understand what happened; we read poets to imagine what
might be, to inspire new worlds into being. Digital humanists share traits with both historians and poets: We are engaged with “worlds past” and also with worlds that are not yet. But digital humanists imagine the past and the future in ways that fundamentally transform the authoring practices of poets and historians, using new sets of tools, technologies, and design strategies. For digital humanists, authorship is rooted in the processes of design and the creation of the experiential, the social, and the communal. We no longer imagine authorship as autonomous work or as the labor of a solitary genius (something that, to be sure, critical theory has been chipping away at for decades). Instead we think of the harnessing and expressiveness of the creative energies of an ever-expanding, virtually boundless community of practitioners.

The question is no longer “what is an author?” but what is the author function when reshaped around the plurality of creative design, open compositional practices, and the reality of versioning?

We are moving from an era of scholarship based on the individual author of the “great book” to an era of scholarship based on the collaborative authoring possibilities of the “great project.” Because we are in the midst of a transformation in the materiality of information and in the media technologies of communication, things that were once considered “mere” support systems, transmission media, and conveyance devices are now fundamentally implicated in any meaning-making process. Great books do not simply “contain” great ideas but are part of a technosocial apparatus of inscription and alphabetization. One may study the history of the page as a spatial unit of order; the material history of paper, ink, printing blocks, and printing presses; and the navigation of the object by the intervention of the human body. Print culture’s centuries of stability undermined humanists’ ability to “see” the materiality of their practices: the book became a transparent medium. Digital humanists, on the other hand, foreground the deeply recursive ways in which meaning and interpretation are bound up with materiality, media, and embodied navigation. This is why we stress that authorship is design and design is authorship.

Within the Digital Humanities, knowledge platforms cannot be simply left to editors, technicians, publishers, and librarians, as if the physical and virtual arrangements of information as argument through multimediial constellations are somehow not the domain of humanities scholars. In the print model, scholars typically “handed off” the content of their manuscripts to publishers who did the layout, design, editing, printing, and dissemination of the work. Now, however,
these tasks have moved to the forefront of the Digital Humanities precisely because choices of interface, interactivity, database design, mark-up, navigation, access, dissemination, and archiving are all part of how arguments are staged in the digital world. These choices are evident, for example, in the projects published in *Vectors*, a multi-modal, multimedia humanities journal in which each “article” is a project that explores the complex interrelation between form and content, underscoring the “immersive and experiential dimensions of emerging scholarly vernaculars across media platforms.” Scholars work closely with designers, technologists, and the *Vectors* editorial team to develop appropriate interfaces, database schemas, navigation features, and content types that, altogether, instantiate an argument. While preserving the authority of peer review, the publication platform not only foregrounds collaborative authorship, but also public feedback through threaded discussion forums and annotation features.

The challenge for the Digital Humanities is to develop the evaluative metrics for legitimizing and credentialing this kind of scholarship since it places a high demand on readers to participate, navigate, explore, interact, and often contribute. A project published in *Vectors* may have multiple “authors,” each of whom contributed to the argument: interface designers who created a Flash front-end, database designers who created a MySQL/PHP back-end, programmers who wrote the code to interact with the database and parse queries, academic scholars who populated the database and designed an interactive architecture for navigating the argument, GIS specialists who formatted and processed the data, modelers who created navigable 3-D models of physical environments, server administrators who oversee the appropriate operating software to ensure that the project remains functional, and so forth. Much like science articles with multiple co-authors, it is already common for Digital Humanities publications to list a series of authors on a project, and this is expanded exponentially when we are talking about the development of a platform. The singularity of the “I-subject” has been transformed into the collaborative authorship of a “we-subject.”

**Collaboration as Creation**

These recalibrations are informed by and contribute to what we have been calling the social life of the Digital Humanities. Even where scholarship still “looks” like a book written by a single author, we are now witnessing the first wave of creative
destruction of long-held truisms, behaviors, and practices in the academy. Some scholars and artists have published versions of their books online using paragraph-by-paragraph blogging software or other collaborative annotation and commenting engines. Not only does this repudiate the notion of intellectual property as something locked up by copyright and exclusive licensing agreements, it also allows the authors to receive immediate feedback by hundreds of self-selecting peer reviewers—before the book is sent, by a university press, to a couple of scholarly authorities in their field. Crowd-sourced evaluations of scholarly arguments, not to mention crowd-sourced production models for generating and editing scholarly content, are transforming both the authorship function and conventional knowledge platforms: A book is not simply “finished” and “published,” but is now part of a much more dynamic, iterative, and dialogical environment that is predicated on versioning, crowd-sourced models of engagement and peer review, and open-source knowledge and publication platforms.

This is nowhere more apparent than with Wikipedia, a revolutionary knowledge production and editing platform. While Wikipedia was dismissed by many within the academy as amateurish, unreliable and lacking in scholarly rigor (especially in its early years), we suggest that it is a model for rethinking collaborative research and the dissemination of knowledge in the Digital Humanities and throughout academia. Wikipedia represents a truly innovative, global, multilingual, collaborative knowledge-generating community and platform for authoring, editing, distributing, and versioning knowledge. To date, it has nearly 4 million articles, more than 450 million edits, more than 15 million registered users, and articles in scores of languages. This is a massive achievement for the first decade of work. Wikipedia represents a dynamic, flexible, and open-ended network for knowledge creation and distribution that underscores process, collaboration, access, interactivity, and creativity, with an editing model and versioning system that documents every contingent decision made by every contributing author. At this moment in its short life, Wikipedia is already the most comprehensive, representative, and pervasive participatory platform for knowledge production ever created by humankind. That is worth some pause and reflection.

It is striking that Wikipedia was not invented at a university, and though one of its founders has a humanities Ph.D., it operates outside the academy. Why might this be? Perhaps because the humanities—in broad strokes—remain fixated on discrete publications by individual scholars, primarily in conversation with
others like themselves, working in single media forms. It is one thing to create new knowledge within the theoretical, methodological, material, and disciplinary paradigms of a field; it is something quite different to imagine a new knowledge platform, a new way of designing knowledge and engaging broad communities in knowledge creation. What this means in practice is that as we shape our platforms, tools, and technologies, our platforms, tools, and technologies shape us. These mutually reinforcing systems form the social life of the Digital Humanities. They are mutually co-constitutive and profoundly recursive in ways that are generating new notions of what it means to be a human being as a subject that knows, as a creator of knowledge, and as an object of study.

**Publishing as a Social Act**

“To publish” is to make something public, to place it within a sphere for broad scrutiny, critical engagement, and community debate. Traditionally, publishing meant finding a journal or press in order to make academic treatises, arguments, and the results of research public—but this “public” was in reality primarily or even exclusively readers initiated in and defined by the discursive conventions of a given field. Today, almost anyone can publish (in the sense of “make public”) anything. As noted earlier, the bar to entry for starting a blog, tweeting messages, posting photographs or videos, hosting a website, or commenting on other people’s blogs, messages, postings, and websites is extremely low. It’s not uncommon for a video that has “gone viral” to amass tens of millions of views across the globe within days or even hours. Clearly, we are witnessing yet another contraction of time and space, as information is radically decoupled from the specific identity of the creator.

For scholarship to engage with this contraction, let alone the unbinding of argument from author, raises serious questions for the humanities, which has, traditionally, considered a “proper” publication to be a peer-reviewed, vetted argument that cites and speaks to the conventions of a particular discourse and represents the views of an author who has gained authority by having passed a series of “tests” that credential the author to speak in legitimated utterances. Authors are generally affiliated with an institution which grants authority to their utterances by virtue of various rules of inclusion and exclusion (i.e., the tenure and promotion system, the imprimatur of book and journal publishing, the grant and foundation support industry, and so forth). The places where works are published, such as journals.
and university press books, have established themselves as authoritative sources of knowledge by virtue of strict mechanisms for peer review, scholarly vetting, and institutional reputation which has been built up over decades, sometimes even centuries.

What happens when anyone can speak and publish? What happens when knowledge credentialing is no longer controlled solely by institutions of higher learning?

These are serious questions confronting the institutions that function within and maintain the social life of the Digital Humanities.

Transforming Publishing and Access

Scholars in the humanities have become used to social norms of knowledge formation and dissemination. Nothing seems more natural to this social structure than the idea that scholars write manuscripts, that publishers produce them as books, and that libraries aggregate them as collections and provide access and other services for reading and research. The inherited norm is that publishers commission authors or acquire intellectual property they deem worthy of making public. They review the manuscript’s content and argument, and check for originality and legitimacy. A scholarly publication would elicit peer reviews. Fact-checking, line-editing, permissions for illustrations, layout, design, printing, and advertising all require a set of skills and professional expertise. Similarly, the tasks of librarians are specialized. Institutions differ, patrons have a host of varied profiles, and the needs of any particular library are specific to its setting and the services it provides, but traditionally these tasks have included acquisitions, cataloging, preservation, conservation, public services, outreach, and access. Digital publishing models, however, are challenging these long-standing roles and institutional boundaries.

A certain tension exists in the current environment as libraries and publishers confront a changing landscape, but it is important to state certain obligations that remain vital to humanistic inquiry no matter how technologies affect social constructions. The recent tight budgets for scholarly presses have pushed for reconsideration of the business models developed in the print environment. Formats are changing, but peer-review—which can now be extended even to the public sphere—remains crucial. Timelines and life cycles of information are shifting, but the need for reliable references remains; perhaps it is more urgent than ever. Licensing agreements and expectations about long-term access must be addressed
as must the recognition that a new business model has to emerge that takes serio-
ously issues involving the evolution of intellectual property, open-source culture,
copyright protections, and what has been referred to as the challenge of “copyleft”
considerations. Print-based understandings of concepts such as first sale—buying a
copy of a book grants the right to pass the book on—are problematic in a digital
environment in which a copy of a text or work can be easily replicated and dis-
tributed. What are the rights of authors and of presses? How does society balance
these rights against the needs of readers, scholars, libraries, and the broader public?

Emerging Fellowships of Discourse

The university has long shared the tasks of knowledge production, curation, stew-
ardship, and storage with other cultural institutions such as laboratories, publish-
ers, libraries, museums, and commercial producers. But the university legitimates
knowledge in a privileged way, supervising rules of admission to and control over
discourse. Not just anyone can speak with authority; one must first be sanctioned
through lengthy and decidedly hierarchical processes, and the knowledge that is
transmitted is primarily circulated within relatively closed communities of knowers,
“fellowships of discourse” as Michel Foucault termed them. Statements are repeated
and circulated through various disciplinary and institutional forms of control that
legitimize what a “true statement” is within a given discipline. Before a statement
can even be admitted to debate, it must first be, as Foucault argued repeatedly,
“within the true.” For an idea to fall “within the true,” it must not only cite the nor-
mative truths of a given discipline, but it must fall “within the true” in terms of its
methodology, medium, and mode of dissemination. Research articles can’t be Wiki
entries; book monographs can’t be exhibitions curated in virtual worlds; seminars
can’t be held in gaming environments. Or can they?

What is at stake is a question of legitimation. Who can create knowledge,
who monitors it, who authorizes it, who disseminates it, whom does it influence and
to what effect? Legitimation is always, of course, connected with power, whether
the power of a legal system, a government, a military, a board of directors, an infor-
mation management system, the tenure and promotion system, the book publish-
ing industry, a professional group, or any oversight agency. Not only are discursive
statements legitimized by the standards established by the practitioners and history of a given discipline, but so are the media in which such utterances are formulated, articulated, and disseminated.

The authorship function in the Digital Humanities is more collaborative, involving designers, coders, information architects, and server administrators, not to mention scholars from adjacent and nonadjacent disciplinary fields. And the notion of “the work” is significantly more porous and process-oriented, requiring a very different set of criteria to evaluate its merits. In the past, hermeneutic analysis sufficed because peer reviewers privileged the “insides” of a text: that is, they privileged what was said, how it was substantiated, and what was argued. An original argument pushed the boundaries of a given field forward but still operated within the theoretical, disciplinary, and media-specific paradigms of knowledge in that field. The medium that conveyed the argument was rendered transparent and neutral as in Beatrice Warde’s long-cited image of the well-designed book as a “crystal goblet.”

Digital Humanities denaturalizes print, awakening us to the importance of what N. Katherine Hayles calls “media-specific analysis” in order to focus attention on the technologies of inscription, the material support, the systems of writing down (“Aufschreibesysteme,” as Friedrich Kittler puts it), the modes of navigation (whether turning pages or waving your hand), and the forms of authorship and creativity (not only of content but also of typography, page layout, and design). In this watershed moment, awareness of media-specificity is nearly inescapable and carries implications for the social life of these media as well.

Shaping New Norms

With the rise of new authoring platforms and collaborative environments, “supporting” apparatuses have been exposed as anything but transparent and neutral, as they not only determine modes of interaction and navigation but also condition and guide the production of meaning. Publication is not an endpoint or culmination of research, but is something significantly more process-oriented, indeterminate, experimental, and even experiential. Therefore, a whole new set of evaluative questions needs to be asked. We might take the following as new normative questions for evaluating humanities scholarship in general—that is to say, not just Digital Humanities scholarship:
How does the work present and advance an original argument that is bound up with and a function of the materiality and medium in which the argument is presented? In other words, what does materiality and media mean for the instantiation of the argument?

Who are the authors of the work and how are their contributions articulated and credited?

How does the design of the interface, the data structures, and the database convey meaning and function as part of the argument? How does a reader interact with the work, and how do the authors expose the rhetorical elements of their interface, data structures, and database?

Is the mode of navigation and kinetic signposting appropriate for the argument?

How complete is the bibliographic apparatus of the work and how do readers access both the sources cited and the data presented?

Can the work be deployed and enhanced by putting it in new contexts or in new digital environments with other projects?

Is the work extensible and iterative? That is to say, can it continue to grow as more research is done either by the author or other people?

How can the participatory dimension of the work be characterized? In other words, does the argument demand greater participation than page-turning or mouse clicks?

Does the scholarship support federated (non-silo based) approaches to scholarly publishing?

Above all, how does the work embody standards of traditional scholarship that can inspire a broad community with its insights?

These kinds of questions interject a different set of evaluative metrics into humanities scholarship while raising the bar for digital work. We are still at the very earliest stages of understanding and legitimating these emergent knowledge formations. We do not want to lose sight of the core values by which scholarship is judged, and we also want to be sure we can answer skeptics ready to assert that the Digital Humanities is all technique and lacks content.

Such a balanced approach not only underscores a fundamental rethinking of how knowledge gets designed and created, but also a fundamental rethinking of what knowledge looks and sounds like, who gets to create and interact with knowledge, when it is made and recognized, how it gets authorized and evaluated, and how it is made accessible to a significantly broader (and potentially global) audience. This is why we must discuss the social life of the Digital Humanities holistically, rather than follow a piecemeal, instrumentalist approach. In the 21st century,
long-established institutions like universities and their presses have the potential to generate, legitimate, and disseminate knowledge in radically new ways, on a scale never before realized, involving technologies and communities that rarely (if ever) were engaged in a global knowledge-creation enterprise. We are just starting to understand and leverage that potential, and the question is how to sustain (and not short-circuit) this critical process of experimentation and risk-taking.

Decolonizing Knowledge

The ways in which we have been discussing the social life of the Digital Humanities have privileged technology’s transformative impact upon scholarship. But there is a reciprocity that is less visible but equally important: The principles of humanist thinking, humanist creativity, and humanist critique have much to offer to computational methods. Humanistic design of digital environments can challenge and even undo the normative assumptions that encode ideological assumptions in operational features. Efficiency and transparency have been bywords of interface design. Yet digital humanists can imagine means to model the complex conditions of interpretation so that we come to a fundamentally different idea or demonstration of the ways engagement with the cognitive processes of reading, viewing, and navigating make meaning. The participatory environment of the creation of cultural materials calls for analysis and display of the co-dependent relation between communities of thought and their expression. We have yet to engage seriously with modeling environments that support cultural difference, rather than register it, often in static and even monolithic ways, on standard platforms developed by dominant industry players.

If the platforms set the terms of cultural production, then whose worldviews and ideologies will they embody and structure into the creation of knowledge? Might we envision alternatives, for instance, to mapping the beliefs of indigenous peoples onto a Sloan Digital Sky Survey, and instead remake the presentation of the sky in the form of such beliefs? It is not that such interfaces and affordances “change” the sky so much that our appreciation of how people “see” the heavens becomes both deeper and broader. The decolonization of knowledge in the most profound sense will arrive only when we enable people to express their otherness, their difference, and their selves, through truly social and participatory forms of cultural creation.
If the organization of and navigation through information are statically structured, we move through massive amounts of material but do not change the ontologies, the very ways of knowing, that govern storage, access, and display. Humanistic interfaces are social as well as technological, and so will mutate and change, remaking the order of the knowledge field in response to modes of engagement, interpretive gestures, and linguistic and cultural differences. We have yet to fully examine and expose the historical dimensions of classification systems, epistemologies, and knowledge representations in ways that model and present their incommensurabilities across cultures, historical periods, and individual understandings. We must interrogate the spaces for the production of what gets to count as knowledge at a given moment, the modalities for the production and ordering of discourse, and the conditions of possibility for the configuration of knowledge into systems, classification schemata, representations, and ordering principles.

Bringing these fundamental features of humanistic inquiry into the digital environment is also essential work for the Digital Humanities. Building and using tools that are rooted in traditional humanities concerns—subjectivity, ambiguity, observer-dependent variables in the production of knowledge, contingency—will allow us to model knowledge and creative work both ontologically and socially. The next generation of Digital Humanities work will make a contribution to theory only if it can show how to think in digital methods, not just with digital tools. Indigenous, local, independent, and truly alternative humanities platforms are still only speculative concepts, latent, perhaps on the verge of emergence. The excitement lies in envisioning these possibilities and imagining how to shape future knowledge production along lines as yet unthought, unmapped, and unsaid. We need to take seriously the conviction that the humanities have their own methods—not based in calculation, automation, or statistical probability, but in ambiguity, interpretation, and in embodied and situated models of knowledge and knowing.

Revitalizing the Cultural Record

By conceiving of scholarship in ways that significantly involve community partners, cultural institutions, the private sector, nonprofits, and/or government agencies, the Digital Humanities expands both the notion of scholarship and the public sphere in order to create new sites and nodes of engagement. With such an expanded
definition of scholarship, digital humanists are able to place questions of social justice and civic engagement, for example, front-and-center. They are able to revitalize the cultural record in ways that involve citizens in the academic enterprise and bring the academy into the expanded public sphere. The result is a form of scholarship that is, by definition, applied: It applies the knowledge and methods of the humanities to pose new questions, to design new possibilities, and to create citizen-scholars who value the complexity, ambiguity, and differences that comprise our cultural record as a species.

By foregrounding the values of the humanities, such projects create an environment in which silenced voices, cultural differences, linguistic multiplicity, and historical perspectives vitally inform and expand the notion of “public” and the “public sphere.” Documentary projects that integrate social media offer compelling examples of how technologies like Twitter can be used to give voice to people who are otherwise silenced. Crucial political events since the advent of social networking have shown how highly localized and accurate accounts of what was happening on the ground can be assembled using a combination of random and trusted informants, including everything from simultaneous postings to live feeds and messaging platforms, often with links to audio files and other media reports that help the world “see” and “hear” what is going on in real time. In effect, the digital portal becomes a global public sphere linked to precisely located events that, in turn, become part of a Web archive and living memorial.

While the “role” of social media has been feverishly debated in fomenting, planning, and sustaining revolutions since Twitter was first hailed as a revolutionary technology in Moldova in 2009 and YouTube became a living archive for election protests in Tehran during the summer of that same year, it seems incontestable that “something” is happening to media that is changing the way in which events unfold. If nothing else, there is a massive contraction and alignment of the event (an embodied and location-specific phenomenon), the representation of the event (through tweets, cellphone video and photographs, and so forth), and the dissemination of the event (through Web-based social networks and information channels). The result is a significantly more adaptable, amorphous, global, but also ephemeral public sphere, one which may, for example, be constituted in distributed locations simultaneously.
Publics and Counterpublics

While physical embodiment becomes simultaneously less and more important in constituting a public, it is also worth remembering that media and communication technologies have always played a fundamental role in creating what is understood as the public sphere. Jürgen Habermas’ acclaimed study of the structural transformation of the public sphere showed it to be an invention of bourgeois society in the late 17th and early 18th centuries that came about through the rise of newspapers and novels as well as through new forms of sociability that encouraged discussion and debate. Print technologies and the spread of literacy were critical for the formation of “the public” and the rise of the modern nation-state, with the former specifically arrayed against the state as a locus of authority. Kant considered the “public use” of reason to be that of “a scholar before the entire public of the reading world,” a definition that also betrayed the conspicuous limits of that term: Kant’s public was constituted by literate men, who became literate because of their belonging to a particular socioeconomic stratum.

“Counterpublics” emerged as a parallel phenomenon, constituted by intellectuals, some of them outstanding women authors who organized salons in their homes—in tension with, often against, but still connected to, public discourse. In this regard, notions of “the public” and “the counterpublic” are exclusive and often even elite formations precisely because the admittance of members to discourse is socially and economically determined. More recently, attention has been paid to the discourses of the “subaltern,” those whose class, race, and gender positions situate them fundamentally outside any dialectic of “public” and “counterpublic,” creating dialogues that are barely recognizable as “public speech” because they do not stem from “within the true,” as Foucault put it.

Perhaps, then, the utopian impulse of the Digital Humanities can be characterized as a modality of radically opening discourse to participation for everyone.

What if there were participation without condition? What if utterances were neither admitted nor denied based on gender, sex, race, ethnicity, language, location, nationality, class, or access to technology? We are not saying that these facticities do not matter or cease to matter in the digital world; instead, we are saying that the utopian element of the Digital Humanities is to at least posit, if not fully enable, a future in which participation is possible for everyone, anywhere, anytime. It would be as if it were possible to bring about a public sphere in which no one was excluded. This is a core human value of the Digital Humanities.
Electronic Presses and Ubiquitous Libraries

For many centuries, university presses have played a crucial role in establishing the currency of the humanistic profession in formats and practices. Monographs, edited collections, critical editions, and scholarly journals are the basic elements of research and professional development. Careers are made on the basis of vetted and peer-reviewed literature in the form of essays and book manuscripts. The presses have the expertise to create marketing plans, assess audience, and develop distribution networks with libraries and scholars. Acquisitions editors keep tabs on their fields with expert attention—attending conferences, tracking the intellectual development of disciplines, and helping shape the discourse in any particular field by the work they recognize through publication. This bedrock expertise combined with a professional commitment to disciplines and discourses must continue to be supported by salaried jobs and institutional frameworks even as the social and economic conditions of academic publishing change in the digital era.

As the social life of the Digital Humanities evolves, many university research libraries are also reconsidering their charge. Can they continue to afford to collect serial work that essentially buys the right to distribute intellectual research that has been created by faculty on their own campus? This is the real problem of skyrocketing scholarly journal prices. And what happens to licensed material if a service provider or company goes out of business and the link to published work disappears? Here we confront the issues of bit rot, technological obsolescence, and the risks of investing in emergent technologies. Many considerations enter into the mix. Are copies stored on local servers in the library? Or are links to a repository the only means of accessing intellectual work? Many of the thorniest problems are social rather than technological. Putting knowledge in protected silos, areas in which scholarship is only available to a limited community of academic professionals, can hugely benefit those select scholars. But such lockdowns go against the impulse to bring the best cutting-edge work before the broadest possible audience.

Add to this mix the problem of finding a recognized and visible portal for exposing new digitally published research. In particular, if the granularity of contributions changes, so that annotations, code, data sets, or large-scale processing are considered units of argument, then where and how will these be recognized and acknowledged? If posting becomes equivalent to publishing (on a blog or a social media site, via a live feed or other as-yet-to-be-imagined platform), then our
definitions of scholarly publishing and our traditional obligation to preserve, catalog, and provide access and reference to these pieces will push us toward radically new understandings of the roles of both libraries and publishers. Distribution mechanisms will need to evolve in ways that recognize the productive distinction between popular work and more specialized scholarship, and address the complex set of issues that will continue to emerge around intellectual property, licensing and use, peer-review, and the role of professionals in publishing, preserving, and providing access to scholarship. The challenge of maintaining platforms, as well as works, will only complicate matters further, as the iterative versions of software and hardware for access and display, driven by market forces and industry agendas, compete with the longevity and stability that print forms have accustomed us to over the centuries.

To be sure, the need to avoid redundancy and optimize resources will drive part of the reconfiguration of publishing in the digital realm. But the theoretical issues remain: What is a publication? Who will undertake the making-public of arguments, research projects, repositories, archives, and other materials of the human record, its creative expression and interpretation? New concepts are already transforming notions of publishing, publicity, and the public. The digital turn in scholarship is bringing into view genres undreamt of in earlier media. As it does this, libraries and publishers will forge alliances that distribute old tasks along new lines as they take on novel responsibilities and forms of engagement unforeseen in an analog world.

The Care and Feeding of Hedgefoxes
Digital Humanities has many goals. Some involve research; some focus on outreach to broader publics; some are pedagogical in nature. One of the fundamental questions confronting Digital Humanities is what kind of student will its methods produce? If the academy and society support Digital Humanities, what kinds of students will they train and how will these students shape the world? An alternate method is to imagine the kind of students one would like to see, and then work backward to envision the educational environments most conducive to producing such a cohort. This kind of hypothetical persona-building allows us to reinvigorate all-but-exhausted discussions about the broader implications of a liberal arts education, and ties these issues back to the discussion of Digital Humanities as forming a core curriculum. The kind of student universities train leads to the questions of
what sort of citizens they can become, how they will function as autonomous individuals, and how they will integrate themselves into society.

To think through these questions, it is worth reaching back. Two-and-a-half millennia ago, the Greek poet Archilochus broke the world of knowledge into two camps, represented by two different types: “the fox knows many things, but the hedgehog knows one big thing.” Half a century ago, Isaiah Berlin reworked this metaphor to divide thinkers “between those… who relate everything to a single central vision, one system less or more coherent or articulate… [and] those who pursue many ends, often unrelated and even contradictory, connected, if at all, only in some de facto way.” Berlin made no claims for the superiority of the ways of either the fox or the hedgehog, and devoted an essay to the productive conflict Leo Tolstoy generated as a fox who thought he was a hedgehog.

We are in an era far different from the Greek poet’s, the Russian novelist’s, and the English don’s. There can be little doubt that the technologies that give rise to the Digital Humanities push us—scholars, students, and citizens alike—into the fox family. The nature of discourse and debate in networks, the reality of study in multimedia environments, and the inexorable splintering of attention that multiple windows and channels afford lead to pursuing “many ends.” This tendency toward multi-tasking and shortened attention has a multitude of detractors, of course, as well as the usual contrarian supporters of the “everything bad for you is good for you” variety. But the Digital Humanities can confront this reality on the ground (and in the ether) without either nostalgia for a reader’s paradise that never was or the kind of hype over technology that we expect from industry. The Digital Humanities has methodologies that can harness the habits and possibilities of the minds of a networked generation to create better and more inquisitive foxes.

Yet what of the hedgehog? It is precisely the hedgehog’s tenacity, its willingness to spend months, years, and decades in pursuit of a “single central vision” that ties it to the practice of the humanities. There are fewer opportunities for the long haul and the deep dig in a society that embraces the business quarter, instant access, and machine time. The traditions of the humanities, on the other hand, embrace the durational, accepting that some studies will take years to complete, that certain ideas, needless to say conclusions, demand lengthy gestation. The multivolume study, the life devoted to a specific slice of a discipline, these are the hallmarks of the humanities, and the Digital Humanities would be foolish indeed to abandon its inner hedgehog.
How can the Digital Humanities keep the ways of the hedgehog alive in the era of the fox’s ascendance? How do we inject deep digs into the free-ranging ways of networked scholarship? The hedgehog’s great depth is inspiring for its rigor; the fox’s curiosity is astonishing in its energy. It is not an either/or situation: the goal is hybridization, the creation of hedgefoxes, capable of ranging wide, but also of going deep. Making the move from creating, appreciating, and interpreting the hedgefox aesthetic to responsible, 21st century citizenship requires that students of Digital Humanities see social networks as having both pro- and anti-social agendas, that they develop political literacies, and that they harness the collaborative energy of their academic experiences and apply them to the broader culture.
4. PROVOCATIONS
THE ERA OF DIGITAL HUMANITIES HAS JUST BEGUN, BUT IT MAY BE COMING TO AN END.


BOTH CRITICALITY AND EXPERIMENTATION MUST SHAPE ITS FUTURE DEVELOPMENT.
Decades of work were involved in building digital repositories and establishing conventions for access and use, not to mention in developing the communication, presentation, and publication tools upon which humanists rely for information-sharing and dissemination. Each of these undertakings represents an act of interpretation. Every migration from analog to digital is a translation that stages a certain experience of artifacts encountered online. Advanced Web technologies add a social dimension into online experiences. Other developments will follow and create new operational possibilities as well as new constraints, absences, and blind spots.

When new norms establish themselves, when new procedures and techniques become naturalized, assumptions can become invisible. The pressure to reflect critically, to innovate and alter consolidated practices, can subside. Digital Humanities is still in its infancy. But its ability to serve as a driver of innovation could become threatened as “doing the humanities digitally” becomes business as usual. Could the era of Digital Humanities come to an abrupt end? Perhaps it could. Or it might give rise, phoenix-like, to a new spirit of experimentation if “doing the humanities digitally” is accompanied by the same spirit of innovation that fueled the first generation of digital work. That will require thinking creatively and experimentally.

Today’s humanists work fluidly across the digital/analog divide. Venerable binarisms have begun to blur into a continuous workflow. Though even digital natives recognize the difference between a manuscript held in one’s hands and one viewed on the screen, the space of engagement created by working across media tends to collapse differences and create an illusion of frictionless exchangeability. We sit with books in front of us, typing notes into files, watching videos on other screens, and tracking references through search engines on windows open on our laptops. Are we all digital humanists? No. Are we carrying out the work of the humanities digitally? Routinely so.

But the new routines that structure this world of practice have the potential to become just as sedimented and automatic as those of the print era, and when they do, they sound the death knell for Digital Humanities as a practice that is both critical and experimental. How will Digital Humanities continue to provide ways of thinking differently about the methods and objects of study that constitute knowledge?
AS DIGITAL TOOLS BECOME NATURALIZED, THE DIGITAL HUMANITIES WILL STRUGGLE TO RETAIN ITS CRITICAL, EXPERIMENTAL CHARACTER.

Maintaining criticality and experimentation means challenging received traditions, even—perhaps, especially—those that defined the first generations of Digital Humanities work. Innovative forms of public engagement, new publishing models, imaginative ways of structuring humanistic work, and new units of argument will come to take their place beside the pioneering projects of the first generation. This means embracing new skill-sets that are not necessarily associated with traditional humanistic training: design, programming, statistical analysis, data visualization, and data-mining. And this means developing new humanities-specific ways of modeling knowledge and interpretation in the digital domain. It means showing that interpretation is rethought through the encounter with computational methods and that computational methods are rethought through the encounter with humanistic modes of knowing.

THE HUMANITIES NEED TO ESTABLISH DISCIPLINE-SPECIFIC AGENDAS FOR COMPUTATIONAL PRACTICE.

But, as they do so, the toolkits they employ and the topics they tackle may become as attached or detached from contemporary societal discourse as are today’s languages of critical theory and cultural critique. Humanists have begun to use programming languages. But they have yet to create programming languages of their own: languages that can come to grips with, for example, such fundamental attributes of cultural communication and traditional objects of humanistic scrutiny as nuance, inflection, undertone, irony, and ambivalence.

Is computational work fated to remain locked in the realm of quantifiable and repeatable phenomena? How might one model the complex dynamics of interpretation or the processes by means of which reading, viewing, and playing generate cultural meanings within a given community or tradition? How might techniques like probabilistic modeling, interpretive mapping, subjective visualizations, and self-customizing navigation alter our experience of the digital realm and the character of the Web as a public domain?
The navigation of information remains structured in a static manner despite the fact that it is experienced dynamically. Users rarely engage with or alter the ontologies that govern the storage and display of material: Their responses don’t shape the information architecture, only the contents it will serve up. Yet the study of the human cultural record demonstrates that, far from innate, such architectures are built upon classification systems and knowledge representations that differ across cultures, historical periods, and even the worldviews of different individuals within a single culture.

This raises the question of how humanistic ways of doing and thinking might be brought to bear in the domains of knowledge retrieval, curation, and use. Imagine, for instance, a Heraclitean interface, a hybrid of the very old and the very new, founded on notions of flux and the non-self-identical nature of experience. Such an interface might mutate and change, shifting ontologies on the fly, remaking the order of the knowledge field in response to a user’s queries and reactions to the results. It might well work like a dream for performing certain research tasks (like studying dreams) and like a nightmare for others (like counting hedgehogs or proving a point).

**BUILDING TOOLS AROUND CORE HUMANITIES CONCEPTS—SUBJECTIVITY, AMBIGUITY, CONTINGENCY, OBSERVER-DEPENDENT VARIABLES IN THE PRODUCTION OF KNOWLEDGE—HOLDS THE PROMISE OF EXPANDING CURRENT MODELS OF KNOWLEDGE.**

AS SUCH, THE NEXT GENERATION OF DIGITAL EXPERIMENTERS COULD CONTRIBUTE TO HUMANITIES THEORY BY FORGING TOOLS THAT QUITE LITERALLY EMBODY HUMANITIES-CENTERED VIEWS REGARDING THE WORLD.
Tools are not just tools. They are cognitive interfaces that presuppose forms of mental and physical discipline and organization. By scripting an action, they produce and transmit knowledge, and, in turn, model a world. In the case of an indigenous humanities digital toolkit, the world in question might not be the same as that envisioned by the server farm that monitors inventory levels at Walmart warehouses, or the ones envisioned by the systems that track air traffic over the Pacific or match banner ads to the content of Gmail accounts. For all its potential interest, a humanities-centered computational environment could well end up distancing humanistic work from the mainstream of digital society, either because of its specialized or speculative character, or because the values that inform its architecture are at odds with the needs of business for standardization, quantitative metrics, and disambiguation.

**AS HUMANS AND DATA MACHINES BECOME EQUAL PARTNERS IN CULTURAL PRACTICE, SOCIAL EXPERIENCE, AND HUMANISTIC RESEARCH, THE HUMANITIES MAY NO LONGER LOOK LIKE “THE HUMANITIES.”**

**THE SCALES AND REGISTERS OF WHAT COUNTS OR IS VALUED AS HUMAN EXPERIENCE AND, THEREFORE, THE OBJECTS OF HUMANISTIC INQUIRY, WILL FIND THEMSELVES ALTERED.**

The cognitive horizons of digital researchers are already being deeply altered by the ability of data machines to zoom back and forth between grand sweeping views of masses of texts, data, and images and the microscopic particulars of single documents or objects. Trust in computers’ capacities for aggregation, synthesis, and even selectivity is sure to grow over the coming century. Visions of machine agency and emerging sentience reek of science fiction fantasies, but unintended consequences may well be in our future.

Will we read the machine’s analyses and summaries of marked texts, structured data, and natural language processing and feel we are in conversation with an adept
partner, whom we will be tempted to imagine as a natural extension of our own cognitive capacities? Our partner will not only provide information, but also parry our every query with alternatives and suggestions for reflection. Perhaps we will become ever-more seduced by the macro and micro ends of the perceptual spectrum, by very big and very small data. We may become ever-more inclined to neglect the in-between realm within which most of human experience has unfolded over the millennia. In a kingdom in which zoomability rules, linear reading may seem akin to a horse-and-buggy ride. On the other hand, these technophilic projections may themselves come to seem dated, quaint relics of an era before reading in an expanded field was the norm.

In reality, the machine may provide conceptual frames and filters that provide access to, process, and shape the historical record. Analysis of materials concerning the relative significance of the seas during 10 centuries of human history, for instance, will generate ecological, biological, chemical, political, literary, artistic, or geological filters. Each framework creates a different synthesis with pointers toward higher and lower levels of aggregation as well as specific documents, materials, views, models, or other evidence on which the synthesis was compiled.

Complex adaptive systems theory suggests that our ways of understanding knowledge production in social systems could expand (but always at a cost, given the finitude of available cognitive resources). We might come to recognize that what occurs in communities and through communications networks takes a shape that emerges from the patterns of collective activity, rather than merely being the aggregate of individuals’ actions. At this higher level, networked systems of exchange produce a thinking effect, simulacral or real, a sense of knowledge produced at the system level. What, for instance, is the sum of the phone calls on a given evening from one point to another when these are not seen as an aggregate of individual conversations, but as the pattern of the network itself? How do such patterns influence the activities and perceptions of individuals through the coercive force of normativity? Where and how are ideas stored in the *noösphere*? What is the medium of collective thought and how might it be realized and understood, visualized, analyzed, grasped?

Only a small segment of the humanities community needs be excited by the design of projects and protocols to address questions of these kinds. Most will be happy to be users of digital domains. Phrases like “distant reading,” “content modeling,” or “knowledge representation” will become just as familiar a part of our vocabulary as the terms “social media” and “networking” have.
A TENSION EXISTS IN THE CONTEMPORARY ERA OF THE DIGITAL HUMANITIES, WITH ONE WING OF THE HUMANITIES EMBRACING QUANTITATIVE METHODS, THE OTHER CONTINUING TO INSIST UPON ITS ROOTS IN QUALITATIVE ANALYSIS.

THE QUANTITATIVE WING BECOMES INTEGRATED INTO THE SOCIAL SCIENCES. THE OTHER FIGHTS TO DEFEND ITS AUTONOMY AND CRITICAL STANCE.

PARTNERSHIPS AND PARTISANSHIP LIE AHEAD.

The prodigious ability of computers to work with large data sets, be they of inventories in automobile showrooms or research libraries or collections of ancient papyrus fragments, leads to a bifurcation within the Digital Humanities community that can be traced back to its beginnings.

The proponents of big data analysis seek to marshal these powers to undertake tasks that exceed the scale of mainstream humanistic inquiry, arguing for a close alignment with the quantitative social sciences. They look beyond the qualitative or interpretive preoccupations of traditional humanistic inquiry in favor of standard social science statistical methods, preferring a macro scale of analysis and description in order to examine such questions as the dissemination patterns of cultural forms, the shape of literary marketplaces and reading habits, and shifts in the physical and other external attributes of aesthetic objects.

The primacy of big data research is rejected by digital humanists who consider such methods epistemologically naive and their results generally trivial, self-evident, or flawed. They argue that the tools of the empirical sciences—statistical graphs and visualizations, grids and charts, maps and tables—carry conviction because they assume information is observer-independent and rooted in certainty. And while they are willing to admit that such techniques have played and will continue to play important roles in expanding the compass of Digital Humanities research, they contend that such tools are ill-equipped to capture the complexities of novelistic
constructions of character or to trace the day-to-day, document-to-document shifts in tone found in a statesman’s archive that translate into policy shifts and alter world affairs. At stake for them in tracking this elusive universe of signs is much more than the mismatch between qualitative judgments and the quantitative strictures imposed by analytic tools or graphical expressions borrowed from the social sciences. What is at stake is the humanities’ unique commitment to wrestle with uncertainty, ambiguity, and complexity; to model incommensurate temporalities and ontologies; to explore not just geographies but psychogeographies and the dark recesses of the self; to attend to non-repeatable and nonstandard phenomena. Such forms of attention are freighted with special meaning inasmuch as they closely correlate with the critical function that the modern humanities disciplines have performed in contemporary society: their championing of difference and the non-normative, their assault on sedimented social behaviors and norms, their ability to defamiliarize and historicize social institutions.

The battle rages on with both sides freely encroaching on one another’s turf, with an itinerant tribe of digital humanists caught in the middle of the rift. The latter shuttles back and forth between the two folds, mixing macro and micro scales of analysis, meshing the quantitative with the qualitative in the hope of creating sparks, frictions, a grand synthesis, a grand breakdown. With unimpeded access to ever-vaster cultural data sets, the separation may well grow or the process may produce generative synthesis. With an increasing number of platforms that combine qualitative analyses and quantitative methods, other outcomes are possible.

AN ALTERNATE CRISIS TAKES PLACE AS THE DIGITAL HUMANITIES BECOMES “THE HUMANITIES” TOUT COURT.

A CULTURE OF CRAFT RISES UP IN A POST-DIGITAL REVOLT THAT PRIVILEGES PHYSICAL PRESENCE OVER VIRTUAL PRESENCE, TOUCH OVER SIGHT AND SOUND, POOR MEDIA OVER RICH MEDIA.
Physical making, including self-consciously “backward” forms of manual work and handcrafting, has always accompanied and sometimes intersected digital culture. Such phenomena as the revival of knitting subcultures, the rise of a cottage industry of chapbook publishers, steampunk fabrication, makers fairs, even the Slow Food movement, were once confined to cities such as San Francisco and London, but are now spreading virally.

In the era of ubiquitous networks, they become the hubs of a revolt against screen culture, yet no distinction is made between the commercial Internet and the Digital Humanities. A significant sector of the humanities community splinters off and embraces these values as a critique of contemporary society, leaving their peers to bridge the two contexts, striving to conjugate the manual with the virtual, the macro with the micro, scholarship with arts-and-craft practice.

Regardless of our considerable enthusiasm for the social aspects and technological affordances of the Digital Humanities, there will always, and must always, be space for uninterrupted reading and reflection—such habits of mind stand in opposition to a culture that appears to demand multi-tasking and faceted attention at all times. The “classical” humanist attachment to concentration on the singular object, text, or task-at-hand may well become the mental equivalent of the attention to art and craft we now see in the realm of making.

As concepts of authorship, document, argument, provenance, and reference become increasingly unstable, concepts that are fluid, iterative, and distributive, but less “authoritative,” are taking their place.

Yet it is becoming easier than ever to validate, track, and cross-check information.

Concepts of authorship in Digital Humanities research are already trending toward fluid, iterative, and distributive models. Whatever the medium, authorship is increasingly understood as a collaborative process, with individuals creating materials...
within the setting of a team that merges their identities into a corporate subject (the laboratory, the technology sandbox, the research group). Far from disappearing, authorial traces proliferate within the merged identity and can be brought to the surface by means of analytical tools that make it possible to track nano-units of authorship like isotopes of intellectual property whose fingerprints can be extracted from the swarm of discourse.

These fingerprints themselves will prove mutable as humanists become accustomed to working with flexible and modular discourse units and even embrace combinatoric writing styles. Generative processes of composition and algorithmic criticism could soon become widespread practices with the result that the old hypertext model of modules, units, nodes, and connections will return, but stripped of the need for elaborate menu-driven navigation systems. Rather than a garden of forking paths, readers and writers will enter combinatoric matrices where the associative trail and argument structures can be produced from Semantic Web capabilities in collaborations that are user-structured.

The notion of the document will shift accordingly. As the cumulative product of multiple interventions by multiple authors, the document migrates from medium to medium and platform to platform in ways that reshape its boundaries as a discursive object. A modular argument can be repurposed in chunks as small units of commentary weave a tight rhetorical web across a field of related artifacts, topics, or events. The field of reference thus becomes an emergent feature of discourse, one that is produced as an effect of interrelated arguments and exchanges as well as through the paratextual apparatus that spins outward with centrifugal force into the infinite inventory of precedents. A fully realized heteroglossic text will be a feature of technological and humanistic intervention, exhibiting the avenues and byways of associative trails in which the history and the future of composition are interwoven.

Specialized authority may be conceived less in terms of credential platforms such as universities than in terms of public performance, so that the scholarly expert and humanistic guide take their place alongside the imaginative storyteller as a conveyor of history and culture. Collaborative models of authorship, swarm writing, and collective production will make possible real-time integration of partial contributions into synthetic wholes. Expressions of groupthink, however, may obliterate some of the very foundations of autonomous thought, as writers embed themselves in social networks as part of the compositional process. Predictive models of creative and imaginative life may produce agonistic engagements that are generative and iterative in unexpected ways.
As every act of engagement with a digital world generates its own trail of data and metadata, the crucial tasks of forgetting, of strategically looking away, of ignoring, of letting go and even of erasure will become more critical. The practice of discrimination that distinguishes provenance and other features of reliability will need to be attended to by schoolchildren and scholars alike. The still-unanticipated effects of social media and their capacity for herd behavior and swarm politics in the realm of culture may shrink or may expand to the point of overwhelming any individual voice or talent except as a note of common reference in the shared field.

VISIONARY PARTNERSHIPS AMONG GOVERNMENTS, UNIVERSITIES, LIBRARIES, ARCHIVES, MUSEUMS, AND CULTURAL INSTITUTIONS HAVE THE POTENTIAL TO GIVE RISE TO A VAST DIGITAL CULTURAL COMMONS THAT SUPPORTS HUMANITIES RESEARCH IN THE PUBLIC INTEREST.

CITIZEN INVOLVEMENT IN THE CURATION, PRESERVATION, AND INTERPRETATION OF THE CULTURAL PATRIMONY WILL EXPAND.

BUT THIS CULTURAL COMMONS WILL CONTINUE TO BE RESTRICTED TO MATERIALS THAT ANTEDATE THE PAST 75 YEARS. THE PATRIMONY OF THE PRESENT ERA WILL BECOME A BATTLEGROUND BETWEEN THE ADVOCATES OF RESTRICTIVE VS. OPEN ACCESS, WITH DIGITAL HUMANISTS AT THE FOREFRONT OF THE OPEN-ACCESS MOVEMENT.
Though frequent topics of discussion and debate, the great public works projects of the digital era have yet to be fully built: today’s equivalents of the great roadbuilding, electrification, and infrastructure development efforts of the industrial era are still unrealized. Where is the investment in the online equivalents of the Carnegie libraries, settlement houses, and other great philanthropic undertakings that promote the enfranchisement of all sectors of society? When and how will educational priorities change? Will our universities and colleges institutionalize approaches to learning and research grounded in collaboration and cooperation instead of celebrity and competition? Or will we continue to allow profit-driven entities to shape the networked environment on which our digital future depends? Will a cultural commons be established and made available to the citizens of the world from the privacy of their laptops? Or will distinct cultures emerge with their own rules and practices for use and access?

The creation of a global cultural commons has the potential to enhance the quality, depth, and reach of humanistic research. It also offers the prospect of resituating the humanities at the crossroads of contemporary public life. And it may well cast digital humanists in innovative public roles, create new audiences for cultural scholarship, and build bridges between the work of professional and amateur historians. Archival projects that make use of crowd-sourcing have begun to attract the participation of enthusiastic citizen scholars. Schoolchildren and their teachers are now able to work with primary-source materials and to make discoveries akin to those made by amateur astronomers studying the night sky. Communities create and curate their own archival resources, promoting cultural awareness and a sense of citizen ownership of the cultural patrimony.

The realization of such an inclusive vision faces a number of obstacles. None is more daunting than restrictions on the free circulation of the cultural patrimony of the past three-quarters of a century. Copyright restrictions have already led digital humanists to either focus their experiments in fields such as text-mining on 19th century cultural materials or to boldly assert their right to the fair use of more
recent materials, knowing full well that the university counsel’s office would be unlikely to support their stance and that take-down orders may surface sooner or later. Because of copyright, such efforts must typically exclude the bulk of recent critical and scientific scholarship, even when such materials are accessible via online repositories. Even the non-consumptive use of digital assets remains a controversial matter and the object of negotiations with the owners of digital repositories. Entire fields of inquiry (on contemporary art, on certain authors, on huge swaths of popular culture, on topics where the primary assets are in corporate hands) remain off-limits or must operate either under the radar or be subject to exorbitant, arbitrary fees. Even the best-intentioned scholars are left to blindly navigate the murky waters of orphaned and protected works with conflicting understandings of ownership, permissions, and rights.

The copyright system is badly broken, and it is seriously curbing innovation on a multitude of fronts. Digital humanists will have no choice but to continue to storm the barricades for the causes of open access, copyright reform, and the global cultural commons. The future of the humanities and the “commons of the mind” depend upon the successful creation of such public spaces of knowledge production and knowledge exchange.

**WORK IN THE HUMANITIES WILL RELY ON NEW MODES OF ASSESSMENT, ALTERED MODELS OF TRAINING, AND SHIFTS IN OUR UNDERSTANDING OF HOW WE VALUE PROFESSIONAL, CITIZEN, AND AMATEUR CONTRIBUTIONS TO KNOWLEDGE.**

**THE RISE OF CITIZEN SCHOLARS AND BIG HUMANITIES PROJECTS WILL AT ONCE BUILD BRIDGES BETWEEN THE ACADEMY AND SOCIETY AT LARGE AND REINFORCE FRICTIONS OVER THE SOCIAL ADVOCACY ROLES BEING PERFORMED BY PUBLIC HUMANITIES PROJECTS.**
Whereas universities long ago developed standard practices for evaluating print-based humanistic scholarship, classroom teaching, and administrative service, Digital Humanities deals academic leaders a new hand of cards. The fact is that most digital projects are team-based; many are grant-driven (as in engineering and the sciences); they may involve partnerships with numerous extramural entities; they blur the boundary lines among research, teaching, and service; and they are iterative and may require extended timelines. Each of these fundamental aspects of digital projects creates additional social and disciplinary complexities. To these one must add the need to assess the intellectual value of outputs that may only partly correspond to traditional forms or genres of argument. Who should assess these? Who are the peer groups and what constitutes the community of expert evaluators? How ought design or technological inventiveness factor into professional reviews? Who credentials digital humanists? Is this a profession or merely an accessory set of capabilities?

Such properly “professional” questions are accompanied by others that relate to the involvement of non-university partners and to social outreach. Large-scale partnerships necessarily imply diminished control on the part of project directors as well as pressures to please “others” in order to secure continued cooperation. If the project director adopts a rigorously critical line while collaborating with a local historical society motivated by boosterism, that will surely result in reduced support; if, on the contrary, he or she adopts a flexible line, the project partner will be content, but the project may be dismissed by professional historians as “mere outreach.” To what degree ought impact or visibility be considered a measure of success?

Many challenging issues lie ahead as regards the institutional life of Digital Humanities. Aside from the struggle for resources, there is an urgent need for a critical language to describe digital projects and for common—yet flexible—standards for evaluating animation, navigation, information architecture, and other features of born-digital projects and platforms.

**STRATIFIED APPROACHES TO THE CONSERVATION OF HISTORICAL MATERIALS WILL DISPLACE THE UNIFORM CONSERVATIONIST IDEOLOGIES AND METHODOLOGIES OF THE 19TH CENTURY.**
ERASURE AND FORGETTING WILL BECOME AS IMPORTANT TO THE HORIZONS OF HUMANISTIC WORK AS PRESERVATION AND REMEMBERING.

The centralized practices of collecting, processing, and preservation that developed over the past few centuries are responsible for the greatest act of historical recovery and retrieval in the history of humankind. Yet they also have led to an impasse. The sheer breadth and depth of materials now being collected, the growing volume of potential objects for collection and preservation, and the high degrees of redundancy characteristic of contemporary archival corpora have created a supply that so vastly exceeds the capabilities of institutions of memory that the result has been ever-burgeoning backlogs.

The solution is twofold. Nimble models of preservation, conservation, and processing must be developed that bring together researchers, archivists, curators, librarians, and members of the general public. Such models must reset all defaults with “quick and dirty” automated processing as the new norm, with full processing and preservation reserved for selected collections. Techniques such as automated metadata generation, user-tagging, and crowd-sourcing must be employed to expedite availability for user communities. The user-centered—not document- or object-centered—archive must become the rule. Gone is the era of the archive as a Fort Knox.

Total conservation and preservation is not an option, but it really never was. From the very start, institutions of memory were actively engaged in acts of selection and filtering that mostly took place behind closed doors. In the digital era, that process is being democratized, and digital humanists are being called upon to play a central role in archiving and curating collections, making decisions about preservation strategies, and critically reflecting upon the role of cultural forgetting and loss.

Digital archives lead a uniquely fragile existence, allayed only by redundancy and backups. Bit rot sets in; every act of transmission is a transformation; and no file is ever entirely self-identical. The recognition that the task of cultural memory is not exhaustive, but selective, that the shape of who we are is determined as much by what does not remain as what does, is a founding principle of humanistic scholarship and one that underscores the situated character of all knowledge. These principles will be challenged to confront the core tasks of collections-building.
Erasure studies will play as central a role in the future of the Digital Humanities as will collections-building, curation, interpretation, and annotation of and research on historical corpora.

A NEW KIND OF DIGITAL HUMANIST IS EMERGING WHO COMBINES IN-DEPTH TRAINING IN A SINGLE HUMANISTIC SUBFIELD WITH A MIX OF SKILLS DRAWN FROM DESIGN, COMPUTER SCIENCE, MEDIA WORK, CURATORIAL TRAINING, AND LIBRARY SCIENCE.

THE ZIGZAG DISPLACES LINEAR MODELS OF GRADUATE AND POST-GRADUATE TRAINING.

COMMUNITIES OF SCHOLARS ARE REORGANIZED ACCORDING TO DOMAINS OF PRACTICE, NOT ALONG DISCIPLINARY LINES.

THE COLLAPSE OF COMPREHENSIVE MODELS OF KNOWLEDGE (EVEN WITHIN SINGLE DISCIPLINES) BECOMES DEFINITIVE.

For the past half-century, comprehensive models of graduate training in the humanities, not unlike the sciences, have come under increasing pressure due to the explosion of subfields and specializations on the one hand, and the rise of new interdisciplinary fields on the other. The result is that the fiction of comprehensive training in even a single discipline survives on paper alone. In practice, doctoral students now establish themselves as experts in a specialized domain, which they then tie in to other intra- or interdisciplinary micro-domains, with so-called “theory” often serving as a bridge to broader conversations within the humanities or society at large.
The growing prominence of the Digital Humanities is introducing an additional set of pressures and complications as well as opportunities. The relatively linear tracks still being pursued in today’s doctoral programs are already being displaced by zigzagging paths between applied and pure research; realms of doing, making and thinking; experiences of work as research and of research as work. “Outside” skills—skills in fields such as design, computer science, media practice, curation, or library science—are assuming increasing importance alongside core training in a given humanities specialty, with combinations established in a pragmatic, albeit ad hoc, manner. The result is greater variability in the professional profiles of young humanists, along with greater flexibility with respect to the job market. No longer trained for academic careers alone, skilled in practical as well as theoretical domains, they are moving more fluidly between institutions of memory, industry, and the academy. The Digital Humanities reframes our notion of the scholar from the tenured sage in a warren-like office to include a wider range of participants—staff members with research training, community archivists, curators of objects, designers who make it part of their practice to work on humanistic projects, programmers who specialize in cross-disciplinary tool building. This expansion of whom we think of as performing scholarship coincides, sometimes all too complicitly, with the de-tenuring of faculty and the inclusion of adjunct and precarious workers into every facet of academia. Here as elsewhere, the Digital Humanities can be used to justify either the best or the worst of intentions, making it incumbent upon those who would adopt the mantle of digital humanist to do so mindful of the pitfalls as well as the promises.

The prevailing research culture of the Digital Humanities will become entrepreneurial, much like design or certain areas of contemporary engineering and the sciences are. Careers will be built around answers to questions like: Where do the most interesting opportunities lie? What are the richest archival repositories? What is fundable? Which lab is doing the most exciting work? The digital humanist’s sense of identity will be less anchored in a discipline or disciplinary specialty than in a sense of belonging to a community of practice within which tools and methods are primary and objects of study are secondary considerations.

**DESIGN EMERGES AS THE NEW FOUNDATION FOR THE CONCEPTUALIZATION AND PRODUCTION OF KNOWLEDGE.**
DESIGN METHODS INFORM ALL ASPECTS OF HUMANISTIC PRACTICE, JUST AS RHETORIC ONCE SERVED AS BOTH ITS GLUE AND COMPOSITIONAL TECHNIQUE.

CONTEMPORARY ELOQUENCE, POWER, AND PERSUASION MERGE TRADITIONAL VERBAL AND ARGUMENTATIVE SKILLS WITH THE PRACTICE OF MULTIMEDIA LITERACY SHAPED BY AN UNDERSTANDING OF THE PRINCIPLES OF DESIGN.

As the well-oiled machinery of print culture finds itself jammed by the volatile intermedia mix of the digital era, the form that knowledge assumes can no longer be considered a given. Knowledge-making and knowledge design become radically intertwined endeavors: so much so that digital humanists increasingly find themselves called upon to operate as and/or collaborate with designers.

Design means shaping knowledge and endowing it with form; the field of design encompasses structures of argument. We have discussed how the capacious umbrella of “design” incorporates a wide variety of practices: project design, the design of database architectures, metadata schemes, graphic and typographic design, user interface design, data visualization, information architectures, interactivity design, and the crafting of narrative and argumentative structures in multiple media. No digital humanist can become proficient in all, but every digital humanist will have to become familiar with all. The reason is simple: As we hope we have already demonstrated, digital projects of any scope require teams, not individuals, for each phase of design development and implementation. Developing an understanding of the ways the technical components of a project mesh is just as essential as mastering specific skills.

The central role played by design implies new challenges as well as new opportunities. New challenges because design dexterity requires specialized skills that lie outside the traditional knowledge-base of humanists. Amateurish design plagued many early Digital Humanities experiments and contributed to their premature demise.
All future scholarly projects that do not aspire to the highest design standards are unlikely to achieve public impact or enduring results. This is the reason why meticulous attention to design also provides new opportunities: namely, that good design breeds rich and robust digital tools and resources, and can make specialized forms of knowledge and inquiry comprehensible to expanded audiences and user groups. 

Digital humanists still have much to learn about the design and production of networked repositories, systems of communication, and new media environments. Modeling knowledge using digital tools and platforms provides a powerful perspective from which to engage in critical analysis of the rhetorical force and ideological shape of these very modes. Practice and theory inform each other in the process of making. Without making, theory has no traction. Without theory, practice has no critical purchase.

Early practitioners of Digital Humanities were willing to tinker with technology and conquer a steep learning curve in acquiring technical skills. Though much groundwork has been laid in the field of digitally based scholarship, for innovation to occur, humanists have to be inside the technology, ready to plunge into the workings of platforms and protocols at least enough to understand how to think critically and imaginatively regarding the tools they employ. Technical tools and research questions are not unrelated. Coding can be as mindless as any other task, and knowing how to make things work does not guarantee insight. But ideological critique and critical studies of media also reach a limit without some knowledge of technological underpinnings.

The time of diagrammatic thinking is upon us. We need graphical interfaces for multidimensional and multimedia authoring that take advantage of computers’ abilities to aggregate, synthesize, and organize arguments along multiple axes. Authorship and display must converge in such a way that arguments become visible and can be made both graphically and spatially. Relations among visible entities, as well as verbal units of thought, become tractable in the process. Ways of describing relations and visually structuring arguments through juxtaposition, derivation, hierarchy, equivalence, and other spatial relational concepts will introduce an interpretive dimension and enrich understandings of information design in the process.

The glass wall of the screen must become malleable. Crafting arguments in digital form and out of objects belonging to the full spectrum of media types must become no less fluid than doodling with a felt-tip pen on a paper sketch pad.
If the humanities are to thrive and not just exist in niches of privilege, they will have to visibly demonstrate the contributions to knowledge and society they are making in the digital era.

This means shaping—not parroting or simply using—the language of our era.

However contradictory and heterogeneous, plausible or implausible, the scenarios sketched out in this concluding section raise fundamental questions about the sort of vision that could or should shape Digital Humanities as it builds the present and looks toward the future. The vision will have to be bold if the humanities are not to recede into an ornamental role within contemporary research universities. More than just being conversant with the defining languages of our epoch, the humanities will have to prove capable of informing those very languages.

The conviction that animates this book is that Digital Humanities is well-equipped to take on this task as it enters the mature phase of its existence. Understood as a critical experimental practice, carried out in the public laboratory of a cultural commons, Digital Humanities is itself a work-in-progress as much as a future promise, driving digital tool- and platform-development with content-specific research questions that design, investigate, and interrogate the cultural record of humanity.

Will Digital Humanities save the humanities in an era when traditional humanistic forms of inquiry and discourse find themselves drowned out by the din of commerce, the drumbeat of the 24-hour news cycle, and rampant tides of economism and vocationalism? Time will tell. But it is worth recalling that consumerism and perpetual information overload are but the flip side of an era in which both experts and ordinary citizens have unprecedented access to information. Literacy has taken on varied forms, and culture industries are flourishing on a scale that would have been unimaginable only a century ago. These expansions challenge conventions of cultural value and canon formation. This much is knowable: The future course of the humanities will hinge upon informed and imaginative engagement with the historical forces that are shaping our times, our communities, and ourselves.
This final section of *Digital_Humanities* reflects on the preceding chapters, but can also stand alone as a concise overview of the field. As digital methodologies, tools, and skills become increasingly central to work in the humanities, questions regarding fundamentals, project outcomes, assessment, and design have become urgent. The specifications provide a set of checklists to guide those who do work in the Digital Humanities, as well as those who are asked to assess and fund Digital Humanities scholars, projects, and initiatives.

**A SHORT GUIDE TO THE DIGITAL_HUMANITIES**

**QUESTIONS & ANSWERS**
- Digital Humanities Fundamentals
- The Project as Basic Unit
- Institutions and Pragmatics

**SPECIFICATIONS**
- How to Evaluate Digital Scholarship
- Project-Based Scholarship
- Core Competencies in Processes and Methods
- Learning Outcomes for the Digital Humanities
- Creating Advocacy
What is the Digital Humanities?

Digital Humanities refers to new modes of scholarship and institutional units for collaborative, trans-disciplinary, and computationally engaged research, teaching, and publication.

Digital Humanities is less a unified field than an array of convergent practices that explore a universe in which print is no longer the primary medium in which knowledge is produced and disseminated.

Digital tools, techniques, and media have expanded traditional concepts of knowledge in the arts, humanities and social sciences, but Digital Humanities is not solely “about” the digital (in the sense of limiting its scope to the study of digital culture). Nor is Digital Humanities only “about” the humanities as traditionally understood since it argues for a remapping of traditional practices. Rather, Digital Humanities is defined by the opportunities and challenges that arise from the conjunction of the term digital with the term humanities to form a new collective singular.

The opportunities include redrawing the boundary lines among the humanities, the social sciences, the arts, and the natural sciences; expanding the audience and social impact of scholarship in the humanities; developing new forms of inquiry and knowledge production and reinvigorating ones that have fallen by the wayside; training future generations of humanists through hands-on, project-based learning as a complement to classroom-based learning; and developing practices that expand the scope, enhance the quality, and increase the visibility of humanistic research.

The challenges include addressing fundamental questions such as: How can skills traditionally used in the humanities be reshaped in multimedia terms? How and by whom will the contours of cultural and historical memory be defined in the digital era? How might practices such as digital storytelling coincide with or diverge from oral or print-based storytelling? What is the place of humanitas in a networked world?

What defines the Digital Humanities now?

The computational era has been underway since World War II, but after the advent of personal computing, the World Wide Web, mobile communication, and social media, the digital revolution entered a new phase, giving rise to a vastly expanded, globalized public sphere and to transformed possibilities for knowledge creation and dissemination.

Building on the first generation of computational humanities work, more recent Digital Humanities activity seeks to revitalize liberal arts traditions in the electronically inflected language of the 21st century: a language in which, uprooted from its long-standing paper support, text is increasingly wedded to still and moving images as well as to sound, and supports have become increasingly mobile, open, and extensible.

And the notion of the primacy of text itself is being challenged. Whereas the initial waves of computational humanities concentrated on everything from word frequency studies and textual analysis (classification systems, mark-up, encoding) to hypertext editing and textual database construction, contemporary Digital Humanities marks a move beyond a privileging of the textual, emphasizing graphical methods of knowledge production and organization, design as an integral component of research, transmedia crisscrossings, and an expanded concept of the sensorium of humanistic knowledge.

It is also characterized by an intensified focus on the building of transferrable tools, environments, and platforms for collaborative scholarly work and by an emphasis upon curation as a defining feature of scholarly practice.

What isn’t the Digital Humanities?

The mere use of digital tools for the purpose of humanistic research and communication does not qualify as Digital Humanities. Nor, as already noted, is Digital Humanities to be understood as the study of digital artifacts, new media, or contemporary culture in place of physical artifacts, old media, or historical culture.

On the contrary, Digital Humanities understands its object of study as the entire human record, from prehistory to the present. This is why fields such as classics and archaeology have played just as important a role in the development of Digital Humanities as has, for example, media studies. This is also why some of the major sectors of Digital Humanities research extend outside the traditional core of the humanities to embrace quantitative methods from the social and natural sciences as well as techniques and modes of thinking from the arts.
Where does the Digital Humanities come from?

The roots of computational work in the humanities stretch back to 1949 when the Jesuit scholar Roberto Busa, working in collaboration with IBM, undertook the creation of an automated approach to his vast *Index Thomisticus*, a computer-generated concordance to the writings of Thomas Aquinas. By means of such early uses of mainframe computers to automate tasks such as word-searching, sorting, counting, and listing, scholars could process textual corpora on a scale unthinkable with prior methods that relied on handwritten or typed index cards. Other early projects included the debut, in 1966, of *Computers and the Humanities*, the first specialized journal in the field. Seven years later, the Association for Literary and Linguistic Computing (ALLC) was founded, with the Association for Computers and the Humanities (ACH) following in 1978.

By the mid-1980s computational methods for linguistic analysis had become widespread enough that protocols for tagging digital texts were needed. This spurred the development of the Text Encoding Initiative (TEI). This important undertaking reshaped the field of electronic textual scholarship and led subsequent digital editing to be carried out in Extensible Markup Language (XML), the tag scheme of which TEI is a specialized subset. The first humanities-based experiments with database structures and hypertextual editing structured around links and nodes (rather than the linear conventions of print) date from this period, as do the many pilot projects in computational humanities in the United States sponsored by the National Endowment for the Humanities and other agencies, organizations, and foundations.

How do the Web and other networks affect the Digital Humanities?

As this revolution in protocols was taking place, the explosion of personal computing in the mid-1980s combined with the advent of the World Wide Web a decade later gave rise to a new generation of Digital Humanities work that was less text-centered and more design-driven. The desktop environment—with its graphical user interface, real-time WYSIWYG toolkit, and evolution from command lines to icons and window-based frames—not only vastly expanded the corpus of born-digital documents but also ushered in the gradual integration of audio, video, and graphics.

This integration has matured over the past decades and given Web culture its profoundly multi-medial character. It also favored the enhancement of models of sharing, co-creation, publication, and community-building that have situated the Web at the center of contemporary social debates and socio-economic processes. The concept of the Web as a public sphere that extends the physical public spaces of contemporary life has, of course, been intensified thanks to smartphones, tablets, and other ubiquitous and pervasive computing and media devices.

What is ahead for the Digital Humanities?

Contemporary Digital Humanities stands not in opposition to the past, but on its shoulders. It honors the pioneering labors carried out over the past seven decades in the form of statistical processing (computational linguistics), linking (hypertext), modeling (architectural and visual displays), the creation of structured data (XML), and iterative editing and version control (for critical editions as well as analysis and creative practices), even as it seeks to move beyond repository building and editing to new synthetic practices. It is inspired by the same core conviction that animated computational humanities and early Digital Humanities pioneers: the conviction that computational tools have the potential to transform the content, scope, methodologies, and audience of humanistic inquiry.
QUESTIONS & ANSWERS 2
THE PROJECT AS BASIC UNIT

Why projects?
Projects are both nouns and verbs: A project is a kind of scholarship that requires design, management, negotiation, and collaboration. It is also scholarship that projects, in the sense of futurity, as something which is not yet. Projects are often pursued in teams, with collaborators bringing complementary skill-sets and interests to conceptualize the research questions being investigated and design possible trajectories for them to be answered. Hence, projects are projective, involving iterative processes and many dimensions of coordination, experimentation, and production.

Who is involved in Digital Humanities projects?
Digital Humanities projects typically involve multiple circles of researchers, from faculty and staff to students and community partners. A project’s complexity and scale generally implies the involvement of multiple strata of personnel from within and across institutions of learning.

Projects can involve partner institutions such as museums, libraries, and archives as well as members of the community, alumni, and members of interested virtual networks such as collectors, amateur historians, and the like.

Partnerships with corporations, in particular media and technology companies, are also possible, with a caveat that corporate and academic cultures may be different in their goals and values.

How are Digital Humanities projects organized?
Projects are usually faculty-, staff-, or student-initiated. They are often built around a research question and/or a university collection or archival repository. Many take place outside the classroom; others involve a research project that is anchored in a recurring course.

A Principal Investigator (or, PI), co-Pis, project advisors, staff, interns, and students are all part of the project team. It is the responsibility of the PI to organize the project team, establish timelines for deliverables, and assess the project at each stage of development.

What is the difference between Digital Humanities projects and Big Humanities projects?
Digital Humanities projects come in all sizes: big, medium, and small. Some of the defining early Digital Humanities projects, however, as well as prominent contemporary work have assumed the form of Big Humanities projects, which are realized over many years, with many contributors, developers, and funders involved at various stages of development.

Big Humanities projects are built along the lines of Big Science. They involve large-scale, long-term, team-based initiatives that build big pictures out of the tesserae of expert knowledge. The researchers and team members, from historians to technologists to designers, may number in the hundreds.

Little or “lowercase” Digital Humanities projects are typically carried out by individuals or small teams in consultation with experienced staff. As standard platforms and protocols have emerged, editing, exhibit-building, network analysis, and repository development require less one-off investment.

The bulk of Digital Humanities projects fall in between the two ends of the spectrum.

How is the Digital Humanities continuous with traditional forms of research and teaching in the humanities?
Like traditional humanities-based research and teaching, Digital Humanities work involves practices of analysis, critique, and interpretation; editing and annotation; historical research and contextualization. It examines the formal and historical properties of works of the imagination, the interplay of self and society, the history of ideas and of material culture.

It attends to qualitative and non-quantifiable features of the human experience: complexity, ambiguity, medium specificity, and subjectivity. It builds on traditional approaches to the study, preservation, and classification of cultural corpora.

Though the range of media with which Digital Humanities works extends beyond the textual, its core commitments harmonize with the long-standing values of the humanistic tradition: the pursuit of analytical acuity and clarity, the making of effective arguments, the rigorous use of evidence, and communicative expressivity and efficacy. Digital Humanities then melds hands-on work with vastly expanded data sets, across media and through new couplings of the digital and the physical, resulting in definitions of and engagements with knowledge that encompass the entire human sensorium.

Both the traditional classroom and solitary study remain key features in the landscape of Digital Humanities.
Humanities learning. At the same time, many precedents for collaborative work in communities of letters and knowledge networks are enhanced by digital platforms in a fabric animated by opportunities for hands-on, project-based learning. Since antiquity, the dominant models of humanistic inquiry have favored an understanding of intellectual labor as solitary and contemplative, cut off from—and even superior to—manual labor and the realm of making or doing. Digital Humanities re-embeds these models in an augmented model of pedagogy that emphasizes learning through making and doing, whether on the level of the individual or the group.

How is the Digital Humanities discontinuous with traditional forms of research and teaching in the humanities?

For nearly six centuries, humanistic models of knowledge have been shaped by the power of print as the primary medium of knowledge production and dissemination. Rather than rejecting print culture or embracing the simple pouring of print models into digital molds, Digital Humanities is engaged in developing print-plus and post-print models of knowledge. Both involve more than an updating of the knowledge delivery system. They entail the cognitive and epistemological reshaping of humanistic fields as a function of the affordances provided by the digital with respect to print. They also respect the increasing role teamwork and collaboration play in humanities research and training.

How does the Digital Humanities function in the print-plus era?

Print typically offers a single viewing angle, linear organization, a research output characterized by finitude and stability, and a scale of documentation and argumentation that has to respect the physical proportions of the book. The digital print-plus era, in contrast, allows for toggling back and forth between multiple views of the same materials. It allows for fluid scale shifts, for “zooming” from the macro- to the micro-level, and for the interweaving of data sets (such as source materials, notes, and correspondence) into research outputs. The screens and augmented spaces of the print-plus era allow for the faceting, filtering, and versioning of corpora; for the coexistence of multiple pathways within a single repository; for multilineral forms of argument. It is extensible in the double sense of allowing for seemingly unlimited scale and of being process- rather than product-based. When a book goes to print, it stabilizes in an edition that has to be reissued in order to be revised; a digital artifact can be altered or revised on a rewritable substrate that supports rapid refresh rates. The same digital artifact can lead multiple lives on multiple platforms, with multiple authors. It can undergo remixing by others before, during, and after its “completion.”

How are Digital Humanities projects funded and sustained?

Because they cross over boundaries between disciplines; between theoretical and applied knowledge; and among the humanities, library science, information technology, and design, Digital Humanities projects typically require support structures that cut across conventional department and school organizational lines. Private foundations, public granting agencies, and industry partners have all provided monies for projects at every scale.

Funding for research in the humanities is far more limited than in the science and engineering fields, but the scope and innovative character of the Digital Humanities have led many projects to successfully garner external funding. In order to attract and sustain such funding, it has proven essential for projects to receive internal support during a period of incubation so that they may prove their worth by successfully reaching an initial set of benchmarks.

Sustaining such projects requires that faculty and students who assume leadership positions need the support and recognition that this work is a combination of research, teaching, and service.

What are the prevailing crediting and attribution conventions and authorship models for Digital Humanities projects?

Traditional authorship and crediting practices in the humanities are based on single authorship. Although practices of attribution are still fluid in the Digital Humanities community, the emerging model recognizes that many, if not most, Digital Humanities projects are analogous either to natural science laboratory projects or to the collaborative attribution system used in the performing arts.

No standardized crediting system for Digital Humanities projects has been embraced universally. But the dominant trend is toward the differentiation of roles such as principal investigator, researcher, designer, programmer, modeler, editor, and the like.
How do Digital Humanities projects interconnect the classroom with libraries, museums, and archives?

Most colleges and universities have extensive resources for research and study that are underutilized after fulfilling their core research, teaching, and training missions. Contemporary Digital Humanities taps these riches by expanding the concept of the classroom to encompass library, museum, and archival collections, positioning them as central training places via hands-on research in the company of peers.

Much as in a natural science laboratory, students involved in Digital Humanities projects learn by making and doing, working within this extended classroom under the guidance of expert curators, archivists, and researchers, and in the company of peers. Whereas traditional models of humanistic training view the acquisition of skill-sets and disciplinary training as preconditions for the transition to becoming engaged in the creation of original scholarship, Digital Humanities work accelerates this apprenticeship, inserting students into research communities from the start.

How can Digital Humanities projects involve inter-university collaboration?

The scale and scope of many Digital Humanities projects, as well as their ties to physical collections and IT infrastructure needs, make them ideally suited to inter-university collaboration. Projects can be developed and divided up strategically among multiple partner institutions leveraging specific strengths, distributing workloads, sharing the benefits of research outcomes, and building cross-institutional bridges.

Benefits include cost-sharing and enhanced prospects for external funding. But they also transcend the practical sphere: They enable Big Humanities models of research whose outcomes are of potential interest to broad cross-disciplinary and nonspecialist audiences. By involving multiple institutions, such projects contribute to a sense of shared identity and of belonging to a broader research community. They also help to answer endemic student anxieties regarding the practical value of humanities knowledge and research.

How can Digital Humanities projects involve expertise outside the academy?

Many Digital Humanities projects develop entirely within a single college or university. But others require domains of knowledge and forms of expertise that are under- or unrepresented in or lie outside the confines of academic fields. Combining intra- and extramural expertise within well-designed Digital Humanities projects often proves essential to their success. Such approaches include work with communities of collectors and historical associations and the use of crowd-sourcing for the processing, transcription, and annotation of archival documents. Not only can the scope and quality of humanities research benefit from such partnerships, but they also contribute to the creation of a new class of citizen scholars who otherwise would be mere citizen consumers.

How can extramural partnerships play a role in developing, supporting, and sustaining Digital Humanities projects?

The promotion of public knowledge is a core value of the Digital Humanities. Extramural partnerships—whether with professional societies, historical associations, institutions of informal learning (libraries, museums, archives), corporations, or public entities—can extend the reach and impact of humanities research in contemporary society. The most successful partnerships address questions of shared critical interest with research results that rise to the highest standards of scholarly rigor while being conjugated across multiple media platforms in the “language” of the partner institutions through exhibitions, performances, books, Web publications, or other means.

Partnerships can expand the depth and diversity of the talent pool of available participants in a project, broaden a project’s potential audience and impact, and, as with inter-university collaborations, help to solidify short- and long-term financial sustainability.

How can educational institutions support Digital Humanities research?

Digital Humanities research projects require fluid boundary lines among academic departments and institutional units. Because the projects are often team-based and imply merged models of theoretical and applied knowledge across the traditionally separated domains of “research,” “teaching,” and “service,” elements such as design facilities, information systems, multimedia production, IT work, and collections-based research are not mere “supports,”
but rather integral features of project design and execution.

In addition to promoting a culture where such boundary lines do not stand in the way of innovation, institutions must embrace co-teaching as a standard feature of the new landscape of the humanities, rather than penalizing it as a form of work reduction. Co-creation must be seen as a legitimate form of scholarly and student intellectual labor, complementary to traditional forms of output. The easing of access and use-restrictions on museum, archive, and library special collections represents a key precondition to the creation of an expanded, hands-on classroom, and serves open-access models equating preservation with proliferation, rather than restricted control.

College and university legal offices must be careful not to interpret copyright restrictions narrowly out of an unwillingness to broker hypothetical risks. Fair use needs to be understood in the broadest possible sense in order not to shackle Digital Humanities research. College- and university-based collections need to be shared with the research community as freely as possible.

Last but not least, institutions of higher learning must promote and foster a less risk-averse culture in the humanities disciplines: a culture where, as in the sciences, “failure” would be accepted as a productive outcome when undertaking innovative, speculative work. Differentiating between productive forms of failure and poor research is essential to promoting research communities where innovation is a core value.

What are the institutional niches that best support Digital Humanities projects?

Digital Humanities projects have generally flourished less within single departments, schools or institutional units, than across such structures. Even humanities research centers, built to house and support the research of individual scholars, have not always proven to be the ideal home—although some have successfully reshaped their policies, funding models, and physical infrastructure to support collaborative Digital Humanities work.

More typically, Digital Humanities has thrived in independent, free-standing laboratories or centers where there exists a community of scholars (humanists and non-humanists alike), staff members, curators, and students interested in the shared exploration of innovative models of scholarship. Such environments are best envisaged as a hybrid of making, thinking, and play spaces, combining computational facilities; digital imaging, sound, and video production facilities; and meeting and exhibition spaces.

How can institutions assess the scale of investment and expectation for Digital Humanities projects appropriate to them?

Projects come in all sizes. There is no inherent reason why a large project cannot be undertaken by a small institution or a small project by a large institution. Nor is there any inherent reason why individual scholars cannot undertake large-scale collaborations among multiple colleges or universities.

So there is no single formula for success. The scale and form that Digital Humanities projects take must be dictated by thoughtful project design—combining research questions, ambitions, and anticipated outputs—as well as the available logistical, personnel, and financial resources. Much as in the laboratory sciences, this implies a balance between pragmatic vision and entrepreneurial initiative.

How can peers and academic leaders assess Digital Humanities projects?

Metrics for evaluating the quality and impact of Digital Humanities projects combine traditional assessment methods in the humanities with new factors. Peer review remains fundamental to processes of assessment, but now draws as much from the community of leading Digital Humanities practitioners as from field-based peers. A less risk-averse culture is the prerequisite for a more innovation- and experimentation-driven model of the Digital Humanities to take hold.

In addition to traditional peer-based criteria, some assessment tools that have a long history in the natural and social sciences may become relevant to humanities fields: citations, grant-writing success, public impact, and the like. It should be noted that variations in the sizes of fields make caution essential in the use of quantitative tools; otherwise they will provide very crude, and possibly misleading, measures of importance or impact. Original scholarship and intellectual rigor remain the essence of Digital Humanities work.

Traditional print-based metrics of productivity are already being eclipsed by the realities of print-plus and digital publishing, so expectations of productivity must encompass multiple media, different formats, and variable scales of contributions to knowledge. In other words, the media and technologies in which intellectual work is realized matter as much as its “content.” This means that the “work” is not just the content but, rather, everything: the environment that has been designed for the work’s performance and publication; the interface and data structures, the back-end database, and the code that enables multiple forms of audience engagement. All of these matter in assessments of quality and rigor.
This text provides a set of guidelines for the evaluation of digital scholarship in the humanities, social sciences, arts, and related disciplines. The guidelines are aimed, foremost, at academic review committees, chairs, deans, and provosts who want to know how to assess and evaluate digital scholarship in the hiring, tenure, and promotion process.

The list is also intended to inform the development of institution-wide policies for supporting and evaluating scholarship and creative work that reflects traditional values while incorporating specific understandings of new platforms and formats.

**Fundamentals for initial review**

The work must be evaluated in the medium in which it was produced and published. If it is a website, that means viewing it in a browser with the appropriate plug-ins necessary for the site to work. If it is a virtual simulation model, that may mean going to a laboratory outfitted with the necessary software and projection systems to view the model. Work that is time-based—such as videos—will often be represented by stills, but reviewers also need to devote attention to clips in order to fully evaluate the work. The same can be said for interface development, since still images cannot fully demonstrate the interactive nature of interface research. Authors of digital works should provide a list of system requirements (both hardware and software, including compatible browsers, versions, and plug-ins) for viewing the work. It is incumbent upon academic personnel offices to verify that the appropriate technologies are available and installed on the systems that will be used by the reviewers before they evaluate the digital work.

**Crediting**

Digital projects are often collaborative in nature, involving teams of scholars who work together in different venues over various periods of time. Authors of digital works should provide a clear articulation of the role or roles that they have played in the genesis, development, and execution of the digital project. It is impractical—if not impossible—to separate out every micro-contribution made by team members since digital projects are often synergistic, iterative, experimen-

tal, and even dynamically generated through ongoing collaborations. Nevertheless, authors should indicate the roles that they played (and time commitments) at each phase of the project development.

Who conceptualized the project and designed the initial specifications (functional and technical)? Who created the mock-ups? Who wrote the grant proposals or secured the funding that supported the project? What role did each contributor play in the development and execution of the project? Who authored the content? Who decided how that content would be accessed, displayed, and stored? What is the “public face” of the project and who represents it and how?

**Intellectual rigor**

Digital projects vary tremendously and may not “look” like traditional academic scholarship; at the same time, scholarly rigor must be assessed by examining how the work contributes to and advances the state of knowledge in a given field or fields. What is the nature of the new knowledge created? What is the methodology used to create this knowledge? It is important for review committees to recognize that new knowledge is not just new content but also new ways of organizing, classifying, and interacting with content. This means that part of the intellectual contribution of a digital project is the design of the interface, the database, and the code, all of which govern the form of the content. Digital scholars are not only in the position of doing original research but also of inventing new scholarly platforms. Five hundred years of print have so fully naturalized the “look” of knowledge that it may be difficult for reviewers to fully understand these new forms of documentation and the intellectual effort that goes into developing them. This is the dual burden—and the dual opportunity—for creativity in the digital domain.

**Crossing research, teaching, and service**

Digital projects almost always have multiple applications and uses that enhance research, teaching, and service. Digital research projects can make transformative contributions in the classroom and sometimes even have an impact on the public-at-large. This ripple effect should not be diminished. Review committees need to be attentive to colleagues who dismiss the research contributions of digital work by cavalierly characterizing it as a mere “tool” for teaching or service. Tools shape knowledge, and knowledge shapes tools. But it is also important that review committees focus on the research contributions of the digital work by asking questions such as the following: How is the work engaged with a problem specific to a scholarly discipline or group of disciplines? How does the work engage with a problem specific to a scholarly discipline or group of disciplines? How does the work enhance the public-at-large? How does the work enhance the public-at-large? How does the work enhance the public-at-large? How does the work enhance the public-at-large? How does the work enhance the public-at-large?

Nevertheless, authors should indicate the roles that they played (and time commitments) at each phase of the project development.
Peer review
Digital projects should be peer-reviewed by scholars in fields who are able to assess the project’s contribution to knowledge and situate it within the relevant intellectual landscape. Peer review can happen formally through letters of solicitation but can also be assessed through online forums, citations, and discussions in scholarly venues, by grants received from foundations and other sources of funding, and through public presentations of the project at conferences and symposia. Has the project given rise to publications in peer-reviewed journals or won prizes by professional associations? How does it measure up to comparable projects in the field that use or develop similar technologies or similar kinds of data? Finally, grants received are often significant indicators of peer review. It is important that reviewers familiarize themselves with grant organizations across schools and disciplines, including the humanities, the social sciences, the arts, information studies and library sciences, and the natural sciences, since these are indicators of prestige and impact.

Impact
Digital projects can have an impact on numerous fields in the academy as well as across institutions and even the general public. They often cross the divide that arises among research, teaching, and service in innovative ways. Impact can be measured in many ways, including the following: support by granting agencies or foundations, number of viewers or contributors to a site and what they contribute, citations in both traditional literature and online (blogs, social media, links, and trackbacks), use or adoption of the project by other scholars and institutions, conferences and symposia featuring the project, and resonance in public and community outreach (such as museum exhibitions, public policy impact, adoption in curricula, and so forth).

Approximating equivalencies
Is a digital research project “equivalent” to a book published by a university press, an edited volume or a research article? These sorts of questions are often misguided since they are predicated on comparing fundamentally different knowledge artifacts and, perhaps more problematically, consider print publications as the norm and benchmark from which to measure all other work. Reviewers should be able to assess the significance of the digital work based on a number of factors: the quality and quantity of the research that contributed to the project; the length of time spent and the kind of intellectual investment of the creators and contributors; the range, depth, and forms of the content types and the ways in which this content is presented; and the nature of the authorship and publication process. Large-scale projects with major funding, multiple collaborators, and a wide-range of scholarly outputs may justifiably be given more weight in the review and promotion process than smaller-scale or short-term projects.

Development cycles, sustainability, and ethics
It is important that review committees recognize the iterative nature of digital projects, which may entail multiple reviews over several review cycles, as projects grow, change, and mature. Given that academic review cycles are generally several years apart (while digital advances occur more rapidly), reviewers should consider individual projects in their specific contexts. At what “stage” is the project in its current form? Is it considered “complete” by the creators, or will it continue in new iterations, perhaps through spin-off projects and further development? Has the project followed the best practices, as they have been established in the field, in terms of data collection and content production, the use of standards, and appropriate documentation? How will the project “live” and be accessible in the future, and what sort of infrastructure will be necessary to support it? Here, project specific needs and institutional obligations come together at the highest levels and should be discussed openly with deans and provosts, library and IT staff, and project leaders. Finally, digital projects may raise critical ethical issues about the nature and value of cultural preservation, public history, participatory culture and accessibility, digital diversity, and collection curation which should be thoughtfully considered by project leaders and review committees.

Experimentation and risk-taking
Digital projects in the humanities, social sciences, and arts share with experimental practices in the sciences a willingness to be open about iteration and negative results. As such, experimentation and trial-and-error are inherent parts of digital research and must be recognized. The processes of experimentation can be documented and can prove to be essential in the long-term development process of an idea or project. White papers, sets of best practices, new design environments, and publications can result from such projects, and these should be considered in the review process. Experimentation and risk-taking in scholarship represent the best of what the university, in all its many disciplines, has to offer society. To treat scholarship that takes on risk and the challenge of experimentation as an activity of secondary (or no) value for promotion and advancement can only serve to reduce innovation, reward mediocrity, and retard the development of research.
SPECIFICATION 2
PROJECT-BASED SCHOLARSHIP

Project-based scholarship exemplifies contemporary Digital Humanities principles. It differs from traditional scholarly publication in being team-based, distributed in its production and outcome, dependent on networked resources (technical and/or administrative), and in being iterative and ongoing, rather than fixed or final, in its outcome. It necessarily involves many dimensions of conception, design, coordination, and resource use that build extra layers of complexity onto the traditional approach to humanities research. The following list is useful to the creation of a grant proposal or research plan for project-based work and reflects best-practices standards (with the caveat that debate persists).

Contribution to knowledge
The project should meet the criteria of any scholarly work through its contribution to knowledge in a discipline or field. How is the project in dialogue with an issue or topic in a given disciplinary field and how does it move the discourse forward in an innovative way? Does the project contribute to and advance the state of knowledge of a given field or fields?

The model of knowledge
How is the knowledge shaped and modeled: as an argument, a presentation, a display? What can be taken from the project as a theoretical principle, method, or information that is useful for other scholars, including those who are not engaged with Digital Humanities research? How does the project model and embody new knowledge?

Research questions and digital media
Digital environments allow for different approaches for relating and processing materials and this should be demonstrated in the research plan. Simply putting something online is not digital research. The litmus test is to ask what is being done that could not be done in print-based or traditional scholarship. How has the research project been formulated from within the affordances of digital methods?

Tools and content
Many digital projects involve innovative recombining and reconfiguring of existing tools toward the formulation of new knowledge. Is this a tools-based project or a content-driven project and how do these intersect? How can the intellectual labor of the design and development of the “tool” be assessed in tandem with the “content”? To what extent are they inextricable and why?

Methods
Does the project have a thesis or guiding methodological principle? How did the digital platform allow it to be explored, tested, argued, demonstrated, or even refuted?

Born digital and/or digitized artifact
Digital projects often combine analog materials that have been scanned or digitized and elements that are born digital—analysis, research, processing, or newly authored files. Elements of information structure are also born digital. How are each of these elements understood and what role do they play in the overall project?

Collections-sharing and licensing
The future of humanistic learning and the level of societal impact that humanities scholarship can achieve depend upon unrestricted access to cultural and historical repositories; accordingly, the least restrictive licenses should be the norm. What kinds of licensing and intellectual property issues will the project encounter? How can the work be accessed and used by the scholarly community and public-at-large?

Interface as knowledge representation and content-modeling
The interface of a project expresses an argument in its design. Does it offer a snapshot of the contents of the project, or a set of entry points for activities that can be performed? Understanding the ways the interface is structured, how it embodies the ideas of the project, and how it supports the engagement with the project is essential.

Team, collaborative, and project management
Knowing who will take responsibility for each part of a digital project is crucial for development and design. Each participant’s role should be spelled out in documentation: project conception, research plan, technical analysis, Web development (infrastructure), Web design (interface), content development, database design, and so on. Some account of the percentage of effort in the project as a whole should be indicated.

Credit for intellectual contributions/authorship
Project teams have to work collaboratively, and the research activity unfolds within the implementation; it is not separate from it. But the responsibility for the research question and the intellectual contribution of each participant should be made clear in documentation. This should include a description of how the project was shaped by design decisions, discipline-specific knowledge, and technical expertise.
Info architecture/institutional cyber-infrastructure/systems administration

Decisions about information architecture and design are crucial parts of the project. Knowing where the work will sit institutionally, how it will be supported and in what server environments, and how the software and/or platforms for content development will be chosen is at the foundation of the project. It is also necessary to know who will configure the server infrastructure, administer the systems, install the software (and keep it up to date), and back up the content.

Open-source software and technology transfer

Development of tools and platforms is one of the foundation stones of Digital Humanities projects. It is in the interest of the common enterprise of teaching and learning for software to be understood as a community resource with source code shared so as to enable support and development by the user community as a whole. In general, projects should be built with an eye toward fostering common solutions and shared platforms, though there may be times when one-offs serve a specific purpose. How does the project allow for the documentation and transfer of code, tools, platforms, and applications?

Documentation

Documentation of the structure and design of a project is an essential piece of the work. Too often this is ignored. Documentation is essential for continuity of the project after its initial start-up, and it is an important contribution to the field, as well as a way for others to repurpose the design. Development processes should be documented; functional and technical specifications should be documented; system requirements for the project should be documented (for example, which browsers and versions are supported; what plug-ins are required); database entities and relational schemata should be documented; and, finally, code should be documented, including the publicly available code libraries used in the project, licensing agreements or user agreements (especially for APIs), and the intended operations of individual modules, with author attributions.

Audience, user considerations

Making clear who the audience for the project is and how its members are engaged in its development is important, even if the research is driven by an individual scholar’s curiosity or agenda. Projects without audiences or users are silos into which work and resources disappear. User-testing is often a critically necessary part of the refinement of the project’s interface and navigational features.

Compliance with all legal regulations

Digital Humanities projects must follow Americans with Disabilities Act (ADA) standards in their design and must be compliant with intellectual property and copyright restrictions. The latter are, however, to be applied with a clear understanding of the right to fair use, the not-for-profit character of nearly all humanities research, and the contribution that such research makes to the knowledge and recognition of cultural objects and heritage.

Publishing/dissemination models

Getting attention for a digital project requires putting it into view in an online venue, getting it reviewed, and creating visibility within a scholarly community and among potential users and future contributors. Projects should have a plan for dissemination and publication. Projects built with and from communities have more buy-in than projects built by single scholars. Digital projects should not “rebuild the wheel” but instead strategically assess and, where possible, take advantage of existing software solutions, platforms, or tools. Both the future of humanistic learning and the ability of humanities scholarship to matter in society at large depend upon the unrestricted circulation of scholarly knowledge; accordingly, the least restrictive licenses should be the norm.

Assessment criteria

A project should have its metrics of success and failure stated explicitly. These might range from creating a project that proves a concept or demonstrates a design principle to a project that sets a goal of digitizing and marking up a particular amount of material or engaging a specific community in online discussion and discourse. Having clear goals and milestones is useful as a way to assess the relation between resources and results.

Conversation with multiple fields

Is the project in dialogue with other works in its field, both those traditionally conceived as well as those realized in digital media? Do the authors understand and reference other research and digital projects as models? How does the project situate itself within the intellectual development of a given field or fields?

Sustainability

However experimental its technology base, preservation strategies are a defining feature of good project design. Digital assets are fragile by nature, and this fragility needs to be addressed from the outset by means of a mid- to long-term preservation strategy. What is the plan for sustaining the digital project? Where will it be housed and maintained institutionally? How will those resources be sustained? What will it cost to continue the project, if it is open-ended, and what possible sources of revenue are there for this support? The labor of staff, students, and consultants as well as the costs of hardware, software, and other materials need to be taken into account, not to mention the intellectual commitments of the primary researcher and community of advisors and contributors.

Transparency

All funding sources, whether monetary or in-kind donations, should be disclosed in the various outputs to which a Digital Humanities project gives rise.
SPECIFICATION 3
CORE COMPETENCIES IN
PROCESSES AND METHODS

What are the basic skills essential for being able to do Digital Humanities work? How can such projects be supported within an academic or institutional environment? This advisory lists the fundamental elements necessary for the creation of digital research projects. The specific competencies will vary by field and discipline and not all projects require all of these competencies.

All digital projects have technical, administrative, and intellectual aspects to their production. As tools and platforms designed specifically for the Digital Humanities become increasingly available, building custom-designed projects will only be justified if a new tool or platform is part of the development or if the project has some demonstrably unique elements that require a one-off solution.

TECHNICAL

Web development, infrastructure, server environment, interface design; choices about tools, platforms, software, and hardware.

Familiarity with data types and file formats
On what basis are decisions about file formats and data types made?

Database knowledge
If a database is part of the information architecture, what type is it? How will it work and why is it needed? What are the entities in the database, what are their attributes and relationships, and how will the objects be queried and sorted? Is the database open-source, proprietary, and/or licensed? What data sets will be used in the project and who controls them? What kind of permissions and rights will govern the data sets?

XML structured data
What schema or version of XML is being used and why? Is it used for mark-up or just for metadata?

Metadata standards
What process of metadata selection was used and how does the metadata standard suit the project and its disciplinary field as well as its institutional home? Are the metadata standards compliant with existing standards in the field?

Scripting languages
To what extent are scripting languages used in the project and how are they suited to the server and administrative environment in which they work, as well as to the tasks to which they are put?

GIS platforms and spatial data
Tools for spatial mapping and analysis have been developed within geographical disciplines for professional use but other more popular tools for mapping (like Google Earth) have a lower threshold for use. What are the spatial (and temporal) aspects of the data and how will these data be appropriately marked up for analysis? How will they be displayed within a mapping or GIS system, and what are the research questions that can be tested with such systems? Are the data already “spatial” and, if not, is this process automated or does it involve manual geo-rectification of materials (whether maps, historical photographs, videos, or oral histories)? How will this be done, by whom, and with an eye toward what standards for visualization and sharing within and across geo-browser applications?

Virtual simulation tools
Virtual worlds and three-dimensional modeling are tools for creating immersive environments for historical research and presentation. Again, what tools, software, and systems are being used and for what ends? What standards are being followed and how will various communities of practice engage with the models, simulations, and virtual worlds? Into which existing platforms will the models be placed and what kind of constraints do these platforms have?

Existing and emerging platforms for content management and authoring
How will the project manage existing content and support the growth of new content? Who are the authors of this proposed content, and how will they input it? Will they need to be technically savvy or does a browser interface enable their participation? What content management systems are used in the infrastructure or repository? Do the content management systems enable data to be shared across platforms and repositories?

Interface design as knowledge modeling
How is content displayed in the interface and how does a user navigate this content through the interface? What is the interface model and how does it express the knowledge model of the project and support its mission?
Game engines
Game economies have a role to play in scholarly work as well as in entertainment. Understanding the way game engines might be incorporated into a project to support participation is useful in certain circumstances.

Design for mobility and diversity
Does the project have dimensions that will make its content available on mobile applications or allow it to be repurposed for use in multiple contexts? Will the project work on different platforms? Will it work across cultural, linguistic, and social divides? Is the project ADA compliant, or does it have limitations for use by persons with disabilities?

Custom-built vs. off-the-shelf
Is part of the project’s research the designing and building of a platform or tool, and if so, can this work be repurposed or generalized from its customized use for a broader audience? If off-the-shelf solutions or standard software systems are being used, how were they chosen? Many times, Digital Humanities projects will be a combination of these two approaches, using existing APIs, standard content management systems, or blogging engines that can be variously customized and extended to address the specific needs of a project.

INTELLECTUAL
While the most visible intellectual element is usually the content, it is important to recognize that Digital Humanities projects present arguments and knowledge experiments in many different ways, often contributing to the creation of new knowledge through complex interactions, visualizations, data and data structures, and even code. Digital Humanities projects are not just about the content (although this is often primary), but also about the design of multiple levels of knowledge and argument from the operations on the back-end database to the front-end access points of a user interface.

Cross-cultural communication
Has consideration been given to the ways in which the design of the project will work cross-culturally? Is it meant to engage communities whose language and/or cultural orientation will be varied?

Generative imagination
Is the project generative and will it continue to create new content, dialogue, debate, and engagement, or is it largely a packaged repository of content meant to be viewed and used but not altered through contributions or extensions? Both of these are worthwhile and serve different needs, audiences, and intellectual goals.

Iterative and lateral thinking
How might the project change over time, and how will reflections on its limitations be used to improve each iteration? Can the project “play well” with other projects by sharing data through Web services frameworks or code modules through code-sharing repositories?

ADMINISTRATIVE
Resource allocation, reporting lines, clear job descriptions, goals, and outlines of responsibility for all involved are crucial and should be spelled out in a memorandum of understanding, at the very least.

Intellectual property
Have rights and copyright clearances for intellectual property been managed and documented? The terms for use of content should be posted clearly on the site and the contact information for inquiring about the use of intellectual property easy to locate.

Institutional circumstances
What is the institutional home for this project and who will be responsible for its maintenance after the project is built? Costs and impacts on human and material resources should be assessed.

Sustainability, funding, and preservation
Long-term plans for sustainability can include migration of the project into an institutional repository, or archiving on a server or paid service provider, or creation of a revenue stream and business model for its ongoing support and maintenance. Collaboration with institutional entities, particularly libraries and data repositories, will be necessary for preserving data created for and by a Digital Humanities project. Can the data be “outputted” easily from the project and archived in standard formats that are widely readable? What kind of data management plan has been created and how will it be implemented? Are there any privacy or security concerns that need to be addressed?
SPECIFICATION 4
LEARNING OUTCOMES FOR THE DIGITAL HUMANITIES

While core assessment standards remain continuous with those of traditional classroom-based humanities pedagogy, the Digital Humanities recognizes the importance of additional outcomes produced by hands-on, experiential, and project-based learning through doing. Digital Humanities pedagogy emphasizes teamwork and implies an increased role for peer assessment, as well as attention to a widened set of skills beyond text-based critical thinking and communication. Outcomes emphasize the ability to think critically with digital methods to formulate projects that have humanities questions at their core. Among the learning outcomes for the Digital Humanities, we prioritize the following:

Ability to integrate digitally driven research goals, methods, and media with discipline-specific inquiry
Acquire and demonstrate new fluencies from working within and navigating across various information platforms to conceptualize and carry out discipline-specific research. In practice, this means bringing together the traditional tools of humanistic thinking (interpretation and critique, historical perspective, comparative cultural and social analysis, contextualization, archival research) with the tools of computational thinking (information design, statistical analysis, geographic information systems, database creation, and computer graphics) to formulate, interpret, and analyze a humanities-based research problem.

Ability to understand, analyze, and use data
Demonstrate ability to synthesize data from multiple sources and harness multi-modal and multimedia technologies to produce digital arguments. Create capacity to formulate a research problem or question that lends itself to a computational approach. Develop ability to analyze problems by applying digital methods to humanities-based data and to interpret the results of digital analysis and computationally produced outcomes in a critically significant way.

Develop critical savvy for assessing sources and data
Judging the reliability of information and knowledge presented in a digital environment requires skills of discernment that examine the source, the authority, and the legitimacy of the digital material. With regard to data, this means examining how they were obtained, marked-up, stored, and variously made accessible to end-users.

Ability to use design critically
Understand the importance of knowledge design in communication, project development, and long-term preservation of digital data in ways that go beyond competence to a critical understanding of tools, their uses and limitations. Develop ability to use computational design thinking to produce forms of argument and expressions of interpretation.

Ability to assess information and information technologies critically
Interrogate digital, visual, and multi-modal information as evidence and critique its formation and validity. Critique the digital features of publications for a) scholarly relevance, b) best practices (e.g., online footnoting and citation, transparency of sources and data), c) attribution, d) authority and argumentative rigor. Understand and critique the epistemologies, worldviews, and structuring assumptions built into digital platforms, technologies, visualizations, and even computational languages.

Ability to work collaboratively
Think across disciplines, media, and methodologies on multi-authored research projects, project proposals, reports, and presentations aimed at both academic and nonacademic communities. Work in teams and participate in peer assessment. Acquire knowledge of the development life cycle of a Digital Humanities project and the ability to understand the needs and priorities of each phase of development. Meet aggressive deadlines and produce completed, fully functional digital prototypes, products, research tools, and publications. Identify and assess specific contributions and roles in collaborative projects for the purposes of peer review and intellectual credit.
Among its other activities, digital scholarship asserts the possibility of changed relations between consumers and producers of cultural work. Listed here is a set of considerations for addressing the cultural significance of humanities work, of transforming individuals into prosumers with critical insight into the workings of digital platforms. It also contains a handful of crucial points on which to advocate for Digital Humanities as a field.

Value of the cultural record

Humanistic scholarship is engaged with the production, preservation, and interpretation of the cultural record. Gauging the value of legacy materials and vetting the value of contemporary contributions is essential. In what ways does the project contribute to the cultural record (through preservation of materials, through interactions among contributors, through modes of public engagement, and so forth)?

Humanistic values/cultural significance and legitimacy

Demonstrating the value of interpretive methods and fundamental humanistic values as a counter to those of managed culture is an essential part of advocacy. How are the values and perspectives of the humanities a central part of the contributions of the project? What does the project contribute to the cultural record and how is this record legitimated (and by whom)?

Expanded notions of community and participation

For whom is this project of value and how are they engaged in its production, reception, or preservation? What notions of community and participation are central to the project? How is participation opened up, managed, and facilitated? How are decisions about permissions for participation, inclusion and/or exclusion, made and who makes them? And what are the limits, liabilities, and challenges that remain for participation without restriction?

Ability to analyze modalities of organization and presentation

Skills for understanding the ways media organize and present arguments are the foundations of informed use of information in any environment. The specific characteristics of digital media—in all their multiple, hybrid, and overlapping forms—need their own languages of assessment.

Reflexive awareness of coercive regimes

All media conceal as well as reveal the rules according to which they include certain kinds of expressions and prevent others. What is possible in any given digital space or project and what is not? We must be reflexive, dialectical thinkers aware that any “solution” always prevents certain questions and problems from arising, while privileging the very ones to which it is the answer. All technologies are coercive in some respect, and many have become so naturalized that we no longer consider them coercive but rather self-evident and necessary. It is up to digital humanists to denaturalize these technologies and create fissures for new, imaginative possibilities to come about.

Thinking beyond the ideologies of templates and structured discourse

How do we read the embodiment of power dynamics and relations in the organization of structured spaces and processes? The digital environment structures its ideological expression in the graphical interfaces, the data types, the database relations, as well as in the content of each project. Epistemological defamiliarization—the “making strange”—is an important feature of modern critical thought. The force of delight, surprise, and even alienation in the face of innovative inventions are the enlightening elements of contemporary imaginative thought. What can be shown to wake us from our passive consumption? And how do new ways of knowing, engaging, and designing become the very means to provoke inquiry, generate thought, deepen values, and contribute to the cultural record of our species?

From passive consumer to active prosumer

The role of reader and viewer varies from that of a consumer of material on display to that of a critically informed and discriminating prosumer of cultural materials. How does the project facilitate productive, critical engagement rather than passive consumption?

Creation of citizen-scholars and scholar-citizens

Many projects support the substantive participation of amateurs, scholars without professional affiliation whose expertise in a field is highly developed, informed, and driven by intellectual passion. In what ways does the project integrate (and also evaluate) a multiplicity of perspectives and knowledge-creators? How do scholars—traditionally conceived—become engaged with a broader public citizenry, and, similarly, how are citizens engaged in the intellectual project of knowledge creation as scholars?
AFTERWORD: NOTES ON PRODUCTION

THIS BOOK is a metalogue: a dialogue that assumes the form of that which it discusses. In the present case, we knew that collaboration would be a key theme, so we entered into the construction of this volume with the meta-issues not only in mind, but also in flux. We’ve noted elsewhere that we did not want this to be a collection of disparate essays, or even a whole with individually signed parts. Instead, we strove to create a consistent, if choral, voice. We also wanted the book’s design to be integral to its writing, to acknowledge the inseparability of form and content. From our very first working session we each contributed to the shape of the book, thus we are all listed as full co-authors, a signal that multiple types of knowledge formation require multiple modes of authorship.

The first step toward crafting this voice was, of course, the composition of the team itself. Here the evolution was organic. Each of us had a past working relationship with at least one other member of the team, and we found ourselves coming into ever-increasing contact thanks to a series of allied initiatives concerning the impact of technology on the academy. The convergence accelerated when Jeffrey came down from Stanford to spend the 2008–09 academic year at UCLA co-teaching a mixed reality seminar with Todd. The seminar, entitled “What Is(n’t) Digital Humanities?,” was funded by the Mellon Foundation and was part of a Mellon-sponsored initiative at UCLA to support transformative approaches to the humanities. During this period they co-wrote the first draft of the “Digital Humanities Manifesto” on Commentpress, opening it up initially to a few other contributors, including both Peter and Johanna, and, subsequently, to contributions, annotations, and even fulminations from seminar participants and the entire World Wide Web.

The following academic year, with the support of the University of California Humanities Research Institute, Peter organized the conference “Nowcasting: Design Theory and Digital Humanities,” in which all five co-authors participated and the team convened for the first time. That year, Jeffrey was transitioning from Stanford to Harvard; Todd, Johanna and Peter were steering a new Digital Humanities undergraduate minor and graduate certification through UCLA’s academic senate; and Anne was co-writing “Digital Learning, Digital Scholarship and Design Thinking” with Holly Willis. The next year, with the UCLA Program established and metaLAB launching at Harvard, all five of us gathered in Cambridge for “Digital Humanities 2.0: A Conversation About Emerging Paradigms in the Arts and Humanities in the Information Age”: an evening in which we each presented our own work within a unified framework. In other words, we had long been testing out our ideas and developing a rapport with one another while at the same time marshaling foundation and institutional support—from the departmental level all the way up through university-wide initiatives.
For two days before the event, we held the first of several charrettes. A few words of explanation are perhaps in order. In the 19th century, architecture professors at the École des Beaux-Arts in Paris were known for conducting a workshop exercise known as the charrette, in which small groups of students were given a design brief to resolve within a short time frame. As the deadline approached, a charrette (or “cart”) made its rounds to collect each group’s designs. Students were often observed leaping into the cart along with their submissions, working passionately to add finishing touches, even as the cart bounced along the streets of Paris. We looked to the charrette, an abiding feature of architecture and design training even today, as a fitting means to undertake the writing of a book about the centrality of design to the Digital Humanities. The challenge was to design the book conceptually and graphically in a form that emerged from the ideas.

We worked at the Harvard Graduate School of Design with white boards, laptop computers, and a projector whose long cable we threw back and forth to whoever needed to project something. We began by identifying the areas we wished to frame and then broke into alternating groups to develop headers into lists and lists into structured chapters. These were then posted on white boards as we took turns typing out expanding outlines of the book. Guided in part by Anne’s persistent attention to the shape of our arguments and organization of text by theme and format, the design infrastructure began to emerge in the process. By the time we took the dais at the Harvard Humanities Center on the evening of the third day, it felt as if we’d collectively entered the state of focused motivation that social psychologist Mihaly Csikszentmihalyi calls “flow.”

To keep the flow flowing we considered a number of production models. We thought of books developed by means of crowd-sourcing, like McKenzie Wark’s Gam3r 7h30ry, an online initiative carried out with the Institute for the Future of the Book in 2006 that came out as Gamer Theory with Harvard University Press in 2007, and Kathleen Fitzpatrick’s Planned Obsolescence: Publishing, Technology, and the Future of the Academy which was put through an open peer-review process on MediaCommons before its publication with NYU Press in 2011. Though some of the early ideas for the book appeared in condensed form in the “Digital Humanities Manifesto,” we wanted to keep the face-to-face mindmeld alive throughout the entire writing process, experimenting with a variety of private document-sharing platforms and relying upon regular meetings either in person or via Skype.

We imagined a shared-access manuscript as the best analogue to what we had been developing in person, but found that the main platforms were less robust than expected, and, more importantly, that the proliferation of iterations hurt more than the transparency of the compositional process helped. After starting with Google
Docs, we ended up using email and tracking changes in attached word processing documents to create a round-robin writing-and-editing loop. When one person finished drafting a chapter or section, he or she would pass it on to another, who would edit and amend it, and so on. As the round robin proceeded, the book grew with both a speed and unified character that came as a surprise to all of us.

By the time there existed a beta version of the whole, the full manuscript was run through another round of editing by team members. Each iteration was passed on with changes visible to all. The next editor/author/designer in the sequence treated this as a “new” version, looking back at other changes only briefly before moving forward with the iterative writing process. The most uncanny effect of the process was running across lines, paragraphs, or whole sections you yourself had authored but which now were subtly tweaked or appeared in unfamiliar new contexts. We came to analogize this to crossing paths with an amiable ex-lover at a party. There was familiarity and affection, but also a new sense of remove.

While the manuscript was still underway, Anne spent the summer of 2011 at Art Center working on a research project called “MICRO MEGA META.” The project investigated the future of scholarly production through the creation of speculative prototypes and design fiction. Both Johanna and Peter spoke to her graduate student researchers about the overarching issues and how they related to the book project. The student researchers, in turn, worked with drafts of the book to design digital environments built upon humanities values. This interaction led to a second charrette at Art Center which was devoted to thinking through the structures of the text and how they might be embodied through the design of the book.

Making the shift from the linear vertical scroll of word processing software to the spatiality and recto-verso of the codex altered the rhythm and organization of the text. We worked with a reader in mind; revisions made the rounds, sections were dropped or altered or moved. Lastly, Anne and Peter spent two days “writing to the design”—editing and embellishing to make the most of the semantic changes brought about through line breaks, recomposed information hierarchies, navigational maneuvers, and spatial relationships. Though Anne created the actual page layouts, the book’s design had been underway since that first meeting at Harvard.

The book in your hands is the result of several years of collaborative composition, design, and writing. It will have future lives and iterations as a transmedia artifact, as it migrates into various digital forms and gives rise to its own generative scholarship. We see this book as a beginning, an opening to create and re-create that deep linkage that we call Digital_Humanities.
We offer this brief inventory of references and resources as entry points into the expanding field of Digital Humanities. The book’s ideas are informed by a vast network of individuals, projects, and organizations that have built the field as it exists today, only a handful of which are cited in the text. Rather than provide a map or a bibliography that represents that network, or any of the networks that make the humanities digital, we refer you here to a list of living resources (which are always subject to change).

In that spirit, individual institutions, labs, centers, and projects are not listed here, given that many online compendia exist and these areas are developing so rapidly that any print work categorizing them risks instant obsolescence.

**Research tools, technologies, and platforms**

The links below point not only to digital tools and libraries, but also to initiatives concerned with emerging specifications and best practices.

- ARTStor Digital Library  [www.artstor.org](http://www.artstor.org)
- Bamboo DiRT (Digital Research Tools) provides a fairly comprehensive inventory of digital research tools organized by category (ranging from data analysis and text mining to visualization and mapping); it is an integral part of Project Bamboo [dirt.projectbamboo.org](http://dirt.projectbamboo.org)
- Creative Commons  [creativecommons.org](http://creativecommons.org)
- Europeana  [www.europeana.eu](http://www.europeana.eu)
- Fair Cite Initiative  [faircite.wordpress.com](http://faircite.wordpress.com)
- Fedora Commons  [www.fedora-commons.org](http://www.fedora-commons.org)
- HathiTrust Digital Library  [www.hathitrust.org](http://www.hathitrust.org)
- Mukurtu  [www.mukurtu.org](http://www.mukurtu.org)
- Open Access Directory  [oad.simmons.edu](http://oad.simmons.edu)
- Project Gutenberg  [www.gutenberg.org](http://www.gutenberg.org)
- Public Knowledge Project  [pkp.sfu.ca](http://pkp.sfu.ca)
- Spatial Humanities  [spatial.scholarslab.org](http://spatial.scholarslab.org)
- Text Encoding Initiative  [www.tei-c.org](http://www.tei-c.org)
- Voyant Tools  [voyant-tools.org](http://voyant-tools.org)

**Associations and institutions**

The following list represents thousands of scholars and centers worldwide, providing leadership and community as well as technical and infrastructural support. Foundations and scholarly societies, such as the MLA, AHA, and ACLS, have also invested in research, teaching, and institutional formations in support of the Digital Humanities.

- Alliance of Digital Humanities Organizations  [www.digitalhumanities.org](http://www.digitalhumanities.org)
- Arts-Humanities Net  [www.arts-humanities.net](http://www.arts-humanities.net)
- Association for Computers and the Humanities  [www.ach.org](http://www.ach.org)
- Association for Literary and Linguistic Computing  [www.allc.org](http://www.allc.org)
- Council on Library and Information Resources  [www.clir.org](http://www.clir.org)
- Digital Library Federation  [www.diglib.org](http://www.diglib.org)
- Digital Research Infrastructure for the Arts and the Humanities  [www.dariah.eu](http://www.dariah.eu)
- Electronic Literature Organization  [eliterature.org](http://eliterature.org)
- HASTAC (Humanities, Arts, Sciences, and Technology Advanced Collaboratory)  [www.hastac.org](http://www.hastac.org)
- Institute for the Future of the Book  [www.futureofthebook.org](http://www.futureofthebook.org)
- Institute of Museum and Library Services  [www.imls.gov](http://www.imls.gov)
- MediaCommons  [mediacommons.futureofthebook.org](http://mediacommons.futureofthebook.org)
- NEH Office of Digital Humanities  [www.neh.gov/odh](http://www.neh.gov/odh)
- THATCamp: The Humanities and Technology Camp  [thatcamp.org](http://thatcamp.org)

**Collections, series, journals, and forums**

Numerous online bibliographies exist to help scholars address their research and teaching needs, including ones developed and maintained by the institutions previously listed. Edited collections can also provide excellent points of access. Recent publications include:

Several publication series have been launched by university presses, as well as partnerships between university presses and foundations that envisage the creation of digital publishing platforms. Following are just a few of the growing number of specialized journals, forums and discussion groups dedicated to Digital Humanities work that can be found online:

Association for Computers and the Humanities QA digitalhumanities.org/answers

Digital Humanities Now digitalhumanitiesnow.org

Digital Studies/Le champ numérique www.digitalstudies.org

Humanist Discussion Group www.digitalhumanities.org/humanist

Literary and Linguistic Computing llc.oxfordjournals.org

MediaCommonsPress mediacommons.futureofthebook.org/mcpress

Vectors: Journal of Culture and Technology in a Dynamic Vernacular vectors.usc.edu

Sources cited in the text

Aristotle, The Poetics, introduced by Francis Fergusson (New York: Hill and Wang, 1961), section IX.


Earlier versions available online:
www.plannedobsolescence.net


Jürgen Habermas, The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society, trans. Thomas Burger, with Frederick Lawrence (Cambridge, MA: MIT Press, 1991)

N. Katherine Hayles, design by Anne Burdick, Writing Machines, (Cambridge, MA: MIT Press, 2002).


Many campuses are witnessing the birth of a new field of inquiry called the digital humanities, which applies computational methods to humanistic inquiry, provides new methods for presenting scholarship online, and encourages novel forms of collaboration. Occurring within this new universe of practice are debates on what exactly defines the digital humanities. How does it differ from the non-digital humanities? How might it fit into the evolving landscape of higher education? The name itself is under constant assessment. Should we call it something else? Digital scholarship? Digital liberal arts? Is the movement a revolution—or simply an evolution out of the world of humanities computing? Does it have sufficient gravitas and engagement in the critical questions of the humanities to actually qualify as a new discipline? Or is it a temporary moment in our disciplinary history, one that will serve as scaffolding for what the humanities will become in the 21st century?
Rather than reenact these important debates here, I want to instead consider how the digital humanities, and technology in general, call into question the distinctions that we make as we organize our work on our campuses and within our various professions. We all agree, more or less, that there is a difference between science and humanities, between teaching and research, between data and analysis, between scholarly and popular, between liberal arts and practical, between big and small. And yet we also know that these distinctions—useful for organizing our work, creating our budgets, and even defining our institutional and professional missions—are provisional. If we probe closely, they are actually two sides of the same coin and are not, in fact, in opposition to each other. A reading of the literature surrounding the birth of the digital humanities clearly reveals this complementarity. The digital humanities, and perhaps technology-fueled inquiry in general, dismantle the either/or and replace it with a both/and.

### Science or Humanities :: Science and Humanities

C. P. Snow famously described the two-culture problem of higher education in 1959: that within higher education there exist scientists who are interested in a very different set of problems than are the humanists; and that the very language and worldviews are so wildly disparate that scientists and humanists might as well operate on parallel campuses.

The digital humanities continue the tradition set by humanities computing in using computational methods developed largely within the sciences and applying them to questions and problems within the humanities. From an operational point of view, in looking at the work taking place within a digital humanities lab, we see the familiar set of activities that we see in a physics or biology lab: students and faculty gathering data, using software (often open-source or homegrown) to analyze that data, and visualizing results in graphical forms to test their hypotheses. They grapple with the usual IT problems: how to store their data, what formats to use, how to learn the various software tools, how to stay current on the best methods of analysis, and how to find the financial resources needed to keep this operation afloat. On many campuses, digital humanists have also found fruitful collaborations by working with computer scientists and other science colleagues interested in the vexing computational and information management problems that arise in the digitization and analysis of massive amounts of data.

That said, it would be facile to suggest that the digital humanities rep-
Teaching or Research ::

**Teaching and Research**

In most cases, there is a very clear and well-acknowledged difference between the activities of teaching and research. When explaining derivatives to students in an introductory calculus course, the professor of mathematics is teaching, and when that same professor is working with a colleague on a proof to be published in a journal, she is doing research. Each institution, depending on its mission and resources, finds a balance in how its faculty members spend their time. And there is a well-understood and highly-valued connection between the two activities. For many faculty, the teacher-scholar model is the ideal, with the classroom being a perfect place to try out the ideas generated in one's research and with research being generative not just for contributions to the discipline but also for classroom engagement.

Within the digital humanities, however, distinctions between teaching and research are blurred. The digital humanities draws on the practice, used within the sciences, of providing students with research experiences that reinforce and extend classroom learning in important ways and that directly contribute to the research taking place in the faculty member's lab. Staff at digital humanities labs are discovering that this model works well with students who are brought in as co-investigators on humanities-focused questions, doing meaningful work on large, complicated research projects.

The work of digital scholarship actively complements teaching. The products of digital scholarship are often digital works that can be integrated into the classroom experience, offering important access to primary-source materials and, in many cases, providing new tools and analytical forms that can be assigned alongside traditional secondary literature. The discrete, granular nature of this scholarship has affinities for remix and reuse that are not typical of the traditional scholarly output in the humanities: the journal article and the monograph, written by experts for experts.

Data or Analysis ::

**Data and Analysis**

This leads to a third distinction that digital humanities publications make problematic. Although some of the scholarship that results from digital humanities work takes traditional forms (the monograph, the journal article, and their current digital counterpart, the PDF), the examples of scholarship that is “born digital” and can be read only on-screen are myriad and increasing in number. In addition to putting forth the traditional scholarly argument, these publications provide access to the underlying data that inform those arguments: media databases, GIS data sets, full-text corpora, marked-up editions, animations, other forms of multimedia, and software tools for inquiry, analysis, and presentation. As Tom Sehenfeldt has noted, it is not particularly helpful, at this early stage of the development of the digital humanities, to criticize the field for its focus on building databases and tools at the expense of doing “real” scholarship. The creation of these databases and tools can itself constitute actual scholarship and, if not that, can still be critically important for the ability of the field to eventually turn its attention to conducting more traditional forms of scholarship.

Scholarly or Popular ::

**Scholarly and Popular**

In thousands of classrooms on any given day, librarians are teaching undergraduates the difference between scholarly and popular literature. Looking at the extreme cases, clearly we want our future engineers to learn to build bridges not by consulting some teenager's blog but, rather, by carefully studying the scholarly record that has been created through the process of peer review. Digital scholarship, however, has not yet fully developed a process for vetting its born-digital publications. The good news is that important work is taking place in examining what open-source peer-review methods might look like, in developing alternative metrics, and in articulating evaluation standards that are appropriate for these new formats and genres. Libraries and university presses are looking into launching new born-digital presses that can take advantage of the nimble, expressive, and analytical affordances of the new technologies while still providing the assurances of peer review and the continuity of an uninterrupted chain of scholarly communication.

Liberal Arts or Practical ::

**Liberal Arts and Practical**

Many in the discipline feel that the digital humanities needs a new name. William Pannapacker, from Hope College, has argued that it should be called the digital liberal arts. He asserts that the work of the digital humanities is, by its very nature, interdisciplinary and that
the digital liberal arts will provide a more student-centric “big tent” to cover the entire campus. Embedded in Pannapacker’s argument, and consistent with general findings from practitioners, is the idea that student work in the digital humanities (or the digital liberal arts) (1) challenges the distinction often made between liberal arts education and more practical or vocational education, (2) makes more apparent the practical skills already engaged through the humanities (e.g., critical thinking, writing, information organization), and (3) adds a new digital, analytical component that was previously more dominant in other disciplines. By engaging in the technical but also conceptual activities of organizing and implementing work in the digital humanities, students are learning important, transferable skills and capabilities that will serve them well when they leave campus to become not only members of the workforce but also citizens of an increasingly connected and digital planet.

**Big or Small:**

**Big and Small**

Pannapacker’s argument is also one that confronts some of the elitism that conflicts with the largely democratic and open ethos of the digital humanities. The digital humanities today is to be found largely, but certainly not exclusively, at well-funded research universities. Pannapacker argues that the digital humanities in fact fits neatly into the worldview of small colleges focused on residential, liberal arts education. At the same time, organizations such as the Council on Library and Information Resources (CLIR) are asking questions about “Coherence At Scale,” wondering whether or not it is possible to orchestrate and coordinate the myriad large- and small-scale efforts into something that might resemble a coherent, aligned strategy for moving forward in an efficient manner that balances innovation against the long-term needs for sustainability and the preservation of the scholarly record. To complicate matters further, organizations such as the Humanities, Arts, Science, and Technology Alliance and Collaboratory (HASTAC) are challenging higher education to take more seriously the connections between the digital humanities and online learning, making the point that distinctions between these are not all that meaningful in the endlessly recombinable world of digital media. An infectious enthusiasm surrounds those who have embraced the digital humanities movement. As I have tried to suggest, the digital humanities represents both a fascinating case study in how a new technology-fueled practice can traverse traditional boundaries and an opportunity to explore, rethink, and redefine our assumptions about organizational structures and conceptual distinctions.

**Conclusion**

Developing a campus digital humanities strategy requires thinking through a set of interconnected and complex issues, many of which are playing out well beyond the confines of any individual institution. The “crisis of the humanities” is forcing difficult conversations about the role that the humanities in general has in the future of higher education. The “crisis in scholarly communication” is putting immense pressure both on publishers and on libraries. At the same time, the dramatic increase in adjunct and non-tenure-track appointments calls into question the institutional commitment to research and scholarly pursuit. All of this is taking place within the larger financial, if not existential, crisis in higher education as we experiment with new delivery models to try to find our way out from under what William Bowen has described as the “cost disease.”

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Capturing the Visible Evidence of Invisible Learning

Posted on October 13, 2014

by Randy Bass and Bret Eynon

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Originally Posted January 7th, 2009

Note: This is a synthesis essay for the Visible Knowledge Project (VKP), a collaborative project engaging seventy faculty at twenty-one institutions in an investigation of the impact on technology on learning, primarily in the humanities. As a matter of formatting to the Academic Commons space, this essay is divided in three parts: Part I (Overview of project, areas of inquiry, introduction to findings); Part II (Discussion of findings with a focus on Adaptive Expertise and Embodied Learning); Part III (Discussion of findings continued with a focus on Socially Situated learning, Conclusion). A full-text version of this essay is available as a pdf document here.

Here, in this forum as part of Academic Commons, the essay complements eighteen case teaching, learning, and new media technologies. Together the essay and studies constitute the digital volume “The Difference that Inquiry Makes: A Collaborative Case Study of Learning and Technology, from the Visible Knowledge Project.” For more information about VKP,
Déjà 2.0
Facebook. Twitter. Social media. YouTube. Viral marketing. Mashups. Second Life. PBWikis. Digital Marketeers. FriendFeed. Flickr. Web 2.0. Approaching the second decade of the twenty-first century, we’re riding an unstoppable wave of digital innovation and excitement. New products and paradigms surface daily. New forms of language, communication, and style are shaping emerging generations. The effect on culture, politics, economics and education will be transformative. As educators, we have to scramble to get on board, before it’s too late.

Wait a minute. Haven’t we been here before? Less than a decade ago, we rode the first wave of the digital revolution—email, PowerPoint, course web pages, digital archives, listservs, discussion boards, etc. As teachers and scholars, we dove into what is now called Web 1.0, trying out all sorts of new systems and tools. Some things we tried were fabulous. Others, not so much. Can we learn anything from that experience? What insights might we garner that could help us navigate Web 2.0? How can we separate the meaningful from the trivial? How do we decide what’s worth exploring? What do we understand about the relationship of innovations in technology and pedagogy? What can we learn about effective ways to examine, experiment, evaluate, and integrate new technologies in ways that really do advance learning and teaching?

The teaching and research effort of the Visible Knowledge Project (VKP) could be a valuable resource as we consider these questions. Active from 2000 to 2005, VKP was an unusual collective effort to initiate and sustain a discipline-based examination of the impact of new digital media on education. A network of around seventy faculty from twenty U.S. colleges, primarily from American history and culture studies departments, gathered not only to experiment with new technologies in their teaching, but also to document and study the results of their inquiries, using the tools of the scholarship of teaching and learning. In this collaborative and synoptic case study, under the title *The Difference that Inquiry Makes*, we try to capture and make sense of the visible evidence of this relatively invisible learning as it emerged over five (and more) years of collaborative classroom inquiry. We share participants’ reports on key elements of the VKP inquiry, and integrate their reports into a framework that can help us learn from this experience as we navigate a fast-changing educational landscape.

**Invisible Learning**

What do we mean by “invisible learning?” We use this phrase to mean at least two things. First, it points us to what Sam Wineburg, in his book *Historical Thinking and Other Unnatural Acts*, talked about as “intermediate processes,” the steps in the learning process that are often invisible but critical to development. All too often in education, we are focused only on final products: the final exam, the grade, the perfect research paper, mastery of a subject. But how do we get students from here to there? What are the intermediate stages that help students develop the skills and habits of master learners in our disciplines? What kinds of scaffolding enable students to move forward, step by step? How do we, as educators, recognize and
support the slow process of progressively deepening students’ abilities to think like historians and scholars? In VKP, from the beginning, we tested our conviction that digital media could help us to shine new light on—to make visible—and to pay new attention to these crucial stages in student learning.

Second, by invisible learning we also mean the aspects of learning that go beyond the cognitive to include the affective, the personal, and issues of identity. Cognitive science has made great strides in recent years, scanning the brain and understanding everything from synapses and neurons to perception and memory. Educators are still struggling to grasp the implications of this research for teaching and learning. However, perhaps because it is less “scientific,” higher education has paid considerably less attention to (and is even less well prepared to deal with) the role of the affective in learning and its relationship to the cognitive.

How does emotion shape engagement in the learning process? How do we understand risk-taking? Community? Creativity? The relationship between construction of knowledge and the reconstruction of identity? In VKP we explored the ways that digital tools and processes surfaced the interplay between the affective and the cognitive, the personal and the academic.

Visible Evidence
Education at all levels has largely taken on faith that if teachers teach, students will learn—what could be seen as a remarkable, real-life version of “If you build it, they will come.” In recent years, calls for greater accountability have produced a new emphasis on standardized testing as the only appropriate way to assess whether students are learning. Meanwhile, growing numbers of faculty in higher education have taken a different approach, engaging in the scholarship of teaching and learning—using the tools of scholarship to study their own classrooms—to deepen their understanding of the learning process and its relationship to teacher practice. Spurred by the ideas of Ernest Boyer and Lee Shulman of the Carnegie Foundation for the Advancement of Teaching, faculty from many disciplines have posed research questions about student learning, gathered evidence from their classrooms, and gone public with their findings in countless conference presentations, course portfolios, and scholarly journals. This movement, with its focus on classroom-based evidence, provided key tools and language for the Visible Knowledge Project. It allowed VKP faculty to study the impact of new technologies on learning and teaching, and it also helped us frame questions about problems and practice, inquiry and expertise that remain critical as we move into a new phase of technological innovation and change.

The Visible Knowledge Project
The Visible Knowledge Project emerged in 2000 from the juxtaposition of these two powerful yet largely distinct trends in higher education—the scholarship of teaching and learning movement and the initial eruption of networked digital technologies into the higher education classroom. Responding to a dynamic combination of need and opportunity, faculty engaged in multi-year teaching and learning research projects, examining and documenting the ways the use of new media was reshaping their own teaching and patterns of student learning.

Participating faculty came from a wide range of institutions, from community colleges and
private liberal arts colleges to research universities; from Georgetown and USC to Youngstown State, the University of Alabama, and City University of New York (CUNY). Meeting on an annual basis, and interacting more frequently in virtual space, we formed our research questions representing a broad spectrum, shared ideas about research strategies, discussed emerging patterns of our evidence, and formulated our findings. The digital resources used ranged from Blackboard and PowerPoint to interactive online archives and Movie Maker Pro. The VKP galleries (https://digitalcommons.georgetown.edu/blogs/vkp/) provide a wealth of background information, including lists of participants, regular newsletters, and reports from more than thirty participants, as well as a number of related resources and meta-analyses.³

The VKP ethos was formed by a belief in the value of messiness, of unfolding complexity, of adventurous, participant-driven inquiry that would inform the nature of the collective conversation. A few scientists and social scientists entered the group and helped create exciting projects, but the vast majority of the participants were from the fields of history, literature, women’s studies and other humanist disciplines. While technology was key to our raison d’être, our inquiries often evolved to focus on issues of pedagogy that transcended individual technologies. We wanted to learn about teaching, to learn about learning. We wanted to go beyond “best practice” and “what worked” to get at the questions about why and how things worked—or didn’t work. In some cases, we went further, rethinking our understanding of what it meant for something to “work.” Our questions were evolving, shaped by the exigencies of time and funding as well as our on-going exchange and new technological developments. We struggled with ways to nuance and realize our inquiries, to come up with workable methods and evidence that matched our changing and, we hoped, increasingly sophisticated questions.

Over the course of the Project, we found that participants’ teaching experiments started to group in three areas:

1. Reading–Engaging ideas through sources/texts: As VKP took shape at the end of the twentieth century, the great museums, universities, and research libraries of this country were mounting their collections on the Web. Web sites such as the American Memory Collection of the Library of Congress vastly expanded the availability of archival source materials on the Web. It was a time, as Cathy Davidson put it recently, of digitally-driven “popular humanism.”⁴ Responding to this opportunity, VKP’s historians and culture studies faculty explored the effectiveness of active reading strategies using primary sources, both textual and visual, for building complex thinking. Introducing students to the process of inquiry, faculty tested combinations of pedagogy and technology designed to help students “slow down” their learning, interpret challenging texts and concepts, and engage in higher order disciplinary and interdisciplinary practices.

For example, Susan Butler, teaching an introductory history survey at Cerritos College, had her students examine primary sources on different facets of the Trail of Tears, made available online by the Great Smoky Mountains National Park, PBS, and the
Cherokee Messenger; as students grappled with perspective and the evolving definition of democracy in America, Butler examined evidence of the ways that scaffolded learning modules that incorporated online primary sources could expand students’ capacity for critical analysis. Meanwhile, Sherry Linkon at Youngstown State used online archives to help students in her English course create research papers that contextualized early twentieth-century immigrant novels. And Peter Felten at Vanderbilt integrated online texts, photographs and videos into a history course on the 1960s, analyzing the ways students did—or didn’t—apply critical thinking skills to visual evidence.

Across the board, the focus was less on “searching” and “finding” than on analyzing, understanding, and applying evidence to address authentic problems rooted in the discipline. Testing innovative strategies, faculty asked students to model the intellectual behaviors of disciplinary experts, focusing earlier and more effectively on the learning dimensions that characterize complex thinking.

(For sample projects addressing these questions, see: http://cndls.georgetown.edu/crossroads/vkp/themes/poster_showcase_reading.htm)

2. **Dialogue–Discussion and writing in social digital environments**: As VKP faculty moved into the world of Blackboard and Web-CT, they explored ways that discussion and social writing in online environments can foster learning. Projects explored strategies for using online communication to make the intermediate processes of learning more visible and to provide opportunities for students to develop personal and academic voice. For example, Mills Kelly, teaching a Western Civilization survey at Virginia’s George Mason University, focused on the possibilities of using online tools, including the WebCT discussion board and a special GMU Web Scrapbook, as tools for enhancing collaborative learning. Meanwhile, Ed Gallagher at Lehigh University tested the impact of his detailed and creative guidelines for students in prompting more interactive and substantial discussion in an online context.

In general, carefully structured online discussion environments provided students and faculty a context in which to think socially; they also allowed discussion participants to document, retrieve and reflect on earlier stages of the learning process. This ability to “go meta” offered a new way for students and faculty to engage more deeply with disciplinary content and method. Highlighting the scaffolding strategies that might maximize student learning, these projects gathered evidence of learning that reflected the social and affective dimensions of these digitally-based pedagogical practices. (For sample projects, see http://cndls.georgetown.edu/crossroads/vkp/themes/poster_showcase_discussion.htm)

3. **Authorship–Multimedia construction as experiential learning**: As multimedia authoring became easier to master in these years, faculty became interested not only in creating multimedia presentations and Web sites; they also sought to develop ways to put these
tools into the hands of students. Many VKP scholar-teachers were guided by the constructivist notion that learning deepens when students make knowledge visible through public products. In the projects clustered here, student authorship takes place in various multimedia genres of the early twenty-first century, including digital stories and digital histories, Web sites and PowerPoint essays, historically-oriented music videos, electronic portfolios and other historical and cultural narratives. The emergent pedagogies explored by these scholar-teachers involve multiple skills, points of view, and collaborative activities (including peer critique). For example, Patricia O’Connor had her Appalachian literature students at Georgetown University create Web pages about Dorothy Allison’s *Bastard Out of Carolina*, annotating particular phrases and creating links to historical sources and images, while she investigated the ways that “associative thinking” shaped students’ ability to make nuanced speculations about literary texts.

Meanwhile, Tracey Weis at Pennsylvania’s Millersville University and several faculty at California State University at Monterey Bay gathered evidence on the cognitive and emotional impact of student construction of short interpretative “films,” or what we came to call “digital stories.” Examining the qualities of student learning evidenced through such assignments, these projects spotlight issues of assessment and the need to move beyond the narrowly cognitive quiz and the critical research essay to find ways to value creativity, design, affect, and new modes of expressive complexity.

Naturally, these three areas of classroom practice–critically engaging primary sources, social dialogue, and multimedia authorship–converged in all kinds of ways. Some of the richest and most intriguing projects engaged students in a scaffolded process of collaborative research and writing, laying the groundwork for multimedia-enhanced performances of their learning. Our fluid categories were defined and redefined by the creativity of our faculty as they experimented within them.

The key to faculty innovations in VKP was not merely trying new teaching strategies but looking closely at the artifacts of student work that emerged from them, not only in traditional summative products such as student writing, but in new kinds of artifacts that captured the intermediate and developmental moments along the way. What did these artifacts look like? They included video evidence of students working in pairs on inquiry questions, as well as student-generated Web archives and research logs; they included careful analysis of discussion threads in online spaces and student reflections on collaborative work; they included not only new forms of multimedia storytelling but evidence of their authoring process through interviews and post-production reflections about their intentions and their learning. One of the consequences emerging from these new forms of evidence was that, as faculty looked more closely and systematically at evidence of learning processes, those processes started to look more complex than ever. The impact of transparency, at least at first, seemed to be complexity, which can be unsettling in many ways.

**Pieces of Insight**
This phenomenon had a significant impact on the kinds of findings and claims that emerged from this work. We set out looking for answers (“what is the impact of technology on learning?”) and what we mostly found were limited claims about impact, new ways of looking at student learning, and often dynamic new questions. In fact, the VKP projects followed a pattern typical in faculty inquiry. Whatever the question that initiates the inquiry, it often changes and deepens into something else. For example, Lynne Adrian (University of Alabama) started off investigating the role of personal response systems (“clickers”) in a large enrollment Humanities course to see if the use of concept questions would increase student engagement, but was soon led to reflect much more interestingly on the purpose of questions in class and the very nature of the questions she had been asking for more than twenty years. Similarly, Joe Ugoretz (Borough of Manhattan Community College), in an early inquiry, hoped to study the benefits of a free-form discussion space in an online literature course, but got frustrated because the students would frequently digress and stray off topic; finally it occurred to him that the really interesting inquiry lay in learning more about the nature of digressions themselves, considering which were productive and which were not. The changing nature of questions, and the limited nature of claims, is not a flaw of faculty inquiry but its very nature. John Seely Brown describes the inevitable way that we build knowledge around teaching: “We collect small fragments of data and struggle to capture context from which this data was extracted, but it is a slow process. Context is sufficiently nuanced that complete characterizations of it are extremely difficult. As a result, education experiments are seldom definitive, and best practices are, at best, rendered in snapshots for others to interpret.”

Here is where the power of collaborative inquiry came into play. That is, what emerged from each individual classroom project was a piece of insight, a unique local and limited vision of the relationship between teaching and learning that yet contributed to some larger aggregated picture. We had, in the microcosm of the Visible Knowledge Project, created our own “teaching commons” in which individual faculty insights pooled together into larger meaningful patterns. Each of these snapshots is interesting in itself; together they composite into something larger and significant. What follows below is our effort at putting together the snapshots to create a composite image in which we recognize new patterns of learning and implications for practice.

**A Picture of New Learning: Cross-Cutting Findings**

Collectively, what emerged from this work was an expansive picture of learning. Although we started out with questions about technology, early on it became clear that the questions were no longer merely about the “impact of tools” on learning; the emergent findings compelled us to confront the very nature of what we recognized as learning, which in turn fed back into what we were looking for in our teaching. Over the years, faculty experienced iterative cycles of innovation in their teaching practice, of reflection on an increasingly expansive range of student learning, and of experimentation shaped by the deepening complexity (and at times befuddlement) that emerged from trying to read the evidence of that learning. From this spiral of activity developed a research framework with broad implications for the now-emergent Web 2.0 technologies. We have come to articulate this range of cross-cutting findings under the
headings of three types of learning: adaptive, embodied, and socially situated.

Briefly, by adaptive learning we mean the skills and dispositions that students acquire which enable them to be flexible and innovative with their knowledge, what David Perkins calls a “flexible performance capability.” An emphasis on adaptive capacities in student learning emerged naturally from our foundational focus on visible intermediate processes. What became visible were the intermediate intellectual moves that students make in trying to work with difficult cultural materials or ideas, illuminating how novice learners progress toward expertise or expert-like thinking in these contexts.

Our recognition of the embodied nature of learning emerged from this increased attention to intermediate processes—the varied forms of invention, judgment, reflection—when we realized that we were no longer accounting for simply cognitive activities. Many manifestations of the affective dimension of learning opened up in this intermediate space informed by new media, whether it was the way that students drew on their personal experience in social dialogue spaces, or the sensual and emotional dimensions of working with multimedia representations of history and culture. In these intermediate spaces, dimensions of affect such as motivation and confidence loomed large as well. We have come to think of this expansive range of learning as embodied, in that it pointed us to the ways that knowledge is experienced through the body as well as the mind, and how intellectual and cognitive thinking are embodied by whole learners and scholars.

Inasmuch as this new learning is embodied, similarly is it socially situated. Influenced by the range of work on situated learning, communities of practice, and participatory learning, our work with new technologies continuously brought us to see the impact new forms of engagement through media had on the students’ relative stance to learning. This effect was not merely a sense of heightened interest due to the novelty of new forms of social learning. Rather, what we were seeing was evidence of the ways that multimedia authoring, for example, constructed for students a salient sense of audience and public accountability for their work; this, in turn, had an impact on nearly every aspect of the authoring process—visible in the smallest and largest compositional decisions. The socially situated nature of learning became a summative value, capturing what Seely Brown calls “learning to be,” beyond mere knowledge acquisition to a way of thinking, acting, and a sense of identity.

These three ways of looking at pedagogies—as adaptive, embodied, and socially situated—together help constitute a composite portrait of new learning. Each helps us focus on a different dimension of complex learning processes: adaptive pedagogies emphasizing the developmental stages linking learning to disciplines; embodied pedagogies focusing on how the whole person as learner engages in learning; and socially situated learning focusing on the role of context and audience. In this sense, the dimensions are overlapping and reinforcing in any particular set of practices. For example, consider Patricia O’Connor’s work making use of Web authoring tools to lead students to engage in close reading of print fiction. Calling the activity “hypertext amplification,” O’Connor asks students to make increasingly sophisticated
“associational” connections, to move from novice reading encounters with texts to more expert ones. She wants them to experience “associational thinking” on multiple levels, from the personal and emotional to the definitional and critical. Ultimately, students’ ability to engage fully along a continuum of expert practice is shaped by their knowledge that their Web pages will be public, and their presentations to their peers a social act. All three key dimensions are in play in her teaching practices, as in so many of the case studies coming out of VKP.

Nevertheless, we believe it is a valuable exercise to slow down and look closely at each of three areas, and to begin making sense of how each dimension might be better understood for its shaping influence on learning. We now explore each of these areas more fully below.

A Note on Findings
Because faculty inquiry lives at the boundary of theory and practice, we have chosen to present the findings in two forms: as conceptual findings (representing the way theory informed practice, and vice versa) and design findings (representing some of the key claims on practice made by these concepts and values about learning). As a further response to the challenge of representing collective findings in a messy research environment, we also present each area with a set of “tags,” keywords that help associate the findings with various trajectories. Finally, at the end of each finding description we link to several relevant case studies within this volume.

Notes
2. Many good resources exist on the scholarship of teaching. Two essential resources can be found at the Carnegie Foundation for the Advancement of Teaching (http://www.carnegiefoundation.org/CASTL/) and the Scholarship of Teaching and Learning tutorial at Indiana University, Bloomington (http://www.issotl.org/tutorial/sotltutorial/home.html).
3. In all, more than seventy faculty from twenty-two institutions participated in the Visible Knowledge Project over five years. Participating campuses included five research universities (Vanderbilt University, the University of Alabama, Georgetown University, the University of Southern California, Washington State University, and the Massachusetts Institute of Technology), four comprehensive public universities (Pennsylvania’s Millersville University, California State University (CSU)–Monterey Bay, CSU Sacramento, Ohio’s Youngstown State University, and participants from several four-year colleges in the City University of New York system, including City College, Lehman, and Baruch), and three community colleges (two from CUNY–Borough of Manhattan Community College and LaGuardia Community College, and California’s Cerritos College). In addition to campus-based teams, a number of independent scholars participated from a half dozen other institutions, such as Arizona State and Lehigh University. The project began in June 2000 and concluded in October 2005. We engaged in several methods for online collaboration to supplement our annual institutes, including an adaptation of the digital poster tool created by Knowledge Media Lab (Carnegie Foundation),
asynchronous discussion, and Web-conferencing. For more detailed information, see the VKP galleries and archives at http://crossroads.georgetown.edu/vkp/.


6. For a broader discussion of the “teaching commons,” see Pat Hutchings and Mary Huber, The Advancement of Learning: Building the Teaching Commons (San Francisco: Jossey-Bass, 2005).

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Peer Reviewed

Title: No Half Measures: Overcoming Common Challenges to Doing Digital Humanities in the Library

Author: Posner, Miriam, UCLA

Publication Date: 01-25-2013

Series: UCLA Previously Published Works

Permalink: http://escholarship.org/uc/item/6q2625np

Published Web Location: http://www.tandfonline.com/doi/full/10.1080/01930826.2013.756694

Keywords: digital humanities, library administration

Local Identifier: 10.1080/01930826.2013.756694

Abstract: While much work on libraries and digital humanities has focused on how to train and encourage individual librarians, we have not paid enough attention to the administrative and institutional factors required to help these professionals succeed. This article outlines some common sources of frustration for library professionals engaged in digital humanities work and offers sketches of some library-based digital humanities programs that are working to address these challenges.

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No Half Measures: Overcoming Common Challenges to Doing Digital Humanities in the Library

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ABSTRACT. While much work on libraries and digital humanities has focused on how to train and encourage individual librarians, we have not paid enough attention to the administrative and institutional factors required to help these professionals succeed. This article outlines some common sources of frustration for library professionals engaged in digital humanities work and offers sketches of some library-based digital humanities programs that are working to address these challenges.

Once you start noticing, the pattern becomes clear: Library after library is rolling out support for digital humanities. That support might consist of a “center,” a “suite of services,” a librarian with a revised job title, or, murkiest of all, an “initiative.” (A place, a thing, a person? Who knows?) Spend some time talking to the people who staff these new offerings, and another pattern emerges: Many of them are frustrated. Many of them fear that will disappoint patrons. Many of them wonder whether the tasks they have been charged with are actually doable.

We do not acknowledge often enough that if a library is to engage in digital humanities activity, its leaders need to give serious thought to the administrative and technical infrastructure that supports this work. I want to argue here that many of the barriers to completing digital humanities projects in the library arise not from librarians themselves, but from a set of institutional and administrative factors that will be familiar to most people who have worked in libraries.

This is not to say that DH is not done in the library. It is, and often well. Many of the contributors to this issue represent flourishing library-based digital humanities programs. And it is crucial to remember that what we now call digital humanities grew out of a set of practices, and a community of practitioners, which themselves arose in libraries and archives. The Text Encoding Initiative (TEI), for example, a vital humanities computing effort, grew out of the work of electronic scholarly editing programs, many of which were based in libraries (Hockey, 2004; Renear, 2004). So did any number of pioneering humanities computing projects, including important work on digital archives, interface design, and textual analysis.
But digital humanities has reached new levels of popularity, piquing the interests of a great many institutions that have little previous experience with it. And, as my colleagues and I found when we conducted a survey through the Association of Research Libraries, with the exception of a few well-known programs, most library-based DH is being done in a very piecemeal fashion. Forty-eight percent of survey respondents described their libraries’ digital humanities support as “ad hoc” (Bryson, Varner, Pierre, & Posner, 2011, p. 16). Relatively few libraries have dedicated digital humanities centers or programs, and many existing initiatives are still in the developmental stages. Staffing for libraries’ digital humanities programs is often confined to a digital scholarship librarian (who may fill many other roles) and a few information technology professionals, many of whom work on contract on grant-funded projects, or have responsibilities well beyond digital humanities programs. The result is that the success of library DH efforts often depends on the energy, creativity, and goodwill of a few overextended library professionals and the services they can cobble together.

When we talk about bringing new digital programs into the library, we often focus on what individual librarians can do, encouraging them to adopt a spirit of entrepreneurialism or seek out opportunities to learn new skills (e.g., Brian Mathews, 2012; Tzoc & Millard, 2011). But I contend that much of the discussion about building a DH-friendly library environment leans too hard on individual librarians, without taking into account the set of institutional supports, incentives, and rewards that will allow DH to flourish in a sustained way (and keep these library professionals from burning out).

In fact, there are very good reasons why individual librarians may choose to eschew digital humanities work, and they have to do with the lag between libraries’ enthusiasm for DH and institutions’ ability to support it in meaningful ways. If we hope to develop robust digital humanities programs in the library, we need to address these institutional shortcomings. Here, I outline some of the challenges for libraries as they attempt to offer digital humanities programs, offering some suggestions for how they might be addressed.

WHAT DOES IT MEAN TO DO DIGITAL HUMANITIES IN THE LIBRARY?

But before I move to these points, there remains the nagging question of what we talk about when we talk about doing DH in the library. In an earlier draft of this article, I assumed a model of DH support common to many fledgling DH programs, in which a scholar (usually a faculty member) conceives an idea for a DH project and approaches the library for help in accomplishing it. (See Posner, 2012)
But as Trevor Muñoz cogently pointed out, this approach — let’s call it the service-and-support model — is not the only, or necessarily the best, one out there. “Digital humanities in libraries isn’t a service and libraries will be more successful at generating engagement with digital humanities if they focus on helping librarians lead their own DH initiatives and projects,” writes Muñoz, drawing on his own work as both a librarian and the associate director of the Maryland Institute for Technology in the Humanities (Muñoz, 2012). He argues that librarians’ work needs to be seen as intellectual labor, and that their efforts within library incubators (or “skunkworks,” as Bethany Nowviskie describes them in a separate article in this collection) could offer invaluable opportunities for “technology transfer” to the university community at large.

The on-the-ground reality at some institutions may be that the skunkworks or incubator model, in which digital humanities activity takes place entirely at the discretion of library-based DH experts, is not a politically feasible option. But that does not mean that the service-and-support approach makes sense either.

Muñoz points to an error not only in my own thinking about libraries’ support problems, but also in the way that the libraries-and-digital humanities question has been framed in the library community at large. Many of the problems we have faced “supporting” digital humanities work may stem from the fact that digital humanities projects in general do not need supporters — they need collaborators. Libraries need to provide infrastructure (access to digitization tools and servers, for example) to support digital humanities work, but they need thoughtful, skilled, knowledgeable humanists to actually work on it.

Indeed, my experience has been that the service-and-support approach, in which a scholar brings an idea to the library to build, often results in a less-than-optimal outcome. Few scholars are really trained to understand the larger environment of digital humanities tools, projects, and methods, and it can be very challenging for a librarian charged with “supporting” a project to dissuade a faculty member from barreling ahead with a half-baked idea.

Of course I do not mean that good DH project ideas cannot come from scholars. Many do! But in conceiving library-based DH programs, we need to jettison some of our thinking about providing library “services.” It is important to see that some of the most valuable DH work has been imagined and designed by library professionals themselves, and that we need to support librarians who want to make these ideas happen. And when librarians do collaborate on projects, it is important to find ways to impress upon scholars that DH expertise is a specialized,
crucial — and frankly, rare — skill, not a service to be offered in silent support of a scholar’s master plan.

Thus, I offer this list of challenges in the hope that library leaders might use them to correct shortcomings not only in support programs, but also to rethink the possible relationships librarians might have to digital humanities work.

CHALLENGES TO DOING DIGITAL HUMANITIES IN THE LIBRARY

**Insufficient training opportunities**

For librarians, this problem is acute. Clearly, expertise in digital humanities requires new skillsets. But funding for training opportunities is often scarce, and it can be very hard to justify to supervisors why one needs to take a class in, say, Python, when one’s job responsibilities do not currently include Python. In addition, it is not always clear where to go for training. Computer science classes often lack an obvious connection with humanities questions, and very hard for a novice to know which language or skill one needs to start with. The recent abundance of online technical training opportunities, like Coursera and Codeacademy, may seem to offer an attractive solution, but in many cases these classes lack relevance to the library professional who cannot yet imagine what skills will be called for.

Moreover, some of the most valuable skills a digital humanities specialist can offer are not strictly technical, but a combination of “soft” and “hard” skills: the ability to manage a project efficiently, for example, or knowledge of how to perform an environmental scan to ensure a proposed DH project does not reinvent the wheel. These kinds of skills are best learned through participation in actual DH projects — a Catch-22 situation for many librarians.

**Lack of support for librarian-conceived initiatives**

In a library, responsibilities and opportunities are (logically enough) apportioned in ways that are designed to be consistent with institutional priorities. Libraries tend to be concerned with metrics, with assigning roles efficiently, and with meeting patrons’ demonstrated needs. Projects often get assigned from the top down, and it is not unusual for a project sponsor to be asked to prepare a business case to show that an initiative will meet a need and benefit the library. Many DH projects do not meet any particular demonstrated need — they are done to
find an interesting answer to an interesting question. This can be very difficult to explain to one’s supervisors in the library.

Too many tasks, too little time

With all the hand wringing about whether the library has a future, it can be easy to overlook the fact that many librarians actually feel overburdened. Most subject librarians cover multiple disciplines, and with purchasing, instruction, outreach, professional development, and administrative responsibilities — well, it all adds up. Time for a DH project has to come from somewhere else, and many librarians do not feel they can keep doing their existing jobs well if they add something else to the mix.

Lack of authority to marshal the appropriate resources

This may be one of the most difficult challenges librarians face. When my job was to foster DH projects in the library, I sometimes fought the urge to hide when I saw a faculty member coming at me with a project idea — even if it was a great idea, even if I really wanted to do it. I started tabulating the resources it would take to get the project done: time from a developer, time from a designer, time from a metadata specialist, time from a system administrator, project management expertise, server space, a commitment to host the project in the long term ... I just did not have the authority to make all these pieces fall into place, and neither do most individual librarians. In fact, very few individuals within a library have the ability to bring all these parts together. If a librarian has assembled these resources, he or she has probably (unbeknownst to the patron) gone from desk to desk, pleading for time from each of the people involved. You can imagine why most librarians are not eager to do this over and over again.

Inflexible infrastructure

Libraries, of course, are big, complex organizations, with responsibilities to patrons across the campus. It is easy to see why they place a premium on information technology infrastructure that is secure, scalable, and does not require a lot of fiddly maintenance. Alas, many DH projects require customized support, or at the very least, server-level access for collaborators. If a DH scholar needs to file a support ticket every time she, say, wants to install a Drupal module, a project is virtually guaranteed to languish. But requesting this kind of access or support from already overstretched system administrators is not an exercise for the faint of heart.
Lack of incentive

It may not be all it should be, but for scholars, there is some professional payoff to accomplishing a DH project: some name recognition, something to take on the conference circuit. It is sometimes less clear what the payoff is for the librarian. Too often, the “completion” of a DH project means more headaches down the road (about upgrades and server space and support) for the librarian, while it is a faculty member’s name that’s associated with the project. If the librarian’s institution is not providing support and recognition for librarians involved with DH, it is hard to see what would motivate someone to subject herself to such hard work.

The complexity of collaborating with faculty

If a DH project involves collaboration between faculty and librarians, it is important to be attuned to the peculiar dynamics of this kind of relationship. Frequently, faculty approach librarians as service providers (and too often, librarians approach faculty that way, too). The flaw in this relationship becomes clear a few weeks into the collaboration, when the librarian really needs that dataset, decision, or brainstorming time in order to make progress on the project, but does not feel entitled to make demands from an unresponsive professor. There is no one to appeal to and no one who can help, and so the request languishes. The project will suffer if the relationship is not truly equitable.

Overcautiousness

If a faculty member who wants to write a book, she needs no one’s permission. The book may fail, but it may wildly succeed, and that is a risk she can take on herself. If, on the other hand, you are a librarian who wants to work on a DH project, you will probably need to check with your supervisor, maybe the legal department, whoever is in charge of the technical team, maybe the people in branding. And frankly, for most of these decision-makers, the safest answer is “no.” When so many stakeholders are involved, the incentives for risk-taking become so diffuse as to be almost imperceptible. Oddly, the same math does not seem to apply when one calculates the potential penalties for risk-taking. At many libraries, it is easy to imagine getting in trouble for overstepping one’s bounds; it is harder to imagine getting rewarded for it.

Diffusion of effort
One unfortunate side effect of DH’s new popularity is that enthusiasts, particularly at large campuses, do not always communicate with one another. So it is becoming common to see sibling digital humanities initiatives cropping up on the same campus. This may not be entirely a bad thing — there may be very good reasons to target digital scholarship efforts to, say, a particular discipline. But these multiple efforts can also create unnecessary competition for an institution’s resources, as well as a confusing situation for people on campus looking for a digital humanities “front door.”

**Lack of a real institutional commitment**

When libraries do DH well, they are in it for the long term. That means permanent staff, hard funding, real space to work, and an understanding that some projects will succeed and some will fail. But what we often see now is libraries hedging their bets: willing to wager a postdoc or two, but not more. Alas, this strategy often leads to more frustration than exciting DH projects. DH takes time, and an investment in relationships across the campus. When that commitment is not there, librarians know it, and so do faculty and students.

**WHERE DO WE GO FROM HERE?**

This laundry list of challenges may seem disheartening, but it is (believe it or not) not my intention to discourage DH aspirants. It is true that there are very real hurdles to getting a functional DH center up and running in the library. But thinking through these challenges can provide an occasion to grapple with some of the most fundamental questions libraries are faced with today.

Michael Furlough, associate dean for research and scholarly communication at Pennsylvania State University, asked a question that, in my mind, gets at the heart of the matter: “Is research the Library’s core business?” As Furlough points out:

> the most valued IT services in the institution are the mission-critical enterprise systems: email, financial, student enrollment, course management systems. In the Library, it’s the catalog, OpenURL resolver, or other discovery layers. We don’t hesitate to allocate permanent people and dollars to ensure that those core business activities run 99.9% of the time. But research … sure, it’s a core activity of the faculty, but is it a core business function of the University? (Furlough, 2012)
Furlough asks a genuine question. Digital humanities scholarship, by definition, is eccentric, unpredictable, highly customized, and prone to failure. It will not match up neatly with a library’s existing workflows, and it may well negatively affect existing measures of productivity. So a canny administrator may well ask: Is the library prepared to take on a beast like this? Does it want to?

If DH does make sense for a particular library, some very promising models, both established and emerging, may serve as examples for how a library might balance the productive chaos of DH work with its obligations to support the needs of stakeholders across campus.

Recently, several institutions have demonstrated some creative thinking about how to provide librarians with meaningful training opportunities. At the University of Maryland Libraries’ new Digital Humanities Incubator (an initiative co-sponsored by the Maryland Institute for Technology in the Humanities), librarians participate in a semester-long series of workshops on research development, working with data, developing projects, and writing funding proposals. Columbia University has instituted a librarian re-skilling project, in which 12 librarians collaborate to accomplish a digital humanities project. Inspired by a recent report on librarians’ skill gaps from Research Libraries UK, Columbia is focusing on leadership and interpersonal skills as well as technical skills (Auckland, 2012).

In both cases, librarians are offered the opportunity to participate in targeted, collaborative, project-based training in a relatively low-stakes, supportive environment. These initiatives may well point the way toward more meaningful training strategies for librarians eager to learn new skills.

The University of Nebraska’s Center for Digital Research in the Humanities, a well-established and highly respected DH center, is a joint program of the University of Nebraska-Lincoln’s Libraries and UNL’s College of Arts & Sciences. It maintains strong ties to the library, in personnel and in research activity, but it also exercises a great deal of independence when necessary — running its own sandbox server, for example, and employing its own designer and programmer.

The Scholars’ Lab, at the University of Virginia, is based inside Alderman Library, and identifies strongly with the mission and ethic of librarianship. But, as Bethany Nowviskie explains in her article in this issue, the Scholars’ Lab’s Research and Development team has also purposely embraced an iterative, informal development cycle that focuses as much on process as on end
results. This “skunkworks” model gives the Scholars’ Lab the freedom to experiment in a space set apart from the productivity demands of the larger library system. And, crucially, the R&D team feeds back into the library at large, in what Trevor Muñoz has described as “technology transfer.”

At Harvard, the Library Lab, founded in 2010, is charged with incubating innovative projects that contribute to library services. While not devoted to digital humanities initiatives, the Library Lab has adopted a model that seems promising for DH projects. Faculty, students, and staff can all suggest projects, which, if supported, receive funding and support for three months or longer, depending on how successfully the project appears to be developing. The Library Lab has given rise to projects such as the Highbrow Textual Annotation Browser and Spectacle, a library collections slideshow generator.

These success stories — and numerous others I have not mentioned — indicate that DH is possible in a library setting. But they also demonstrate that DH is not, and cannot be, business as usual for a library. To succeed at digital humanities, a library must do a great deal more than add “digital scholarship” to an individual librarian’s long string of subject specialties. It must provide room, support, and funding for library professionals to experiment (and maybe fail). It must make hard decisions about what the library is not going to do, now that it has taken on this new role. It must find ways to offer incentives, training, and professional credit to library professionals who take risks. It must give serious thought to the technology needs it is willing and able to support.

Above all, a library must be willing to take a hard look at what it considers its core functions. It may well be the case that DH is a distraction from a given library’s basic mission — in which case, better to know that now than to set off a domino effect of frustration in semesters to come. If, on the other hand, a library decides that digital humanities is an activity it truly values and wants to support, it must find ways to value, support, and sustain the people it asks to participate in this work.

REFERENCES


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1 I am sincerely grateful to the many respondents who provided their comments and critiques of an earlier draft of this essay, which can be found at http://miriamposner.com/blog/?p=1274. They include Dale Askey, Amy Buckland, Kaetrena Davis Kendrick, Elizabeth Dill, John Fink, Josh Honn, Tim Lepczyk, Elizabeth Jo Mason, Jenn Riley, Alycia Sellie, John Vallier, and Jacqueline Wernimont. Special thanks to Michael Furlough, Trevor Muñoz, and the pseudonymous Library Loon, who responded to my post with posts of their own. They can be found at http://www.personal.psu.edu/mjf25/blogs/on_furlough/2012/08/some-institutional-challenges-to-supporting-dh-in-the-library.html (Furlough), http://gavialib.com/2012/08/on-success/ (Library Loon), and https://gist.github.com/3415438 (Muñoz).
How cowardly to begin with a disclaimer! And yet. It seems worth saying that I wrote the original post from which this is derived in a fury at job-market news from friends, as well as the latest statistics from VIDA about women’s representation in magazines and book reviews. I probably would have been more temperate if I’d known what kind of reaction this post would provoke — but then again, who knows? Maybe not.

What interests me in hindsight is how relatively limited my original post’s claims are, compared to the breadth of reactions in its wake. I said, simply, that if you want everyone to code, fine — but recognize that not everyone has equal access to this education. Or that’s what I thought I said. The responses, to my surprise, fixed on archival representation, the nature of identity-making in digital humanities, the kinds of knowledge we value, and how community members might productively express dissent.

I do not flatter myself that these reactions have anything in particular to do with the quality of my original blog post. Rather, it seems to me that many people had things to say about identity and community in digital humanities at a moment when these questions feel pressing.

One of the odd things about blogging is that the the final product, the thing you’re left with, is not what you’ve originally written. It’s an oddball aggregate of the comments, responses, and conversations it leaves in its wake. In this case, these conversations changed what, in my mind, the original post was...
about. For me, it’s no longer just about coding and gender; it’s about the kinds of conversations we’re willing to have about uncomfortable questions.

I was inspired and energized by many of the reactions to this post. But I do suspect, in the aftermath of all this, that we digital humanists have not yet developed a robust language for discussing inequities of power among our practitioners. These inequities do indeed have to do with the kind of position one holds — whether, for example, one is a tenured professor, a contract archivist, or a staff technologist — but at this moment, inequities of gender and race feel most pressing to me precisely because we’ve proven ourselves frankly bad at discussing them. Our community is wonderful and worth celebrating, but it’s worth scrutinizing, too.

It’s equally true that we won’t really resolve these questions by reaming each other over the seminar table, as so many of us were trained to do. As Stephen Ramsay suggests, now might be a good time for us to talk to each other not nicely, but benevolently; that is, with the understanding that we value and care about each other as colleagues and friends, even when we disagree.

What follows is an edited version of my original post, called “Some Things to Think about before You Exhort Everyone to Code,” along with selections from the follow-up post I wrote a few days later.

* * *

Oh, how I hate being the bearer of bad news. Yet I feel I have to tell you something about the frustration I’m hearing, in whispers and on the backchannel, from early-career women involved in digital humanities.

Here, there, and everywhere, we’re being told: A DHer should code! Don’t know how? Learn! As digital humanities winds its way into academic departments, it seems reasonable to predict that the work that will get people jobs — the work that marks a real digital humanist — will be work that shows that you can code. And that work is overwhelmingly by men. There are some important exceptions, but the pattern is pretty clear.

In principle, I have no particular problem with getting everyone to code. But I wanted to talk here about why men are the ones who code, so that we can speak openly about the fact that programming knowledge is not a neutral thing, but something men will tend to have more often than women.

First, men — middle-class white men, to be specific — are far more likely to have been given access to a computer and encouraged to use it at a young age. I love that you learned BASIC at age ten. But please realize that this has not been the case for all of us.

Second, the “culture of code,” the inside jokes and joshing that you enjoy, may not be equally appealing to everyone who encounters it. This should be, but apparently isn’t, obvious.

But Miriam, you’re thinking, there are lots of examples of DH coders who started late and are now well-respected and proficient! This is true! And they inspire me all the time. But this is also why I wanted to talk a little bit about what it’s like for a woman to learn to program.

Should you choose to learn in a group setting, you will immediately be conspicuous. It might be hard to see why this is a problem; after all, everyone wants more women in programming. Surely people are glad
you’re there. Well, that’s true, as far as it goes. But it also makes you extremely conscious of your mistakes, confusion, and skill level. You are there as a representative of every woman. If you mess up or need extra clarification, it’s because you really shouldn’t — you suspected this anyway — you shouldn’t be there in the first place.

But there are all these online communities where you can learn to code. There are! But if you are under the impression that online communities are any friendlier to women’s participation, then you, my friend, have not looked lately at Wikipedia.

Well, just practice! I did the work — so should you! Here is the real point I’m trying to make here: It is not about “should.” What women should do has nothing to do with it. The point is, women aren’t. And neither, for that matter, are people of color. And unless you believe (and you don’t, do you?) that some biological explanation prevents us from excelling at programming, then you must see that there is a structural problem.

So I am saying to you: If you want women and people of color in your community, if it is important to you to have a diverse discipline, you need to do something besides exhort us to code.

“What, exactly, are we supposed to do besides exhort women to code?” several people asked, reasonably enough. In a follow-up, I suggested some positive steps we might take.

1. Let’s think about ways to build communities of underrepresented people. We have some great models here, in women’s development groups, in the Praxis Program, in MATRIX, in the Crunk Feminist Collective, and, yes, even though it might not be your bag, in groups like Craftster. Women and people of color are really, really good at building and maintaining supportive communities. Let’s make sure that they (we) have spaces to do that, and that they (we) know we value these communities, even when they say things we don’t totally want to hear.

2. Let’s acknowledge that we all do racist and sexist stuff sometimes. I should know. I do it all the time. All. The. Time. I don’t mean to, and I’m not a bad person, but I do. Let’s just figure out together how we can stop doing this when it counts, when we’re depriving someone of an opportunity to learn or do something important.

3. Let’s talk about when our niceness could be shutting down important conversations. As anyone who knows me very well will tell you, I am a Nice Person. I instinctively recoil at unpleasantness. But sometimes — not always, but sometimes — it might be necessary to have these really uncomfortable conversations.

4. Let’s believe people when they tell us they feel uncomfortable. It’s so easy to correct someone when she tells you she feels slighted because of race or gender. I’ve done it many times. But I’m trying, really trying, to take a minute or two to think: She’s probably the expert on her own experience.


About Miriam Posner
Miriam Posner is the coordinator and a core faculty member of the Digital Humanities program at the University of California, Los Angeles. Her most recent article, on Thomas Edison’s Red Cross Seal films, appears in *Learning with the Lights Off: An Educational Film Reader* (Oxford, 2011). She earned her Ph.D. in Film Studies and American Studies from Yale University in 2011.

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Launching the Digital Humanities Movement at Washington and Lee University: A Case Study

Posted on July 24, 2014

By Jeff Barry, Associate Professor and Associate University Librarian, Julie Knudson, Director of Academic Technologies, Sara Sprenkle, Associate Professor of Computer Science, Paul Youngman, Associate Professor of German

Abstract: This paper offers a case history of the development of digital humanities (DH) at Washington and Lee University. We will focus on how we informally and then formally implemented DH, especially the meshing of the various partner constituencies, the design of our program as it has evolved over time, and the technological environment within which we are supporting DH. We will conclude with an analysis and evaluation of our work in progress and detail our short term and long term future.

Keywords: digital humanities, collaboration, information technologies, library

Introduction

We faced a challenge at Washington and Lee University (W&L) in the summer of 2012: how does one start a movement – in this case, a movement in the digital humanities (DH). The state of DH on campus at that time is best expressed by Suzanne Keen (then interim dean of the college, now dean):

Everybody was working independently, and didn’t really even know about one another’s projects. I felt that if you said “Digital Humanities,” that relatively few W&L faculty would have any idea what that even meant (Suzanne Keen, e-mail message...
Her vision for the end state of a DH program on campus is compelling. She foresees DH permeating the curriculum widely and gaining broad acceptance among faculty, staff, and students. Moreover, she foresees liberal arts graduates who are information fluent, able to work with digital artifacts, and for whom working with large data sets is a matter of course. The difficulty we face is building a bridge from the current state of DH as Dean Keen describes it to her exciting vision.

The primary challenge for digital humanities at a small liberal arts college is in adapting research-oriented digital practices as teaching strategies that enhance critical thinking among undergraduates. As one can see from the dean's vision, DH at W&L had to be about pedagogy given our focus on student learning. The difficulty with this focus is that pedagogy is not normally part of the digital humanities conversation. In its more common essence, DH is about a “product, a scholarly ‘output’ shared with the world” (Alexander and Davis 2012, 384). We needed to adapt this production emphasis on the “triumphantly finished digital product” to suit our undergraduate teaching purposes (Alexander and Davis 2012, 384). For example, where pedagogy is even discussed in DH, the emphasis is generally on teaching DH theory and research practices as opposed to using DH techniques in the undergraduate classroom. As Alexander and Davis so aptly put it, we needed to focus on “the skills of collaboration across disciplines and institutions, working with primary sources and archives, strategically selecting technologies [and tools] under financial constraints, and working within networks and connecting with local communities” (Alexander and Davis 2012, 384). The reason for this is simple: The DH moment is here. In fact, it arrived many years ago along with the so-called digital turn – the movement away from print to digitized and born-digital materials for academic research and publication. We no longer live in an age where information primarily conserves itself in the printed objects we call books and journals. DH, as Burdick points out, “is less a unified field than an array of convergent practices that explore a universe in which print is no longer the primary medium in which knowledge is produced and disseminated” (Burdick et al. 2012, 122). We at liberal arts campuses have been searching for our connection to the DH moment and its associated practices. Given our mission as a largely pedagogical institution, our connection resides primarily in the classroom and secondarily in our research programs.

Our aim is that DH can work and even thrive on a liberal arts campus as a complement to our already strong pedagogical tradition.

DH is truly a critical component in modernizing approaches to humanities and social science teaching and research at W&L and in the broader academy. Moreover, DH is a necessary aspect in our efforts to prepare liberal arts graduates for the modern workplace where text is no longer the dominant medium. As the College's mission statement emphasizes, we seek to advance teaching, curriculum, and campus culture to meet the educational needs and aspirations of our students in a rapidly changing world, and DH is one way to satisfy this goal.
In this case study, we describe our process in starting a DH movement at W&L, focusing on “buy-in” from broad constituencies, on pedagogy as the driving force in our efforts, and on the support and infrastructure required to grow and sustain these efforts.

Informal and Formal Implementation

It is important to note that when it comes to the launching of DH on our campus there were two distinct phases – the informal and the formal. There were officially no partners in the informal phase: everyone met as equals and collaborators. Dean Suzanne Keen suggested a series of casual meetings off-campus in a happy hour setting focused on developing DH at W&L. The diverse attendees included faculty from several academic departments who were working in isolation. Equally important, attendees were also from the University Library and from Information Technology Services (ITS).

As Dean Keen puts it, she used a “bring-a-friend” approach in convening the first informal discussions. This method yielded key leaders as well as grassroots faculty supporters. In addition to having the dean present, it was essential to have the involvement of the chief technology officer and the university librarian. This support provided a solid foundation to both our informal and formal implementation stages. Other attendees included the director of the campus multimedia center, the director of academic technologies, and the senior academic technologist. In addition, key faculty support came from several members of the History Department, one from the Department of German and Russian, a classicist, and a computer scientist. After we hired a digital scholarship librarian, she immediately joined the group.

Critical to our efforts was the dean’s vision to include a robust interdisciplinary and interdepartmental team. In her words, “It seemed clear to me from the outset that if anything were going to happen around DH at W&L, it would only work if people wanted to collaborate with one another” (Suzanne Keen, e-mail message to author, March 11, 2014). This mixture of teaching faculty, library faculty, and ITS professionals has been and remains the strength of the entire enterprise inasmuch as it reflects the cross-disciplinary perspective and teamwork that is the heart of DH. Even though our experiment is still a work in progress, we can declare the mixture of partners a resounding success. All are dedicated to making DH thrive and all feel like important stakeholders in the process.

Our desire at Washington and Lee is to put processes and practices into place that will allow our liberal arts institution to reemerge in a form that will produce graduates with the skills to compete in the modern workplace. In terms of process, we established a framework consisting of two committees. (See Table 1 for committee structure.) First, Dean Keen made the informal movement official by appointing the Digital Humanities Working Group (DHWG) as an ad hoc committee within the college with Paul Youngman from the Department of German and Russian Studies as chair and Sara Sprenkle from Computer Science as associate chair. The DHWG is primarily designed to encourage awareness of DH at W&L. In terms of practices, this group assists developing scholarly and pedagogical projects, promoting collaboration as well
as experimentation, and publicizing results of faculty and student work. It sets priorities and chooses recipients of incentive funding provided by the Office of the Dean of the College. The DHWG discusses and proposes curricular initiatives including the development of an introduction to DH course taught in spring 2014 by the co-chairs of the working group. By keeping the conversation about DH open, this group lays the groundwork for future teaching, research, and scholarship, including collaboration with other institutions. Many of the attendees from the informal meetings were given official appointments. Also, in extending our model of collaboration, we have the dean, CTO, and university librarian serving as ex officio members providing guidance and support as needed.

The other committee that completes our framework is the Digital Humanities Action Team (DHAT): a resource for partnering with humanities and social science faculty in exploring digital approaches to teaching, learning, and scholarship. Guided by the DHWG, the DHAT is a joint initiative of ITS and the University Library and is staffed exclusively by these two units. While the primary focus is on the humanities and social sciences, the DHAT seeks to foster interdisciplinary collaborations across campus. Their core practices include evaluating digital methodologies and tools; collaborating with faculty and students on incorporating digital humanities into undergraduate courses; building expertise about digital humanities across the university; and assessing the effectiveness of these initiatives. The associate university librarian and the senior academic technologist chair the DHAT committee. (See Table 1 for committee structure.) While no single position at W&L is devoted full-time to DH, the composite of expertise on the DHAT creates a sizable staffing infrastructure for supporting DH: the ten-member group would be an impressive number of hands-on professionals involved in DH even for a large research university.

**Encouraging Faculty Participation**

An often-repeated phrase on campus is “As we’ve defined DH here,” as a way of indicating the importance of undergraduate classroom learning in any discussion of DH. As Dean Keen explains, “We wanted our students to acquire skills associated with DH and experience new ways of thinking about research projects and course content” (Suzanne Keen, e-mail message to author, March 11, 2014). While the DHWG and the DHAT provide an institutional structure, additional mechanisms such as workshops and incentive grants are necessary to engage faculty with tools and practices.

The DHWG scheduled a DH kickoff at the end of summer 2013 as part of the annual Fall Academy sessions. Beginning before the start of classes, Fall Academy is open to all faculty and staff and consists of two weeks of workshops, panel discussions, and information sessions on pedagogy, technology, and other topics, as well as orientation sessions for new employees. One day of Fall Academy 2013 was devoted to Digital Humanities topics and guest speaker Bethany Nowviskie, director of digital research and scholarship at the University of Virginia Library.
During our Day of DH, Dean Keen issued a call to W&L faculty to submit proposals for the first round of Digital Humanities Pedagogy Incentive grants. The grant included a $1,000 stipend and close support from the DHAT on using DH as a way of augmenting the teaching/learning experience. The DHWG awarded incentive grants funded by the dean of the college to four courses: Representing Queen Elizabeth (English); Hotel Orient (English); Campus Sex in the Digital Age (Anthropology); and Field Work in Poverty Studies (Poverty Studies).

Faculty receiving incentive grants took various paths to incorporate DH into their courses. Representing Queen Elizabeth is a project-based course that examines the ways that the first Queen Elizabeth has been portrayed in literature and film. Students research, collect, and write commentaries on their findings via an online system. The result is an interactive timeline depicting the representations of Elizabeth over several centuries. Hotel Orient requires students to work in small groups to prepare an interactive website, centered on the concepts of “hotel” and “orient,” that engages with texts, films, and images. This project uses WordPress, SketchUp, and in-house mapping software. Campus Sex is a class created especially as a DH initiative that explores the impact of cell phone use on hooking up and dating in college. The project uses WordPress and Voyant Tools. Field Work in Poverty Studies utilizes digital mapping to illustrate local area low-income services, unaddressed needs, and possible solutions. Further descriptions of these projects are found at W&L's Generally Digital website.

We followed up the incentive grants with a Winter Academy 2013 daylong session devoted entirely to DH. The sessions included guest speakers Rebecca Frost Davis of St. Edward’s University and formerly of NITLE, and Valerie Barr of the NSF and Union College, as well as presentations on various tools. During the Winter 2014 semester, a series of well-attended lunch-time workshops provided an overview of Voyant Tools, our in-house mapping and timeline software, use of GIS in the liberal arts (taught by two GIS specialists from the Scholars’ Lab at the University of Virginia Library), and extracting text from images and PDFs via OCR. A simple tip for increasing workshop attendance is to provide food.

**Key Technologies Used in DH at W&L**

In 2013 the DHAT investigated a range of tools suitable for use within undergraduate courses. The goals were to research the tools, learn to use the tools, then demonstrate uses to other DHAT members and prepare documentation, if necessary. The tools then were introduced to faculty who received DH incentive grants. Later, these tools were demonstrated to a broader faculty audience.

The tool set initially identified for exploration included WordPress (and various plugins), Omeka (including Neatline), and a range of tools for text mining: Voyant, Google Ngrams, Python-based language analysis tools, and mapping and visualization tools similar to those provided by SHIVA at the University of Virginia (shiva.virginia.edu).

The WordPress platform has become an important foundation underlying our efforts in DH. In a
twist on the usual library/IT arrangement, the library maintains the backend of the WordPress system while ITS supports faculty and student use. Implemented in the winter of 2012 and piloted by several journalism courses in the spring of 2012, WordPress has rapidly gained popularity as a blogging and website platform on campus. Currently the service hosts over 90 sites and has over 570 users. Approximately sixteen sites are in use for Winter 2014 or in development for Spring 2014. WordPress is the platform of choice for course websites outside of the University's Sakai learning management system. A key to its popularity is that WordPress provides an easily modifiable environment that avoids the necessity of creating one-off websites requiring custom programming. By contrast, an examination of Omeka found it unsuitable for our purposes at W&L even though Omeka enjoys popularity at other institutions. While Omeka offers a clean interface and a well-structured way of managing data, the DHAT found difficulty in adapting it for undergraduate courses. We decided not to support Omeka until the multisite version of Omeka is released, which is scheduled for late 2014.

Even before the formal founding of the DHWG and the DHAT in the fall of 2013, the Academic Technologies staff already had received several requests for a mapping application. Plain Google maps were not robust enough without additional coding (e.g., to allow multiple filtering) and also required careful coordination of various data from each participant's Google account. Customized WordPress themes, which worked fairly well, lacked versatility and required too much ITS intervention to support. ITS decided to build an in-house mapping application. Working with interested faculty and Academic Technologies staff, the ITS senior technology architect, Jeff Knudson, created Mapplication based on an existing in-house web form builder in conjunction with the Google Maps API. Faculty can specify what information they want students to submit by creating an online survey form. Students then fill out a web form and submit the information to a central database that then is visualized on a Google Map. The location-based data uploaded to the map can include text, images, video, hyperlinks, and audio files. The map display supports features such as filtering, overlays, distance calculation, multiple input feeds, and data export. Students and faculty also can utilize the map as an iframe for embedding in another website or a WordPress blog. The Mapplication software was piloted in Fall 2013 with two professors – one in English and one in Classics – who found the tool useful. In Winter 2014, six professors as well as several departments and programs on campus used Mapplication.

A companion to Mapplication is Timeline, an in-house application that uses the SIMILE Timeline code library (http://simile-widgets.org/timeline/). Features include multiple time scale bands, ability to use multiple data sources, magnification zones for expanding sections of the timeline, decorators to highlight portions of the timeline, stored views for jumping to specific points on the timeline, data source filters, event keyword search, and event legend. The data entry architecture for Timeline is the same as Mapplication's via an existing in-house web form builder and supports customizable input fields. One professor has piloted Timeline in a Winter 2014 course and collaborated with Academic Technologies staff to help inform the decisions made about Timeline features. Future enhancements include a combined Mapplication and Timeline view in which a scrollable Timeline will act as a date filter for points on the map. An
example of the Timeline tool in use is the timeline of the Digital Humanities movement at W&L.

Text analysis is often found in DH projects, but many of the mining tools don't lend themselves very well to an undergraduate environment. Voyant Tools (voyant-tools.org) is an online set of textual analysis tools that can perform various types of statistical analysis and visualization of words in a corpus of texts. Documents can be uploaded to the tool in a variety of formats, and resulting tables, graphs, and images can be linked to or printed out. The director of library technology investigated the tool and conducted workshops on possible uses. The senior academic technologist has worked with two professors and their students in Winter 2014 to integrate Voyant Tools into their classes.

In Winter 2014 two humanities professors expressed a desire to incorporate concept mapping into their courses. The professors consulted with Academic Technologies staff members and the digital scholarship librarian and chose Prezi as the tool to pilot for this function. Prezi allows multiple collaborators to contribute to the same concept map, and the ease of adding concepts and links, rearranging and editing, flexible layouts, and no-cost price tag made Prezi a tool worth investigating. However, the zoom feature can cause a type of motion sickness for viewers and class concept maps can become unwieldy. We will investigate other tools for concept mapping over the summer of 2014.

Currently, GIS use at W&L is primarily in the sciences and Politics. Support for GIS is provided through a position in the University Library that specializes in both numerical data analysis and geospatial analysis. The DHWG hosted a workshop in March 2014, taught by GIS specialists from the Scholars’ Lab at the University of Virginia. The workshop provided an introduction to GIS in the humanities and will allow consideration of GIS as an avenue for further exploration in the humanities and social sciences.

Video creation has been increasing on campus for several years, and its usage in DH courses is expanding as well. Applications such as Vine, VoiceThread, and iMovie involve a potentially collaborative interaction with technology that results in the creation of digital objects that can be shared and commented upon by others. Academic Technologies maintains a video editing suite in the library that allows students access to professional recording and editing equipment, and currently provides all support for video projects in courses.

**Academic Technologies and Library Partnership**

Staffing and workload distribution is a significant issue for any institution tackling DH. In the first eighteen months of the DH initiative at Washington and Lee, the University Library experienced a number of organizational changes including significant vacancies among library faculty. The library structure stabilized in late 2013 with a full complement of library faculty, including the hiring of three librarians in the second half of 2013 that bring significant technological expertise in working with digital content. The staffing changes enable the library to reassess its role in the DH movement on campus. A positive factor is that the library is now capable of taking on an
increasing share of the workload relating to DH, which largely had been shouldered by ITS.

Instrumental to the success of DH is the ITS-library collaboration. At W&L the University Library and ITS are independent divisions unlike the merged ITS/library organizations that now exist at many liberal arts colleges. Each division brings its own professional experiences and expectations towards approaching DH. At times, these perspectives are in conflict regarding information architecture and platform. However, to adequately serve our faculty and students, both ITS and the library must find a common ground for understanding DH, establishing the technical infrastructure for digital initiatives, and formalizing the project management approach to ensure that faculty and students are successful in their DH endeavors. Succeeding in these matters requires a strong level of collaboration and communication between ITS and the library.

As previously noted, the DHAT is the vehicle through which that collaboration is enabled. Indicative of the joint nature of DHAT is the fact that the group is co-chaired by a representative from ITS and the library. The original formation of DHAT was as an agile handful of people that could respond to the needs of faculty in incorporating DH into their courses. As the library staffing changes settled into place during 2013 – 2014, the membership of DHAT expanded as the library brought onboard a number of individuals with significant expertise in areas relating to DH. Concurrently, DHAT membership was extended to additional ITS professionals who brought valuable skills.

One continuing challenge at W&L will be figuring out how to share the workload among this talented group without letting the size of the group get in the way. As a call for another round of faculty incentive grants for the following academic year goes out and more faculty request support, DHAT is adopting a project manager approach in which one team member is assigned to coordinate the DH component of a specific course. The project manager duties will be spread among the team rather than centralized with one individual. Given the size of DHAT, there are enough individuals who can serve as project managers so that a technologist can focus more closely on one course rather than needing to juggle a set of DH-inflected courses. An effort is currently underway by the director of academic technologies to codify the scope and duties of a DH project manager, but it’s expected that a project manager will be paired with the faculty member in managing the project.

Considering that many members of DHAT are new to the university and have not had the opportunity to solidify working relationships with one another, we are planning a summer institute for the team that will focus on building ITS-library collaboration by allowing team members to spend a significant period of time together outside their daily routines. The norms of once-a-month meetings and occasional hallway conversations do not provide enough substance for sustaining a joint initiative. Through the summer institute the team will explore various aspects of digital humanities with a particular focus on tools and methodologies that are applicable to the undergraduate classroom.

While DH at Washington and Lee is defined as a pedagogical strategy, there still exists the
need to support research projects that utilize DH practices. Though Washington and Lee is a liberal arts college, faculty are expected to produce scholarship. Supporting faculty research is a traditional part of library services, and the library is well positioned to handle DH aspects of research projects. The level of involvement in these endeavors will vary from project to project. We are also seeking opportunities that involve students as collaborative partners in DH research projects.

Enhancing Undergraduate Learning with Digital Humanities

The support structure for DH at a liberal arts institution must actively engage with the faculty in conceiving how these often complex DH approaches can be reformulated for the classroom where students do not have either the deep subject knowledge of the discipline or the confidence in tackling a new technology. Another challenge is conveying that DH is more than just teaching with technology. In the future, we plan even more pedagogy-focused workshops that explore how faculty are using tools, the difficulties encountered, the effectiveness of various tools, and how to improve student learning.

Improving student learning, however, first requires defining the learning outcomes expected through DH. One can find an excellent set of learning outcomes and priorities in Digital_Humanities emphasizing “the ability to think critically with digital methods to formulate projects that have humanities questions at their core” (Burdick et al. 2012, 134). Indeed, the mode of critical thinking with digital methods must be incorporated within the mindset of faculty, IT professionals, and librarians to effectively teach with the digital humanities.

Such thinking is the key to the future of digital humanities on this campus. Dean Keen offers an energetic vision:

In ten years, digital humanities projects will be so diffused throughout the curriculum that they no longer look experimental; they gain broad acceptance as a legitimate mode of student work. Student transcripts contain links to their DH projects as part of demonstrated student learning outcomes. Our liberal arts grads possess not only information fluency, but the craft skills to make and manipulate digital artifacts. Parsing large data sets in easily visualized and nuanced ways becomes a normal skill of our humanities grads, along with writing and critical thinking (Suzanne Keen, e-mail message to author, March 11, 2014).

The key for success of the digital humanities at a small liberal arts college is to focus on the learning outcomes. Identify the knowledge and skills that students should acquire through the DH assignments in a course, and think deeply about how students can transfer that digital learning to their other courses and their lives beyond graduation. In the end, the value of the digital humanities is to reinforce the critical thinking and lifelong learning skills that are the foundation of a liberal arts education.
Conclusions and Recommendations

Given that our program is still in the developmental phase, it is difficult to draw any sweeping conclusions about the effectiveness of DH at W&L. We can, however, offer some recommendations and preliminary analysis on starting a movement on a small college campus. Step one is to identify the important constituencies. For faculty this can often be a blind spot. One cannot assume that the teaching faculty are the only critical group and the rest is just details, so to speak. While teaching faculty are central to the success of many ideas, there often is an entire support structure necessary, and this support structure must be brought in as equal partners. For DH specifically, one cannot even begin without cooperation from teaching faculty, library faculty, and ITS staff committing to the vision.

Step two is to create “buy-in” among the different constituencies. There are many ways to set these expectations, but Dean Keen’s year-long informal gatherings were particularly effective as an ice breaking method for groups who do not always work closely together. They also allowed for some relaxed brainstorming that is difficult to foster in a more formal setting. When it comes to DH, for example, teaching faculty at some institutions are not always comfortable engaging with ITS staff. This can be especially true when it comes to humanities faculty, thus the ice breaking was an inspired step.

Step three is to keep the university mission front and center. Small liberal arts colleges are teaching institutions. As long as your movement is related to the enhancement of that mission, it can take off. At Washington and Lee, pedagogy is the central focus of all DH efforts. Research programs are necessary and desirable, and some faculty have begun using DH methods in their research, but the focus is on the classroom.

The last step is to entice teaching faculty. Humanities faculty and qualitatively oriented social scientists are not always comfortable with computing technologies. It is important that library and ITS collaborate to ease the integration of DH methodologies into courses across the curriculum in support of these initiatives. If a movement requires change, it helps if that change can be implemented as simply and easily as possible. If the change is complicated and difficult, there is little incentive for teaching faculty to adopt the desired change.

Bibliography


Table 1: Committee Structure

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<tr>
<th>Representatives</th>
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<td>Computer Science professor</td>
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<td>Director, Academic Technologies</td>
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<td>Senior Academic Technologist</td>
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<td>Senior Technology Architect</td>
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<td>Technology Integration Specialist</td>
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<td>Director, Multimedia Center</td>
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<td>Associate University Librarian</td>
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<td>Chief Technology Officer</td>
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Collaboration: A Primer | Mnanfito@work

Comments are closed.
The purpose of this document is to provide a set of guidelines for the evaluation of digital scholarship in the Humanities, Social Sciences, Arts, and related disciplines. The document is aimed, foremost, at Academic Review Committees, Chairs, Deans, and Provosts who want to know how to assess and evaluate digital scholarship in the hiring, tenure, and promotion process. Secondarily, the document is intended to inform the development of university-wide policies for supporting and evaluating such scholarship.

1. **Fundamentals for Initial Review**: The work must be evaluated in the medium in which it was produced and published. If it’s a website, that means viewing it in a browser with the appropriate plug-ins necessary for the site to work. If it’s a virtual simulation model, that may mean going to a laboratory outfitted with the necessary software and projection systems to view the model. Work that is time based — like videos — will often be represented by stills, but reviewers also need to devote attention to clips in order to fully evaluate the work. The same can be said for interface development, since still images cannot fully demonstrate the interactive nature of interface research. Authors of digital works should provide a list of system requirements (both hardware and software, including compatible browsers, versions, and plug-ins) for viewing the work. It is incumbent upon academic personnel offices to verify that the appropriate technologies are available and installed on the systems that will be used by the reviewers before they evaluate the digital work.
‘It’s a team if you use “reply all”’: An exploration of research teams in digital humanities environments

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Abstract
Given that the nature of research work involves computers and a variety of skills and expertise, Digital Humanities researchers are working collaboratively within their institutions and with others nationally and internationally to undertake the research. This work typically involves the need to coordinate efforts between academics, undergraduate and graduate students, research assistants, computer programmers, librarians, and other individuals as well as the need to manage financial and other resources. Despite this use of collaboration, there has been little formal research on team development within this community. This article reports on a research project exploring the nature of Digital Humanities research teams. Drawing upon interviews with members of the community, a series of exemplary patterns and models of research collaboration are identified and outlined. Important themes include a definition of team which focuses on common tasks and outcomes as well as a need for responsibility and accountability to the team as a whole; elements of a successful team which include clear task definition and productive working relationships over the life of the project and beyond, a need for balance between digital and face-to-face communication and collaboration tools, and potential for more deliberate training in collaboration and team work. The article concludes with recommendations for the individual team members, project leaders, and teams.

1 Introduction
Traditionally, research contributions in the humanities field have been felt to be, and documented to be, predominantly solo efforts by academics involving little direct collaboration with others, a model reinforced through doctoral studies and beyond (See, for example, Fennel et al., 1983; Newell et al., 2000; Cuneo, 2003). However, Humanities Computing/Digital Humanities is an exception to this. Given that the nature of research work involves computers and a variety of skills and expertise, Digital Humanities researchers are working collaboratively within their institutions and with others nationally and internationally to undertake this research. This research typically involves the need to coordinate efforts between academics, undergraduate and graduate students, research assistants, computer programmers/developers, librarians, and other individuals as well as the need to manage financial and other resources. Despite this, there has been little formal research on team development...
within this community with few protocols in place to prepare individuals to work within these research teams.

2 Context

As team research and collaboration become more prevalent, reflection on the nature of collaboration within academic communities is gaining attention. In an article examining academic-practitioner collaboration in management research, Amabile et al. (2001) argue that it is necessary to understand the nature of collaboration and the factors that contribute to its success while minimizing the potential difficulties. Canada’s primary funding agency, Social Sciences and Humanities Research Council (SSHRC), is also examining the factors that encourage research success in large team research projects (Kishchuk, 2005; SSHRC, 2005). In addition, academic research teams themselves are reflecting on their own experiences to better understand the factors that influence research team success (See, for example, Bracken et al., 2006; Garland et al., 2006; Massey et al., 2006). However, despite this increasing focus on research teams, there has been minimal research on the role of teams within academic communities, particularly within the Humanities (Birnbaum, 1981; Kraut et al., 1987, 1988; Newell et al., 2000; Cech et al., 2004).

Within the Digital Humanities community, efforts toward understanding the organizational context in which Digital Humanities research is situated is beginning in earnest. Two large-scale survey projects (Siemens et al., 2002; Toms et al., 2004) have highlighted issues of collaboration, among other topics, and Warwick (2004) found that the organizational context has had an impact on the manner in which Digital Humanities/Humanities Computing centres developed in the United States and England. Other similar studies are underway as well. In addition, within his recent book, McCarty (2005b) explores ways that computers have opened opportunities for collaboration within the Humanities. In addition, he has explored the associated challenges of collaboration and team research within the HUMANIST listserv which he moderates (McCarty, 2005a). Several members of the community have also reflected on lessons learned through collaboration (e.g. Unsworth, 2003, 2007; Liu et al., 2007; Ramsay, 2008; Ruecker et al., 2008a,b; Smith et al., 2008). Finally, through efforts such as the University of Victoria’s Digital Humanities Summer Institute and other similar ventures, the community is working to develop its collaborative capacity through workshops with topics such as community-specific project management skills and team development and support.

Drawing upon these efforts, this paper explores and documents the nature of research teams within the Digital Humanities community to the end of identifying exemplary work patterns and larger models of research collaboration that have the potential to strengthen this positive aspect of the community even further. It is part of a larger research project focused on answering questions on the ways that research teams within this community function.

3 Methods

Given its exploratory nature, this project uses a qualitative research approach with in-depth interviews with members of various multi-disciplinary, multi-location project teams in Canada, the United States, and England. The interview questions focus on the participants’ definition of teams; their experiences working in teams; and the types of supports and research preparation required to ensure effective and efficient research results within teams. These interviews allow the researcher to explore topics more fully and deeply with probing and follow up questions while the participants reflect on their own experiences and emphasize those issues which are important to them (McCracken, 1988; Rubin et al., 1995; Marshall et al., 1999).

Data analysis involves a grounded theory approach, which focuses on the themes that emerge from the data. This analysis is broken into several steps. First, the data is organized, read and coded to determine categories, themes and patterns. These are tested for emergent and alternative
understandings, both within a single interview and across all interviews. This is an iterative process, involving movement between the data, codes and concepts, constantly comparing the data to itself and the developing themes (Glaser et al., 1967; Marshall et al., 1999).

4 Results

The interviewed individuals have been and continue to be members of a diverse range of team research projects, in terms of research objectives, team membership size, budget, and geographical dispersion. These projects have been located within their own institutions, as well as nationally and internationally. Some of these projects have been relatively small with a few team members and limited project scope while others are very large with many team members and larger project scope and budget. A variety of disciplines and discipline-specific methods of work are also represented on these teams. These projects have met varying degrees of success in terms of meeting project goals and member satisfaction as evaluated by the interviewees themselves. The participants have played a variety of project roles including research assistant, researcher, computer programmer/developer, and lead investigator. In several cases, their roles have changed within a particular research project as they gained skills and completed academic training. In terms of individual demographics, there is also diversity as can be seen in Table 1.

Table 1 Demographics of individual participants

<table>
<thead>
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<th>Characteristic</th>
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<tr>
<td>Gender</td>
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<td>Male</td>
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<tr>
<td>Developer/programmer</td>
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<td>Administration</td>
<td>2</td>
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<tr>
<td>Post-doctoral Fellow/Research</td>
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The first identified theme from the interviews focuses on the definition of a team. In their collective opinion, a team is a group of individuals who share common goals, outcomes, and output. One participant stated that a team was ‘people working together toward a common project or goal’. For the interviewees, inherent in this definition is the need for responsibility, accountability, communication, and collaboration among team members. In other words, individuals do not work in isolation on these research projects, but rather in concert with team members to accomplish the team’s goals. In addition, reflecting the variety of tasks required to complete a Digital Humanities project, a group is needed to accomplish these. Several participants also make the distinction between a team and a community, drawing upon differences in levels of accountability and responsibility. As the title of this paper suggests, one is part of a team when one uses ‘reply all’ when responding to an email, given the responsibility and need to coordinate with team members. This very action is necessary to ensure that team members communicate with each other and the team as a whole. This same obligation may not be present within a community. The elements of team definition are highlighted in Fig. 1.

From their understanding of teams, the participants elaborate further on the elements of successful and unsuccessful teams. The participants define a successful team as one which meets both its goals and outcomes while maintaining a good working relationship throughout the life of the project. As shown in Fig. 2, the components of successful teams include tasks, working relationships and time. When discussing the task component, the participants emphasize the need for clearly defined tasks, goals, roles, and milestones, which are negotiated by the team itself. With these, team members understand their role and relationship to each other and the project. The need for planning becomes inherent within this understanding of project success. For example, as one interviewee commented, ‘a well run team has benchmarks along the way to guide the research project’. Another echoed this with the observation that there needs to be a ‘clear and shared understanding of what is to get done’ in order to be successful.

While clearly defined tasks, milestones and outcomes are necessary, these are not sufficient for
A successful team project. A productive working relationship among team members must also be present and may even be more important than the task component to overall project success. The participants comment that it is by (un)productive working relationships that many projects live and die. These relationships are comprised of dignity, respect, trust, and understanding among team members at all project stages. As one interviewee stated, ‘there is something about the interpersonal dimension that is really important’. Within this context, some participants comment on the tension that can exist in this regard between the technical-oriented members and academics on a team. For a working relationship to contribute to project success, the interviewees reflect that all members must be treated collegially and with respect, regardless of role or training.

The participants also provide several possible measures of successful work relationships. One participant suggests that a successful team is one where the ‘team feels as happy getting together at the end of the project as they were in the beginning’. For another participant, trust must exist among the team members so that one is able to send a direct email asking ‘have you done this yet’ and knowing that you are not being rude. According to most participants, an effective working relationship can also be motivating and can create continued commitment to the project. As highlighted by several participants, the director/project lead plays an important role in creating this valuable relationship and has the responsibility to develop an environment that encourages trust and respect. One participant stated that an effective director ‘finds what each person is good at and then finds a way for them to contributed and fulfill their potential in the project’. Building on this, another interviewee felt it was ‘the role of the boss to respond’ to problems. When they do not, ‘an atmosphere of distrust and anger’ may be created. If they do not accomplish this, the end result may be unsuccessful teams which may have accomplished the tasks but at the sacrifice of the working relationship.

The timing of these efforts to define tasks, outcomes and timelines and create an effective working relationship becomes the final consideration for a successful team. The participants stress the need to begin these activities as early as possible, often during the grant development process, before the actual ‘work’ commences. They also feel that these efforts must be reinforced on a regular basis throughout the project’s life to ensure continued collaboration and commitment to it. Whether in person or by conference call, regular meetings are a key activity within these efforts. Finally, this time component often extends beyond the original project. One successful project may prompt people to work together on a second phase of that project or to even begin a new project. As a result, the participants feel that the subsequent projects with the same members may be better equipped to be successful because there is already an environment of trust and respect. As one participant articulates, ‘a second project with the many of the same team is in place precisely because there was a first successful project’.

Because these participants have been involved in various projects, they are quite cognizant of the
many challenges and benefits related to team research. The challenges are many and are predictable at times. Research teams often encounter personality difficulties and conflicts. This may be compounded by the ‘I know best’ attitude of many academics, as highlighted by several participants. Communication and coordination between team members on various levels provide ongoing challenges. These tend to reflect the tension that can exist between programmers and non-programmers, the varying perspectives of different disciplines, a lack of common language and understanding of the project between team members, and a possible feeling of isolation that can occur due to information gaps or geographical dispersion. Given the diversity of skills, disciplines, and individuals involved in many of these projects, standards on roles, expectations, outputs, and credit must be negotiated with each project. These issues can become compounded exponentially as the number of team members and the amount of geographical dispersion increases.

Teams also struggle with members who do not contribute equitably. One participant describes a successful team as a ‘round thing’ with equitable contribution by individual members. A team may become lopsided with uneven effort on the part of members. Time and commitment are ongoing issues given that individuals are generally limited in their ability to devote 100% of their time to a particular project. The final challenge relates to the need for ongoing funding and retention of team members. Digital Humanities projects often need more money than traditional Humanities projects. As a result, ensuring consistent funding can be a struggle. Thus, it may be difficult to keep people involved as money ebbs and flows over the life of the project. As a result, teams must often train many new people over the life of a project, creating another challenge.

However, team research creates many benefits that often offset the challenges, thus ensuring that team research continues. This larger network of individuals with a variety of skills and knowledge creates a richness of interaction and synergies that is often not found in solitary research. Certainly, team research presents an opportunity for social interaction. Single scholar research can often be a lonely affair, as pointed out by several interviewees. Team research ensures that knowledge gaps are addressed. As one participant reflects, ‘team research prompts one to think at a different level about a project than is possible by oneself’. Another stated that ‘it is rare that someone can do it all in digital projects’. Finally, team research builds ongoing relationships that can create the potential for future projects. As one participant remarks, team research is a ‘double-edged sword’. Those very challenges ultimately translate into the benefits that allow a team to accomplish more than any single individual. Table 2 summaries the benefits and challenges of team research.

The research teams, in which these individuals participate, draw upon a variety of communication and collaboration tools. Given the nature of research within Digital Humanities, these research teams employ a range of digital and electronic communication and collaboration tools. The teams use wikis, blogs, websites, email, listserves, shared online project spaces, and instant messaging for record keeping of decisions, tasks and deadlines and the timely sharing of information with team members. Some teams also use instant messaging for quick exchanges in real time in a way that the other digital

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<th>Benefits</th>
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<td>Richness of interaction and synergies</td>
<td>Personality and discipline difficulties</td>
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<td>Greater accomplishments than possible by a single individual</td>
<td>Communication and coordination challenges</td>
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<td>Social interaction</td>
<td>Inequitable distribution of effort</td>
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Table 2: Benefits and challenges of team research

'It’s a team if you use “reply all”'
tools do not allow. All these methods are particularly useful for those teams whose members are geographically dispersed and very busy. However, these tools present several challenges. The digital tools are sometimes viewed as one more task for already busy people. In addition, people struggle with overflowing email inboxes and often do not read nor respond to emails to the frustration of team members. The participants also feel that it is difficult to bond and establish productive working relationships or resolve contentious issues with digital tools.

These teams also draw heavily upon verbal communication tools in two forms to develop their collaborative work relationships. First, conference calls, either by phone or Skype, are standard for many teams. In addition, the participants meet face-to-face on a regular basis to fulfill several objectives. First, these meetings are useful for reviewing progress from previous meetings and planning next steps. Second, agenda items often include those ‘thorny’ issues, which cannot be easily resolved by conference calls or email. In other cases, some groups use face-to-face time for concentrated effort on direct project work. Finally, these meetings are also a time to ‘enjoy each other’s company over good meals and drinks’, as highlighted by one interviewee. All these efforts contribute to the establishment of commitment, obligation, and responsibility to each other and the larger project. As one participant stated, ‘if there is too much time between meetings, you do not feel like a team’. Another realized that they ‘would never underestimate the value of this again’. These benefits, however, come with trade-offs. Given the size of the teams, scheduling these meetings can be difficult and time-consuming. In addition, the projects generally face budget limitations, which can constrain the frequency with which the teams can meet. Funding guidelines may also impose constraints on hospitality budgets. (See Siemens, 2008 for a fuller discussion on the use of communication and collaboration tools in Digital Humanities research teams.)

For the most part, these participants have learned to work in teams through direct experience and/or observation of research teams. In some cases, participants have worked within a semi-formal apprenticeship model where they started as research assistants on a project and then developed skills, which led to increasing amounts of responsibility and contribution in subsequent projects. The participants express some skepticism about management training and its application to Digital Humanities research. However, they are open to the possibility and suggested that potential training might include exposure to the similarities and differences with other disciplines, ways to be a good colleague, and how to effectively chair meetings. Participants suggest that there may be a possibility for the incorporation of more team projects within classes as a way to train the next generation of Digital Humanities researchers.

5 Implications for practice

From this exploration of research teams within the Digital Humanities environment, several implications for practice can be recommended. These focus on various levels within a research team environment.

(1) Deliberate action and commitment on the part of the individual team member—When one decides to join a research team, one is committing to both identified components of a team, that is, common goals, tasks, and output, and accountability and commitment to the team. Thus, to be a productive team member is to commit oneself to the team’s common goals, outcomes, and output as they have been negotiated by the members. Any individual goals and desired outcomes must then fit within these objectives and goals. Second, and perhaps more importantly, one is agreeing to certain expectations about working relationships and responsibility to other team members. Again, one cannot do one’s own thing within a research team. As a result, individuals are well advised to evaluate their commitment to a team prior to joining it to ensure that they can follow through on it. Once one accepts this commitment, their most important role on the team is to be a ‘good colleague’, as suggested by one of the participants.
(2) Deliberate action by the project leader—As highlighted above, the project leader plays a particularly important role in shaping the work environment for these teams to ensure project and research success. They must ensure that team members understand the commitments they have made to the team and that they subsequently live up to these. To ensure productive work relationships, project leaders need to ensure that the project remains ‘round’, not lopsided, and respond to those who do not contribute equitably. The project leader also plays an important role as a model for the desired behaviours. Towards this end, project leaders must facilitate the necessary and ongoing discussions that establish the parameters of the team’s working relationship.

(3) Deliberate action by the team—Potential team members must reflect at the beginning of any discussions toward a team research project on the inherent benefits and challenges of team research. By recognizing these in advance, teams can take deliberate steps to maximize the benefits while minimizing the challenges. These steps might include focused discussion and negotiation of project goals, outcomes, and tasks with the aim of building commitment and buy-in. In addition, teams must develop a common language among members from various discipline backgrounds so that communication and collaboration can be effective and efficient. Members might also explore the similarities and differences between the various academic cultures and disciplines as well as the ones between technical and non-technical team members. As Liu and Smith (2007) argue, team members must be open to the differences that exist between various discipline perspectives and take active steps to explore these differences in advance to reduce confusion and misunderstandings.

(4) Deliberate training—On-the-job training of technical and team skills can be effective; however, it must be used again with deliberate action. Senior team members must model desired behaviours and create learning environments where junior members can gain necessary skills and responsibilities while contributing to projects. Group projects within courses may be an additional way to develop the necessary skills within students in advance of participation in team research projects. Ultimately, the development of team collaborative skills will serve students well as they look for employment within and without the academy. This training can be supplemented with reflection on team processes. Through reflection, team members can establish the key behaviours, tasks, and other factors that contribute to project success. These lessons can then be transferred to other teams through both formal and informal mechanisms. For example, at recent conferences for Digital Humanities, Society for Digital Humanities/Société pour l’étude des médias interactifs and other associations, several papers focusing on various aspects of team processes were presented. In addition, these lessons are transferred to groups as people move between various research teams. As a practical example, Ruecker and Radzikowska (2008a) outline the expanding use of a project charter among various teams in which they are involved.

(5) Balance between digital and in-person communication and collaboration tools—Digital communication and collaboration tools are very effective for geographically dispersed teams, particularly for Digital Humanities teams, which already have an affinity for the digital environment. However, the digital cannot replace the many benefits that flow from in-person interactions, including the development of positive working relationships. A balance between the digital and the personal must be established and ensure that the tools selected support both the task and working relationship components of successful teams. As a result, budgeting for the use of digital and in-person tools, including face-to-face meetings, must be included in project plans and budgets. Money and time is needed to support these tools and it can be argued that project success often hinges on them, a point to stress with project funders.
6 Conclusion

Research teams are widely used in the Digital Humanities community to undertake various research projects. The teams in which these participants have been involved have been successful and found ways to manage many of the various challenges associated with this type of work. This study is one step towards understanding the nature of these research teams while recommending several best practices. However, there is more research to be done. At this point, a relatively small number of individuals involved in Digital Humanities research projects based in Canada, the US, and England have been interviewed. Additional interviews are ongoing. In addition, a survey will be conducted to explore the above themes further within the community at large and provide more empirical data. Further, as more Digital Humanities research teams involve members from a variety of countries, the issues of different cultures, languages, and geography should be explored to determine the impact that these may have on these teams. Finally, further study of research teams in other disciplines might provide further learnings for Digital Humanities research teams. With this knowledge, further research protocols and supports can be developed to support the ongoing Digital Humanities research work, capitalizing on these positive aspects of the community even further.

References


### Collaborative Approaches to the Digital in English Studies

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<td>TITLE</td>
<td>Computing and Communicating Knowledge: Collaborative Approaches to Digital Humanities Projects</td>
</tr>
<tr>
<td>AUTHORS</td>
<td>Lisa Spiro</td>
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<tr>
<td>OVERVIEW</td>
<td>Two cultural and technological transformations are influencing the move toward collaborative digital humanities scholarship: (1) the abundance of data and (2) Web 2.0, or “the participatory web.” This chapter provides compelling examples of how humanities researchers are responding to these transformations and illustrates different approaches both to collaboration and to digital humanities research. Case studies of HyperCities, the Tibetan and Himalayan Library, the Orlando Project, and The Mind Is a Metaphor are presented based on semi-structured, hour-long interviews conducted with project leaders as well as analyses of articles and Web sites associated with the projects. In the chapter’s final section, the author examines the challenges that collaborative humanities researchers face and suggests how to better support this sort of work.</td>
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<td>AUTHOR BIOGRAPHIES</td>
<td>Lisa Spiro, director of the National Institute for Technology in Liberal Education Labs, works with the liberal arts community to explore emerging educational technologies and develop collaborative approaches to integrating learning, scholarship and technology. As part of her passion for tracking emerging educational technologies and analyzing their implications for research and teaching, she edits the Digital Research Tools (DiRT) wiki and authors the Digital Scholarship in the Humanities blog. Lisa’s recent publications include a report for the Council on Library and Information Resources (CLIR) analyzing the prospects for an all-digital academic library (with Geneva Henry), another CLIR report evaluating archival management software, and an essay examining how scholars use digital archives in American literature and culture (with Jane Segal).</td>
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According to stereotype, the humanities scholar works alone, surrounded by books. But a counter-image is emerging of the collaborative digital humanist who participates in interdisciplinary teams and networked communities (Howard, 2009). "Digital humanities," a debated and loosely defined term, refers to a diverse and still emerging field that encompasses the practice of humanities research in and through information technology, and the exploration of how the humanities may evolve through their engagement with technology, media, and computational methods" (About, 2009). I selected this definition because it emphasizes both methods and media, as well as digital humanities' concern with understanding (and shaping) the impact of computation and networked information on the humanities. While some argue that digital humanities should focus on harnessing social media to create a new space for scholarship and public intellectualism" (Parry, 2010), others emphasize that the practical "slow work" of building technologies and methods is likewise important, since digital collections, text analysis software, GIS tools, and the like provide the basis for scholarship (Clement, 2010; Ramsay, 2010b). This chapter takes a wide view of the digital humanities, since computation and communication, method and media, enable us to explore the larger question of how we can employ technology to produce, represent, and exchange ideas about culture. As Stephen Ramsay (2010a) puts it, "technology and discourse are intertwined." Collaborative and multidisciplinary, digital humanities projects bring together cultural data, humanities questions, and computer-based methods for producing, analyzing, and/or representing and disseminating knowledge.

In English studies, digital research can take many forms, such as building editions and collections, using computational methods to produce new interpretations of texts and other cultural objects, examining online reading and writing practices, facilitating participatory knowledge sharing, or producing multimodal scholarship that presents scholarly arguments in a dynamic, interactive fashion. Collaboration is generally vital to accomplishing such projects because of their scope and complexity. As Todd Presner—professor of Germanic Languages, Comparative Literature, and Jewish Studies at UCLA—suggests, "Digital humanities is always participatory and collaborative. . . . No scholar in isolation could have the knowledge, ability, or time to do this work" (personal communication, July 24, 2009).
I want to focus on two cultural and technological transformations that are influencing the move toward collaborative digital humanities scholarship: (1) the abundance of data and (2) Web 2.0, or “the participatory web” (Web 2.0, 2010). The amount of digital information is massive: 12 million books digitized by Google, 6 million JSTOR articles, at least 21.13 billion Web pages, and petabytes of scientific data (JSTOR, 2010; Oder, 2010; The Size of the World Wide Web, 2010). In fields such as genetics, environmental studies, and astronomy, the explosion of data is allowing scholars to pursue information- and data-intensive, distributed, collaborative, and multi-disciplinary approaches to research, such as conducting longitudinal studies of the environment that draw from multiple datasets (Borgman, 2009). What the availability of huge amounts of data means for humanities research remains an open question, one that is being explored through the “Digging into Data” international competition sponsored by the UK’s Joint Information Systems Committee (JISC), the United States’s National Endowment for the Humanities (NEH) and National Science Foundation (NSF), and Canada’s Social Sciences and Humanities Research Council (SSHRC) (NEH, JISC, NSF, & SSHRC, 2009). At the same time that we are gaining access to massive amounts of data, participatory Web 2.0 technologies are enabling people to exchange information through social networking sites such as Facebook; share, comment on, and remix media through social media sites such as Flickr; and collectively construct knowledge through open content initiatives such as Wikipedia. Invoking the participatory, interactive approaches of Web 2.0, Cathy Davidson calls for Humanities 2.0, which embraces the open exchange of information, values participation by academics and non-academics alike, and “de-centers” core assumptions about authorship, expertise, and status (Davidson, 2008). This call has been echoed by the Digital Humanities Manifesto, which advocates for “wiki-scholarship” that is “iterative, cumulative, and collaborative” (UCLA Mellon Seminar, 2009).

As the digitization of the cultural record makes available an abundance of humanities data, and as Web 2.0 technologies connect researchers to each other and to the broader community, digital humanists are exploring new models for producing, analyzing, representing, and communicating information. By examining research goals and practices, this chapter first investigates why the digital humanities tend to be more collaborative than “traditional” humanities. I then provide brief case studies of projects focused on (1) communicating and exchanging knowledge through participatory online environments; (2) building digital collections of primary and/or secondary scholarly resources; and (3) developing computational methods for analyzing humanities data. (For a more extensive listing of different types of collaborative projects in the digital
humanities, see Spiro, 2009b.) These case studies are based on semi-structured, hour-long interviews I conducted with project leaders as well as analyses of articles and Web sites associated with the projects.

The three types of projects listed above can be considered reinventions of traditional humanities work: expansions of the collaborations involved in promoting public humanities, creating scholarly editions and reference collections, and pursuing interdisciplinary approaches to literary criticism. Yet these collaborations also take the humanities in new directions, whether by moving from public to “participatory humanities,” where the public become active co-creators rather than passive recipients of knowledge; engaging humanities scholars not only in editorial work but also in encoding and representing knowledge; or applying methods derived from computer science and statistics to humanities questions.

These projects provide compelling examples of the digital humanities, but they also illustrate different approaches both to collaboration and to humanities research. Participatory projects generally take a distributed, community-driven, “loosely coupled” approach to collaboration, so that work is modular, often occurs remotely rather than via face-to-face meetings, and can be done independently (Olson & Olson, 2000). Yet in the participatory projects discussed in this chapter, HyperCities and the Tibetan and Himalayan Digital Libraries, project teams work closely with local communities to produce media representing the communities’ own experiences. These projects break down the barriers between scholars and the community by engaging all in constructing intellectual resources. With projects to build digital collections, a large group of content experts, programmers, interface designers, and text encoders together define, produce, and disseminate a common scholarly resource. Projects to create new methodological approaches typically involve smaller interdisciplinary teams of humanities scholars and computer scientists, information scientists, or statistics researchers. In the chapter’s final section, I examine the challenges that collaborative humanities research faces and suggest how to better support this sort of work.

**WHY DO DIGITAL HUMANITIES RESEARCHERS COLLABORATE?**

Collaboration has become a buzzword, the subject of hundreds of books and a goal touted in many university strategic plans. Collaboration, meaning “united labor” (“Collaboration,” 2009) in pursuit of a common goal, can take many forms depending on who is working together (e.g., researchers in the same or different fields, inside or outside of the academy), how the work is done (tightly or loosely
managed), and what is produced (e.g., research paper, software, digital collection) (Palmer, Teffeau, & Pirmann, 2009). Closely aligned to collaboration is participation, which suggests "sharing in an action" (Participation," 2009); this sharing may be less coordinated than collaboration, but it likewise involves people working together for a common purpose.

Field-specific research practices typically shape whether and how scholars collaborate. In the sciences, collaboration is expected, reflected in the organization of research into labs where a faculty member oversees work by postdocs, research assistants, graduate students, and undergraduates. In the humanities, by contrast, faculty members typically work alone and advise graduate students on their own unique projects. In part, the practice of solitary humanities scholarship may reflect the romantic ideal of the literary theorist as an "isolated poet and thinker" (Gilman, 2004, p. 386). Even as the humanities preach the death of the author, they value the individual subjectivity of the scholar and practice solo authorship (Ede & Lunsford, 2001).

Whereas the "traditional" humanities continue to produce solo scholarship, the digital humanities tend to be much more collaborative. We can see this trend toward collaborative digital humanities scholarship by comparing rates of co-authorship, a typical measure of collaboration. A study of patent records and articles in Web of Science, an online citation index that includes the Arts & Humanities Citation Index, concluded that in the arts and humanities a single author wrote over 90 percent of the articles, although there is a trend toward teamwork (Wuchty, Jones, & Uzzi, 2007, p. 1037). In contrast, I found that between 2004 and 2008, 48 percent of the articles published in Literary and Linguistic Computing (LLC), a leading digital humanities journal, were written by two or more authors (see Spiro, 2009a). Of these articles, 49 percent were written by scholars from two or more institutions, while about 16 percent involved authors from two or more countries. The relatively high frequency of collaboratively written articles likely reflects the diverse practices of LLC’s contributors, including researchers from disciplines such as computer science, linguistics, classics, information science, and literature; indeed, since digital humanities research joins subject knowledge in the humanities and computer-based approaches, it is by nature interdisciplinary and collaborative. Likewise, two or more authors wrote 41 percent of the articles published in Digital Humanities Quarterly between the spring of 2007 and the fall of 2009. Typically, single authors wrote articles describing interpretive or theoretical work (e.g., "Interpretative Quests in Theory and Pedagogy" [Howard, 2007]), while multiple authors produced articles describing practical projects to develop collections,
tools, or methods (e.g., “Mining Eighteenth Century Ontologies” [Horton, Morrissey, Olsen, Roe, & Voyer, 2009]). Although this study should be carried out more systematically across a wider range of publications and a longer time span, the initial citation analysis supports the observation by Brett Bobley (2009), director of the NEH’s Office of Digital Humanities, that “digital humanities is collaborative and international.”

Why do digital humanities scholars collaborate more frequently than “traditional” humanities scholars? What difference does collaboration make? In part, the traditional emphasis on solitary scholarship reflects how the humanities typically gain access to and make use of information (Toms & O’Brien, 2008). Unlike scientists or social scientists, humanities scholars traditionally have not created data through experiments or elicited data through surveys and focus groups. Rather, they analyze the existing cultural record, which typically does not require collective efforts (Goldenberg-Hart, 2004). Whereas collaboration is common in quantitative, positivist fields like sociology, it is less typical in theoretical and interpretive fields (Moody, 2004)—an observation that likely applies to the humanities as well. According to Andrew Abbott (2008), humanities work is “artisanal” and depends on the individual mind interacting with research materials (p. 533). In contrast, digital humanities work often engages a team of researchers in “building” something (a collection, tool, method, hypermedia publication, participatory platform, etc.), occurs on a larger scale, and demands diverse expertise. A recent survey of digital humanities research teams found that the most common reasons researchers cited for working together are “Team members have different skill sets” and “Collaboration is more productive than individual work” (Siemens, 2009, p. 120).

Yet it would be too simple to say that “traditional” humanities scholars do not collaborate. Even if humanities scholars have tended to conduct independent research and produce fewer co-authored books and articles than their colleagues in the sciences, they actively participate in research communities by exchanging ideas and citations, presenting at conferences, and reviewing essay drafts and journal submissions. Indeed, “at times, the dependence of humanities scholars upon their colleagues can approach joint authorship of a publication” (Brockman, Neumann, Palmer, & Tidline, 2001, p. 11). Scholarship involves a conversation with fellow scholars and with the broader community, past, present and future, as reflected in citations and acknowledgments. Networked technologies such as blogs, wikis, listservs, digital collections, and scholarly networks like Romantic Circles and HASTAC open up, accelerate, and make visible that scholarly conversation.
As humanities scholars gain access to data and embrace the culture of information sharing, collaborative research may become more common in the humanities, even as solitary scholarship will continue to be appropriate for some projects. The tendency to collaborate may not be inherent in the discipline, but is instead a function of the difficulty of accessing and analyzing data. For example, seventeenth-century astronomers such as Johannes Kepler were reluctant to publish and share their data because it was so difficult to generate (Choudhury & Stinson, 2007). In contrast, humanities scholars had long collaborated in copying, illuminating, and "recasting" works such as the *Roman de la Rose*. Choudhury and Stinson (2007) thus suggest that how scholars perform and disseminate their research is determined not so much by "inherent characteristics within specific disciplines" but by "the relative ease or difficulty with which practitioners of those disciplines can generate, acquire or process data." In "big science" projects such as analyzing massive amounts of astronomical data made freely available through the Sloan Digital Sky Survey, interdisciplinary collaborations are common (Borgman, 2009). In twentieth-century humanities research, however, scholars typically built their reputations through their individual efforts, whether by making unique discoveries in archives or advancing brilliant theoretical approaches. Yet the nature of archives is changing, as we move into an era of data abundance (Rosenzweig, 2003). Just as producing manuscripts during the early modern era required the labor of many, so digital humanities projects focused on representing, analyzing, and disseminating data are fundamentally collaborative.

Ultimately, this chapter addresses how modes of knowledge production and dissemination are changing as information becomes networked and digital and as humanities scholars envision new ways of doing their work. In digital literary studies, as in other fields, researchers collaborate because it enables them to accomplish their goals. Stanford University lecturer and academic technology specialist Matthew Jockers suggests, "I think collaboration arises naturally from the pursuit of a particular kind of question. . . . We’re going to see more collaboration because the questions we’re interested in are changing" (personal communication, June 5, 2009; see also Jockers, 2010). These questions might be

- How can we break down the barriers between "academic knowledge" and "community knowledge" and create a platform for sharing all knowledge?
- How do we encode and represent information so that readers can discover new knowledge?
- How can we use computational methods to answer rhetorical, literary, or other relevant questions?
Technology supports performing and delivering such work, but research goals drive it. Although their core questions may differ, these digital humanities projects point toward more interdisciplinary, collaborative approaches to producing humanistic knowledge, approaches that deserve the attention of English studies professionals.

**PARTICIPATORY HUMANITIES**

Collaborative open-content projects such as Wikipedia demonstrate the power of peer production, even as they raise questions about authority and expertise. As Cathy Davidson and David Theo Goldberg (2009) argue, our culture is shifting toward collaborative forms of knowledge production, a shift that academic institutions must engage. Through “citizen humanities” projects, academics and non-academics alike are sharing their knowledge and experiences online, providing genealogical information, digitizing and transcribing documents, and creating dynamic maps of local culture. Rather than viewing the public simply as the subjects of research, participatory knowledge initiatives take “public humanities” to a new level, not only reaching out to communities but also “reaching in” and creating channels for knowledge sharing and collaboration (Davidson & Goldberg, 2004).

Through HyperCities, scholars and citizens co-create knowledge as they contribute their own layers of information to a series of interactive maps that offer different perspectives on the urban experience. HyperCities, “a collaborative research and educational platform for traveling back in time to explore the historical layers of city spaces in an interactive, hypermedia environment” (HyperCities, n.d.; see Figure 1), has been developed through a partnership of universities and civic organizations, including UCLA, USC, City University of New York–Baruch, Pilipino Workers’ Center, and Public Matters, Los Angeles.

![HyperCities Web site](image-url)
By using the Google Maps and Google Earth API to create geospatial mashups, HyperCities has created an open, interactive platform where people can explore and contribute information documenting experiences of urban space and time, such as photographs, video, oral histories, maps, stories, and GIS data. Although HyperCities hosts some data, it also aggregates digital media stored elsewhere, so its architecture is based on connecting distributed information.

HyperCities invites open participation, whether through individuals contributing media, archives sharing collections, or institutions collaborating on city-based projects. Users can search by place and time, see both overlay maps and content associated with a particular place and time, and view data generated by the local community and scholarly community side-by-side. According to founder and director Todd Presner, HyperCities aims to “create maps that are different from more traditional historical maps, to interrogate representations, to use knowledge in communities and the repositories in people’s heads to contribute to academic content and interrogate it” (personal communication, July 24, 2009). Thus, HyperCities recognizes and values different kinds of expertise, both the knowledge of people who live in communities and of scholars who make arguments about those communities. For instance, users can explore Phil Ethington’s Ghost Metropolis, Los Angeles, since 13,000 BP, which provides a global multimedia history of Los Angeles from the age of woolly mammoths to the present, alongside videos documenting Los Angeles’s Filipinotown that were created by students participating in a program sponsored by the Pilipino Workers’ Center and Public Matters.

Although some people complain that putting everything on the same level makes it difficult to distinguish vetted and unvetted material, Presner favors openness, rich juxtapositions of data, and flexibility over locking down information (personal communication, July 24, 2009). According to Presner, exploring HyperCities resembles walking through a physical city, where “there’s going to be graffiti on the subway, but there’s great stuff too. There are many different modes of expression, some of which you may not agree with, but you sift through them.” The user applies his or her own critical judgment in evaluating and applying the knowledge made available through HyperCities. This participatory digital space values experience as well as formal, analytical knowledge and is engaged in the community rather than standing apart from it.

Like HyperCities, the Tibetan and Himalayan Library (THL) re-envisions knowledge creation and dissemination as participatory and collaborative,
engaging the local communities that are the objects of investigation as participants sharing their own knowledge (see Figure 2).

Figure 2. The Tibetan & Himalayan Library Web site.

From its start in 2000, THL aimed to "create a collaborative research environment and publishing system for scholars and projects from around the world" ("A Short History of the Tibetan and Himalayan Library," n.d.). Its initial focus included supporting scholarly exchanges between the U.S. and Tibet, developing software for the Tibetan language, and providing access to "collaborative repositories" of XML-encoded texts, images, GIS maps, audio-video resources, and dictionaries (The UVA Tibet Center, 2008). To encourage contributions to its collaborative repositories, THL features a "Participate!" link in the footer of each page on the site and provides extensive documentation explaining how and why to contribute content.

As THL founder David Germano acknowledges, however, "We didn’t create a truly different model for how we can create knowledge in a radically distributed fashion….The work should involve not just elite scholars and students, but really open up participatory knowledge in a broad variety of localities" (personal communication, June 10, 2009). Thus, THL launched its "Participatory Knowledge Initiative," which aims to document and disseminate knowledge within and beyond local communities. As Germano argues, scholarship suffers when it overlooks the knowledge of local people: "There is a wealth of knowledge about places, communities, practices—but that knowledge is tacit, oral, embodied in character. It doesn’t go beyond that community. Participatory knowledge makes

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1 To facilitate both participation and open scholarship, THL takes a flexible approach to copyright, generally supporting the open content movement but also embracing contributors’ needs to make money from their work by offering more restrictive licenses (Tibetan and Himalayan Library, n.d.).
knowledge more migratable, transmitted to others, kept, sustained, transmitted to future generations.”

The Participatory Knowledge Initiative is building structures that enable local community members to share their own knowledge and take part in conversations about their communities. For example, it worked with Machik (a non-profit), the Columbia Film School, the Maysles Institute, and Rabsal on participatory projects in Eastern Tibet, where students, monks, villagers, and others were provided equipment and training so that they could produce their own documentaries about their community and perspectives. Students produced “Making Good Choices,” a short film that warns against substance abuse among young adults. This work is now being extended in Tibet in partnership with Winrock International to try to create a broader network of partnerships for knowledge creation and dissemination that extend from local communities on the plateau to elite universities in Europe and America and back. These representations support both self-reflection and global understanding as the communities become visible on the Internet, their own cultures documented through multimedia. As Germano argues, “When you use digital technology, you can allow communities to pop up, each distinctive with its own traditions, histories, etc. We then see the world as this heterogeneous stitching together of so many localities” (personal communication, June 10, 2009).

The THL has embraced participatory knowledge creation to fulfill ethical obligations and to benefit both society and scholarship, so that higher education “doesn’t just extract knowledge and send students to study, but rather engages in truly reciprocal relationships where we take care of how the transmission and the delivery of knowledge impact these communities which we engage with” (David Germano, personal communication, June 10, 2009). According to Germano, such a participatory mode of knowledge production and dissemination should be fundamental to what the university does, since both society and scholarship improve when they respect and integrate local knowledge. Participatory projects reflect the growing understanding of writing as social, connected, and collaborative, as readers become writers and editors—or, in the case of HyperCities and THL, mapmakers and filmmakers (Lundin, 2008). Moreover, they demonstrate the larger value of humanities by recognizing that scholarship is an ongoing conversation with the public and that non-Ph.D.s may have valuable knowledge to offer.2 Although getting people to participate, crediting

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2 For example, a comparison of a wiki about Pynchon’s novel Against the Day produced by non-academics to an academic study of the novel suggests that while the wiki is less consistent and coherent, it is also more comprehensive and less prone to error (Schroeder & Den Besten, 2008).
participation, and ensuring that the content is trusted can be challenging, participatory projects point to ways of making the humanities more engaged in the community and ultimately more innovative, as embedded and expert knowledge are shared.

BUILDING SCHOLARLY COLLECTIONS

Scholars have long collaborated to construct scholarly resources such as critical editions and reference works. For instance, the credits page for the Northwestern Newberry edition of Melville’s *Confidence Man* (1984) lists fourteen people, including editors, associate editors, contributing scholars, an editorial coordinator, and co-authors of the historical note. However, producing a digital collection or edition typically necessitates even more staff than a comparable print edition, as people with both technical and literary expertise work together to develop a model of the text, determine how to apply markup standards (which, as Julia Flanders [2009] suggests, are themselves “collaborative technologies” that communicate ideas so that they can be “reused”), analyze and encode features of the texts, design interfaces, and, in many cases, publish the texts. A glance at the credits page for digital collections reveals the extent of collaborative work. For example, the *William Blake Archive* lists 70 people, including the editors, technical editors, project managers, bibliographer, project assistants, research assistants, scanning assistants, consulting editors, programmers, and technical staff.3

Differentiating “traditional” from electronic scholarship, John Walsh (2008) suggests, “Electronic scholarship encourages interdisciplinary collaboration and gives scholars control over more aspects of the production and presentation of their work, from writing and editing to design, contextualization, and publication.” Whereas in traditional literary scholarship the scholar produces knowledge while the publisher determines how it will be represented and disseminated, creating a digital collection often involves a team effort where the production and representation of knowledge are integrated. Teams not only do background research and encode texts using XML markup standards such as the one developed and maintained by the Text Encoding Initiative but also devise stylesheets for representing the texts, design interfaces for interacting with information, and often serve as publishers or distributors.4

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3 Credits pages for digital projects tend to be more extensive than their print equivalents, acknowledging everyone who made a contribution to the project. Since many digital humanities projects rely on student labor, they typically involve a fair amount of turnover.

4 Many digital humanities collections are published by digital humanities centers rather than presses, although their creators tend to prefer the word “distribute” to “publish.” For example, the Walt Whitman Archive is “freely distributed” by the Center for Digital Research in the Humanities at the University of Nebraska–Lincoln (“The Walt Whitman Archive,” 1995) and the Rossetti
Since building digital resources requires extensive teamwork, such projects have caught the attention of those advocating for the humanities to become more collaborative. For instance, Lunsford and Ede (2001) cite the Orlando Project, *Women’s Writing in the British Isles from the Beginnings to the Present*, for exemplifying multidisciplinary collaboration, given the number of scholars involved, the breadth of the goal, and the multiple perspectives necessary to illuminate the writing of women across such a broad span of time* (p. 361). The Orlando Project originated in a print reference book called *The Feminist Companion to Literature in English* (1991), which was so packed with information that there was no room for an index or other research that the editors wished to include. Rather than being boxed in by print, the editors turned to electronic publication—see Figure 3—as a way to offer more information, provide richer modes of access, and, ultimately, realize the advantages of moveable text that permitted dynamic ordering of materials according to reader’s priorities; the dialogism or multi-voicedness that seemed particularly suited to collaboration* (Brown, Clements, & Grundy, 2006, p. 320).

![The Orlando Project Web site.](image)

Here “collaboration” means empowering readers to engage in a dialogue with scholarly materials and participate in the process of building knowledge. As the

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<sup>5</sup> Although the Orlando Project is a reference tool rather than a critical edition, both types of projects involve collaborative efforts to develop data standards as well as to encode and represent the data.
Editors found, such goals entailed moving to "a new mode of scholarly production" that required intense collaboration, explicitness in devising and documenting standards for representing knowledge, and flexibility in applying these standards (Brown et al., 2006, p. 533). On a practical level, creating a digital resource meant expanding the project team from three co-editors to "two principal investigators, four co-investigators, three postdoctoral fellows, a project librarian, a research collaborator, and eight graduate research assistants" (Brown & Clements, 1998); ultimately more than one hundred people in Canada, the United Kingdom, the United States, and Australia worked on the project.

With its focus on women's writing, the Orlando Project is exploring the "domestication of computing for the humanities," bringing a feminist perspective to using computers to produce and disseminate knowledge (Brown & Clements, 1998). Core to the Orlando Project's collaborative, feminist practice was creating an encoding standard for describing women's literary history - that would valorize and give voice to women and the texts they wrote, and make them susceptible to kinds of historicization, interrelation, juxtaposition, and analysis not previously possible" (Brown et al., 2006). The Team Planning Group, made up of "core project members," developed the Orlando Project's Document Type Definitions (DTD) to encode information included in the project, focusing initially on Events, Biography/Life, Writing and Documentation (Brown, Clements, Grundy, Balazs, & Antoniuk, 2007). For example, the Orlando Project represents the social nature of writing by encoding personal as well as textual relationships: family, friends, influences, reception, and even whether authorship is collaborative (see Figure 4).

Figure 4. How Orlando encodes collaborative authorship.

Developing this encoding scheme required a degree of collaboration that distinguishes the Orlando Project from most traditional humanities work: -Instead
of a single researcher needing to communicate effectively and clearly with one or more research assistants, we have a research collective that together had to develop a shared view of the project’s research aims” (Hockey, Butler, Brown, & Fisher, 1997). Through a consensual decision-making process, the group could hash out both the scholarly and technical approaches necessary to accomplish the project’s goals, explicitly representing the structure and semantics of the text. Such a process had some disadvantages: “it took—literally—years to devise, test, and finalise our tagsets” (Brown et al., 2006, p. 321). Team members applied these tags in authoring “chunks” of text documenting literary history, producing a dynamic resource that brings together a number of authorial voices (Brown et al., 2006). By encoding information such as people, places, and intertextuality, the Orlando Project enables readers to go beyond keyword searches and explore connections among different chunks of knowledge. Readers can even view the SGML (Standard Generalized Markup Language) tags that were used to mark up the information. This open approach invites the reader to become a collaborator in navigating and interpreting both the text and the editorial decisions that inform it (Brown & Clements, 1998).

In 2006 Cambridge University Press published Orlando as an online textbase with almost 7.7 million words, but the project team continues to create new content and enhance the technological infrastructure (Brown, Clements, Grundy, Ruecker, Antoniuk, & Balazs, 2009). In particular, the Orlando Project is investigating how to leverage the semantic markup in the texts and provide interfaces that enable readers to study patterns and examine interlinkages such as writers’ associations with each other or with a particular place (Brown, Ruecker, et al., 2009). In the future, the Orlando Project plans to facilitate participatory literary scholarship, so that scholars beyond the core team can be invited to modify and contribute to the textbase (Susan Brown, personal communication, January 28, 2010). Implementing participatory scholarship involves complexity both in balancing openness and authoritativeness and in redesigning the workflow management system to make entries easy to edit and to ensure appropriate permissions. Collaboration thus occurs at different levels in Orlando: the team planning group collaboratively developed standards and approaches; the larger project team, including a number of graduate students, together authored and edited entries and applied the tags; and the readers take part in the ongoing scholarly conversation by using the encoded texts to make connections and see scholarly processes at work.

Many groundbreaking digital collections were launched in the 1990s, prior to the emergence of Web 2.0 (Kirschenbaum, 2010), but now scholars are beginning to
explore using open, participatory approaches to create critical editions and other
digital collections. Given the expense and time required to produce digital
editions, Peter Robinson (2005) proposes embracing a participatory model to
produce "fluid, co-operative and distributed editions, the work of many, the
property of all." Work would be distributed and shared online, so that some
participants would scan the documents, others would transcribe them, and others
would provide commentary, notes and emendations, and so forth. Such a
collaborative approach would recognize that "any good reader must sometimes
be an editor" and enable people to have a common stake in producing and
sharing knowledge (Robinson, 2005). Efforts are underway to create the
infrastructure that will support collaborative textual editing. For instance, the
TextGrid project is building a "virtual workbench" for "collaborative editing,
annotation, analysis and publication of specialist textual data" (D-Grid Initiative,
2013). Similarly, John Bryant (2008) received NEH funding to develop the TextLab
tool, which will open up the editorial process by supporting the collaborative
editing of manuscripts. We thus see the creation of editions and reference tools
transforming from a hierarchical model whereby an editor oversees work by
multiple research assistants, to a cooperative model whereby people with a
range of expertise come to common decisions, to a distributed model where
contributors together build a common intellectual product.

**COMPUTATIONAL METHODS AND DATA-DRIVEN SCHOLARSHIP**

Restricted by the limited availability of information (or access issues) and the
time required to analyze material, English studies scholars—and literature
scholars in particular—have typically based arguments about complex cultural
phenomena on close readings of a handful of texts (Wilkens, 2009). Yet as both
massive collections of texts and text analysis tools become available, humanities
scholars can draw upon a much wider range of evidence in making their
arguments. Humanities scholars can now begin to practice what Franco Moretti
(2000) calls "distant reading," looking at large scale phenomena such as "genres
and systems" by examining patterns across large text collections. Likewise, they
can use computational methods to examine particular features of texts, such as
the presence of metaphor or markers of authorship. Recently, *Literary and
Linguistic Computing* featured two articles that illustrate both the possibilities of
textual analysis and the ways in which collaboration supports such work:
Matthew Jockers, Daniela M. Witten, and Craig Criddle’s (2008) "Reassessing
Authorship of the *Book of Mormon* Using Delta and Nearest Shrunken Centroid
Classification" and Brad Pasanek and D. Sculley’s (2008) "Mining Millions
of Metaphors." These articles not only offer compelling interpretative arguments
about the *Book of Mormon* and metaphor but also explore emerging
computational methods for understanding literature and show how collaboration among humanities, statistics, and computer science researchers is essential to developing such methods.

Each article is motivated by a question that it would be difficult to answer without the aid of a computer. For Jockers, Witten, and Criddle (2008), the question is, “Who wrote the *Book of Mormon*, and how can we know?” while Pasanek and Sculley (2008) ask, “Can a machine learn metaphor?” In each article, the authors bring together a lucid analysis of cultural and interpretive contexts with a detailed description of the computational techniques used to analyze texts, producing a sort of hybrid of literary scholarship and computer science that includes features not commonly seen in literary journals, such as formulas and graphs. The bibliographies likewise reveal the conversation among disciplines, as *Joseph Smith: Rough Stone Rolling* appears with “Class Prediction by Nearest Shrunken Centroids, with Applications to DNA Microarrays,” and *Truth and Method* joins *Machine Learning*. Through the transdisciplinary dialogue that these articles undertake, readers comprehend the challenges facing computational approaches to literature, such as how to evaluate algorithms for authorship attribution and how to make sense of text-mining data. Data-driven humanities scholarship demands diverse expertise in acquiring, curating, processing, analyzing, visualizing, and understanding data, as well as a keen understanding of the literary and cultural contexts surrounding the data.

“Reassessing Authorship of the *Book of Mormon* Using Delta and Nearest Shrunken Centroid Classification” (Jockers, Witten, & Criddle, 2008) tests two different classification techniques for investigating the authorship of the *Book of Mormon*: delta, which has commonly been used in the humanities computing community to evaluate differences among texts and establish authorship, and nearest shrunken centroid, a more general classifier that has been applied to diagnosing cancer. Such computational methods have wider relevance beyond authorship studies, allowing researchers to cluster texts by categories such as genre, rhetorical approach, and even mood; to hone in on relevant data; and to observe sometimes unexpected patterns. This project not only illustrates computational approaches to analyzing cultural information but also offers a vivid example of how methods originally developed in the sciences have potential relevance in the humanities. The collaboration originated when Craig Criddle, a Stanford professor of environmental engineering and ex-Mormon who was investigating the authorship of the *Book of Mormon*, searched the Stanford Web site for a text analysis specialist and came across Jockers’s name. Jockers, manager of Stanford’s Academic Technology Specialist Program and a lecturer
in the Department of English, recognized that they needed to add someone with expertise in statistics and machine learning to the team and recruited Daniela Witten, a statistics graduate student whose other publications include “A Recoding Method to Improve the Humoral Immune Response to an HIV DNA Vaccine” (Huang et al., 2008).

In “Reassessing Authorship,” Jockers, Witten, and Criddle (2008) first provide a context for their analysis by exploring the history of the debate over the authorship of the Book of Mormon, including the flaws in prior work using stylometric methods to automatically classify texts. The article is part methodological primer, part detective story, examining how other researchers misread textual signals and explaining why their own careful, statistical approach produces more reliable results. The section headings are more typical of a scientific article than a work of literary criticism: “Background,” “A New Approach,” “Source Selection,” “Methodology,” “Results,” “Discussion,” and “Conclusions.” However, the key question—“Who wrote the Book of Mormon?”—is one of literary and religious history and requires knowledge of that history to answer.

Through this collaboration, each team member was challenged to explain his or her assumptions and to understand how the other disciplines approached problems. Whereas humanities scholars “tend to seek the complications in things, the scientists and mathematicians… are adept at honing in on revealed sorts of moments, sifting through the complexities and finding things that one could say with a degree of certainty” (Matthew Jockers, personal communication, June 5, 2009). For some, focusing on what can be proven and quantified may threaten the foundations of humanities scholarship, which resists positivism and values argument and interpretation over certainty. However, putting the two approaches into dialogue can foster new insights, challenging humanists to be precise in defining their methods and scientists to acknowledge the importance of interpretation in evaluating humanities data. According to Jockers, working with Witten has been one of the most enriching moments of my academic career. It’s incredibly fun to sit down with someone who sees the world completely differently,” someone who takes an objective perspective and demands proof for conjectures (personal communication, June 5, 2009). This collaboration has led to further work between Jockers and Witten, a comparative analysis of machine learning algorithms for authorship attribution (Jockers & Witten, 2010).

Whereas Jockers, Witten, and Criddle’s (2008) article uses statistical methods to evaluate how the use of common words reveals authorship, Brad Pasanek and
D. Sculley's (2008) “Mining Millions of Metaphors” examines how machine learning and natural language processing techniques can be used to understand metaphor. Invoking Gregory Crane’s (2006) question “What do you do with a million books?” Pasanek and Sculley shift the focus to a more granular, semantic level, seeking to explore the history of metaphor. The project originated in Pasanek’s dissertation, *Eighteenth-Century Metaphors of Mind, A Dictionary*. To support his research, Pasanek set up a database called *The Mind Is a Metaphor*, where he hand curated nearly 9,000 examples of metaphors of the mind harvested from electronic text collections.

Collecting these metaphors was time- and labor-intensive and required deep literary knowledge. When Pasanek ran into his friend D. Sculley, who was working on a Ph.D. in computer science, and told him about the database, Sculley suggested that his “hunt and peck methodology was in part insane. But he said we could automate a lot of what we do” (Brad Pasanek, personal communication, June 15, 2009). Pasanek and Sculley decided to collaborate, since Pasanek offered a compelling project as a subject expert, while Sculley provided technical expertise. While not every literary scholar has a friend who happens to be a computer scientist, their partnership illustrates that literary problems can lead to engaging research for a computer scientist and that computational methods for literary analysis—and the transdisciplinary conversations that it takes to develop such methods—can produce new insights.

Challenging Aristotle’s notion that expertise in metaphors cannot be learned, Pasanek and Sculley asked, “Can we teach a computer to learn metaphor?” (Brad Pasanek, personal communication, June 15, 2009). In order for Sculley to develop and apply algorithms that detected metaphor, he used Pasanek’s hand-curated collection to train an automatic classifier to recognize more examples of metaphor in a larger set of data. Pasanek and Sculley found that their classifiers could detect examples of metaphors of the mind in works by other authors, so that the model developed for Shakespeare can be applied to Pope. Such an insight, tested across eight authors from Shakespeare to Keats, suggests that metaphors retain some continuity through literary history, whether because of the tastes of canon-making critics or poets’ attempts to fit themselves into the literary genealogy through quotation and allusion.

Even though the article is presented in the unified voice of “we,” Pasanek and Sculley (2008) reflect on the dialogue between disciplines and find that learning about the other’s perspective generates new ideas. For example, they acknowledge that “manually mining this data still introduces potential for what
the computer scientist recognizes as human biases into the analysis," so they examine automated, probability-based techniques to categorize metaphors (p. 354). By employing probability to measure the importance of a word to the author's style, Pasanek and Sculley generated a ranked list of the words that Shakespeare and Pope used in creating metaphors of the mind, body, soul, and heart. Although Pasanek found it "alienating" to examine charts rather than poems, they "quickly realized that just this sort of defamiliarization is a good thing" (p. 355). Indeed, the defamiliarization resulting from applying statistical methods to literature forces the critic to direct attention to features of the texts that might otherwise have remained invisible, such as Pope's use of language drawn from eighteenth-century brain science and Shakespeare's references to heat (p. 355).

Using computational methods, literary scholars are pressed to find "objective" ways to describe data, to remove bias as much as possible and look for what can be stated with certainty. At the same time, Pasanek and Sculley acknowledge that the study of literature is ultimately interpretive rather than empirical, as how the researcher chooses to represent the data determines what conclusions are generated by applying the algorithm. Even if the methods for automated classification of literature derive from mathematics and computer science, the data still require analysis and interpretation by a literary scholar.

Pasanek and Sculley's collaboration challenged them to explore how techniques developed in computer science can be applied to literature, enlarging their understanding of both domains. As Pasanek explains, when he and Sculley run experiments they discuss what is happening and "spend a lot of time calibrating, one against the other" (personal communication, June 15, 2009). By explaining assumptions, theories, and practices to someone from another discipline, they also come to understand their own disciplines better. According to Pasanek, the work "helps [him] think about Derrida, and I'm sure it helps [Sculley] to sort out algorithms" (personal communication, June 15, 2009). Pasanek and Sculley identify productive differences in method, such as the computer scientist's sense that more objective means need to be used to test interpretations of differences in language between Shakespeare and Pope, and the literary scholar's need to place data generated through automated means in context.

Pasanek and Sculley have faced some challenges, particularly figuring out how to find time for their collaboration and where to present their work. They get much more accomplished when they meet face to face, but coordinating schedules is difficult since Sculley now works for Google in Pittsburgh and Pasanek is an English professor at the University of Virginia. Pasanek and Sculley's research

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6 Does collaboration demand frequent face-to-face collaboration? That depends on whether tasks can be modularized and completed independently or need to be worked on jointly. With
is an example of a "tightly-coupled" collaboration, since it is ambiguous, requires intense communication, and depends on the expertise of each team member (Olson & Olson, 2000). Without the collaboration, Pasanek doesn’t think he would have been able to accomplish what he has, and he doubts that Sculley would have pursued the project on his own. Since their work crosses disciplinary boundaries, it is not clear where they should publish it. To date they have published two articles in *Literary and Linguistic Computing*, a major digital humanities journal that represents a sort of hybrid between humanities and computer science. To publish in a computer science journal, they would need to come up with a problem and approach that computer scientists would find interesting and innovative. To publish in a mainstream humanities journal, they would likely need to strip out many of the technical details. Yet their work has generated wide interest perhaps because it is interdisciplinary, appearing in *Chronicle of Higher Education* and the *San Jose Mercury News*.

Instead of taking a proprietary approach to the data he has collected, Pasanek is sharing it through *The Mind Is a Metaphor*, an online database that uses an Attribution-Noncommercial-Share Alike Creative Commons license to enable other researchers to reuse the data as long as they cite it (see Figure 5). Pasanek and Sculley (2008) acknowledge that metaphors of the mind have broad relevance to a number of disciplines, including linguistics, rhetoric, history, psychology, philosophy, neuroscience, and literary criticism. They advance their own metaphor for the interdisciplinary collaborations that can take place around commonly available information: the library. They explain, "A library is not just a collection of books—nor even a collection of metaphors—but is also a meeting place for researchers to come together and share ideas, questions, thoughts, and conversations" (p. 359). Thus the library is envisioned not as the place where humanists go to work alone with their books, but as a community that comes together through shared discovery—an apt rethinking of the literary scholar at work. The THL uses similar language in describing the library as a "knowledge community" (Tibetan and Himalyan Library, 2010).

collaborative digital humanities projects such as the Blake Archive, MONK, and the Text Alliance Developers Association (TADA), distributed teams come together physically for occasional meetings and "hackfests," which participants view as essential for defining project goals, working through problems, and making progress on design and programming work (Eaves, 1997; Ruecker, Radzikowska, & Sinclair, 2008). A recent study of digital humanities research teams indicated that face-to-face communication is important to collaborative projects (Siemens, 2009). Project teams maintain continued contact using collaborative technologies such as listservs, project management software, wikis, and instant messaging.
SUPPORTING COLLABORATIVE WORK IN THE DIGITAL HUMANITIES

Although collaboration is essential to many digital humanities projects, such as the examples discussed, would-be collaborators face significant challenges, including infrastructure and technical support, funding, tenure and promotion policies, getting credit, and establishing a common language. As experienced collaborators recognize, “collaboration is immensely enriching, but it is also both time-consuming and inevitably involves lots of administration, communication, compromise, and some relinquishment of scholarly autonomy” (Brown et al., 2006). But obstacles to collaboration can be overcome through institutional support, clear communication, effective management practices, and a common interest in achieving a goal.

Under the solo model of humanities scholarship, producing research is relatively inexpensive, requiring funds for a salary and, perhaps, a research assistant, travel, and research materials. Often, internal funds can cover these costs, which means that humanities scholars are not always working on and worrying over grants (Ayers, 2009). Yet many digital humanities projects depend on grants, since these projects require significant funding for salaries, technology support,
facilities, access to data, and sustaining the project. Compared to the sciences, much less money is available for humanities research. For example, the NSF was allocated $6.49 billion for fiscal year 2009 (National Science Foundation, 2009), dwarfing the total NEH 2009 budget request of $144.4 million, of which $2 million was designated for the Digital Humanities program (NEH, 2008). Some projects, such as Orlando, establish partnerships with publishers to raise funds and disseminate their content, but many aim to make their work available without a subscription. Not only is funding scarce, but applying for grants takes significant time and resources. Less wealthy institutions may lack funding for staff and infrastructure, limiting their ability to participate in digital humanities projects. Describing how liberal arts institutions struggle to provide staff for digital humanities projects, David Green and Michael Roy (2008) argue, “anyone can see that it takes a village’ to produce this type of cyberscholarship. . . . One obvious worry is that this sort of endeavor is so expensive that it will become the exclusive enclave of the richest of institutions.” Green and Roy suggest that colleges and universities can accomplish more by sharing the burden across institutions. Funding agencies such as the National Endowment for the Humanities encourage cross-disciplinary, cross-institutional, and even international collaboration through programs like the Collaborative Research Grants, Digging into Data Challenge, JISC/NEH Transatlantic Digitization Collaboration Grants, and DFG/NEH joint grants.

Despite such opportunities for external funding of collaborative work, institutional norms tend to favor solitary scholarship in the humanities. Can a graduate student earn a Ph.D. for collaborating on a dissertation? How many universities offer a collaborative sabbatical? How about a collaborative appointment? Even the physical layout of humanities departments reflects the focus on solo scholarship, since humanists typically hole away in individual offices rather than working in large collaborative areas such as labs. To provide institutional support for collaboration in the digital humanities, universities are founding centers such as the Institute for Advanced Technology in the Humanities at the University of Virginia and the Center for Digital Research in the Humanities at the University of Virginia."

7 I was not able to find out how much the NEH was actually allocated in 2009.
8 However, the MLA is advocating collaborative scholarship. For example, 2010 president Sidonie Smith suggested alternatives to the long-form dissertation in languages and literatures, such as “an ensemble of forms” that might include a collaborative project (Smith, 2010).
9 Judd Ruggill and Ken McAllister together run a research group in the interdisciplinary field of game studies. They collaborate because “we learned that we do our best work when we do it together. Our articles are smarter and better written, and we write a lot more of them” (Ruggill & McAlister, 2004). When they tried (and failed) to find a joint position as an “academic couple,” joined not by romance but by their collaborative work, commentators suggested that it was a joke and even hypothesized that they had a sexual relationship (Ruggill & McAlister, 2005). The idea of a collaborative pair seemed too strange.
Nebraska. Such centers provide technical, intellectual, and managerial support for digital humanities projects, organize colloquia and other events, sponsor training and educational programs, and often provide both physical and virtual spaces where those interested in digital humanities can come together. Diane Zorich’s (2008) study of digital humanities centers suggests that one of their core principles is “collaboration and cross-disciplinarity,” as they aim to move beyond “divisions between the arts, sciences, and humanities; between the academy, industry, and culture; between practitioners and theorists” (p. 11). However, as Mark Sample (2010) points out, many digital humanists work at institutions without digital humanities centers. Further, some of these centers have a precarious existence subject to changes in academic focus and funding. Thus he urges people to create their own “network of possible collaborators.” Even without the support of formal centers, digital humanities researchers can and do work with collaborators, such as their institutions’ libraries or information technology departments, colleagues in other departments or at other institutions, and community groups.

While funding and infrastructure challenges may limit the ability of humanities scholars to launch collaborative digital projects, tenure and promotion policies may reduce their willingness to participate in such initiatives (Friedlander, 2009). Most existing models for evaluation in the humanities assume that research is done solo, reflecting the discipline’s focus on individual interpretation rather than collective effort (Cronin & La Barre, 2004). Yet there are efforts to change how collaboration is rewarded. For example, the MLA’s 2006 Report on Evaluating Scholarship for Tenure and Promotion recommends developing protocols for evaluating collaborative work. And in 2009 the MLA and HASTAC launched an initiative to establish guidelines for the evaluation of digital works (Jaschik, 2009).

Collaboration requires clear agreements about who does what, sharing of data, allocation of credit, and management practices (Borgman, 2008). Figuring out exactly how to award credit remains an issue. For interdisciplinary projects, definitions of what qualifies as research vary by field, so that collaboration may lead to publishable research in one field but not the other (Paepcke, 2008). As Bethany Nowviskie (2009) points out, many digital humanities projects

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10 According to Zorich (2008), 78 percent of digital humanities centers said that they had experienced unsuccessful partnerships because of staff issues, poor communication, mismatched expectations, partner failures, and external factors such as lack of funding. Although Zorich does not cite a corresponding figure for the number of digital humanities centers that have experienced successful collaborations, she does suggest that centers have collaborated effectively by building trust, securing the appropriate infrastructure, sharing goals, communicating effectively, and nurturing the collaboration.
necessarily involve collaborations among tenured faculty, graduate students, research faculty, and staff. Sometimes such collaborations involve inequities in which the faculty member claims the greater share of the credit as well as intellectual property rights, but Nowviskie argues that the most successful projects typically take a more egalitarian approach. To define how to manage collaborations fairly, participants in the "Off the Tracks" workshop hosted by the Maryland Institute for Technology in the Humanities (MITH) developed a "Collaborators' Bill of Rights" that emphasizes the importance of providing a legible trail of credit and of treating all contributors equally with regard to intellectual property policies (Kirschenbaum et al., 2011). Project teams should engage in open discussions about intellectual property and credit and ensure that the contributions of all members are acknowledged and rewarded. Aiming for transparency, some scientific publications spell out the specific contributions of each author. Since individual reputation can be built on collective achievement, scholars may find that participating in collaborative work brings greater scholarly credibility (Shanks, n.d.).

Just as desktop publishing software enabled users to be designers and the Web gave those with access the power to become publishers, so collaborative technologies and increased access to information can make researchers out of non-academics—a prospect that both opens up the humanities and raises profound anxieties about the nature of scholarly expertise. For projects that depend on community contributions, soliciting public involvement requires hard work in raising awareness of the project, coordinating with local communities, developing an easy and meaningful way for people to participate, and rewarding participation. But, in the sciences as in the humanities, a number of participatory resources, such as blogs and wikis, demonstrate little evidence of participation, perhaps because there are few incentives to participate and academic culture hasn't yet embraced participatory scholarship (Butler, 2005; Harley, Acord, Earl-Novell, Lawrence, & King, 2010).

The academy structures itself around discipline-based expertise validated by a Ph.D. and research record, but opening up participation in scholarly work to those outside the academy raises fundamental questions about incentives for participation, authority, and trustworthiness (O'Donnell, 2008). Can the contributions of an amateur without disciplinary training have the same value as those of someone who has been working in the field for many years? What kind of quality checks can be put into place? Moreover, the tenure and promotion process typically judges unique contributions. Are those contributions devalued if anyone can participate? How can unique contributions be identified and valued?
Such questions remain to be worked out. Kathleen Fitzpatrick (2009), for example, proposes peer-to-peer review, whereby members of an online scholarly community earn credit for commenting on and reviewing works by others. Even initiatives committed to a participatory model of knowledge production and dissemination distinguish between “expert” and “popular” contributions, apparently so that they can persuade scholars to contribute work. For example, THL emphasizes that scholarly work will be reviewed by a prestigious editorial board and that publication within THL is equivalent in academic worth and prestige to publication in a major journal, academic publishing house, or prestigious reference work” (Tibetan and Himalyan Library, n.d.). Even as HyperCities serves as a “participatory platform,” it facilitates the peer review and publication of scholarly “geo-temporal arguments” that meet criteria such as the originality of the argument, the effective use of hypermedia, and success in engaging diverse audiences and enabling them to develop new insights (Presner, 2010).

In my interviews with humanities researchers, I heard skepticism toward interdisciplinary as a buzzword and suspicion that work identified as interdisciplinary doesn’t represent a convergence of methods, but rather an awkward yoking together of different approaches. However, interviewees testified to how effective their interdisciplinary projects were, in part because they made a serious effort to understand the other discipline. Cathy Davidson argues that collaboration by difference—collaborations involving people with different expertise and perspectives—creates new knowledge, since participants don’t get stuck in the rut of shared assumptions but can engage in exchanges that lead to new understanding (qtd. in Bass & Schlafly, 2009). Likewise, Matthew Jockers reported that one of the joys of his collaboration on the Book of Mormon project was learning how other fields operate and getting what amounted to a seminar in statistics. Those with experience in interdisciplinary collaboration emphasize the importance of having a “translator” who can rephrase technical discussions and ensure that there is common understanding. Through interdisciplinary collaboration, new ideas are generated as participants explain their own methods and assumptions and are exposed to others. Collaboration recognizes and values the social nature of knowledge, as understanding is built through conversation and sorting through different perspectives.

Not all work should be collaborative, and we need to continue to value the small, individual, and idiosyncratic. Sometimes collaboration can result in research being diluted as participants work toward consensus and overlook challenging ideas, aiming for “the lowest common denominator” (Nentwich, 2003, p. 449).
One interviewee who asked to remain anonymous described the frustrations of working on an article with two research collaborators who had opposing perspectives. The interviewee was put into the awkward position of having to negotiate between the two, and the resulting article took longer to write and was watered down. She suspects that the two collaborators will publish their own interpretations of the data separately. Yet the interviewee described another experience where collaborating with someone with different but complementary skills enabled both to see the data in new ways. One raised questions that the other, immersed in her own disciplinary expertise and assumptions, hadn’t considered. As a result, they were each challenged more and spent more time thinking about the questions, opening up new perspectives and resulting in better research. Collaboration “brought up a whole bunch of new ideas I hadn’t thought of before, so I could say a lot more than what I could say on my own.”

Collaborating increases the complexity of managing a project, but it can also result in more nuanced, sophisticated research that has a greater public impact.

Despite the challenges of performing collaborative research in the humanities, many digital humanities scholars pursue collaboration because it is central to their goals. A single scholar is limited by both time and expertise in what he or she can accomplish. Teams of researchers, on the other hand, can complete large-scale, ambitious projects by dividing up responsibilities (Blackwell & Crane, 2009). The availability of data and collaborative technologies has lowered the barriers of entry to participating in research. Open source software development provides a model for collaborative scholarly work, as it makes knowledge production modular and provides access to a range of expertise. Such approaches may lead to a greater “economy of scale,” reducing the duplication of effort and providing a check on quality (Fanderclai, 2004, p. 318). Given the new research possibilities opened up by access to vast databases and collaborative networks, we may be seeing the rise of “big humanities,” large-scale projects that aim for a “big picture” view of significant research problems. Just as massive initiatives to produce and analyze astronomical and genetic data required collaboration, so interpreting huge collections of cultural data necessitates a collaborative effort. Excited by the possibilities of collaborative digital humanities to make the work of the humanities participatory and visible, Cathy Davidson (2008) calls for “big humanities” (p. 714). Several digital humanities centers explicitly identify themselves as practicing “big humanities,” including UC San Diego’s Software Studies Initiative Cultural Analytics project and, formerly, the Stanford Humanities Lab (Franklin & Rodriguez, 2008).
CONCLUSION

What difference has collaboration made in the digital humanities? To some extent, collaboration is a hallmark of the digital humanities because this broadly defined field weaves together at least two strands crucial to the contemporary culture of information: networked communities and data-driven research. By building digital collections, humanities scholars develop techniques for making explicit the structure and semantics of texts; make information available to be used for research, education, and personal enrichment; and enable users to interact with information in dynamic ways. Participatory knowledge initiatives such as HyperCities and THL democratize knowledge by engaging people in documenting their own communities. By devising methods for detecting and analyzing patterns in collections of cultural data, scholars are examining their own disciplinary assumptions and beginning to ask questions that it would be difficult to answer without the aid of a computer. All of these collaborative projects engage the fundamental humanities problem of representation, both how scholars represent information and how citizens represent themselves through the production of media.

Perhaps the digital humanities point to a future for the humanities in general to be more open, engaged, and transdisciplinary. While not every scholar will build a digital collection or define new text-mining algorithms in collaboration with a computer scientist, all are facing the data deluge, and all are part of a knowledge society that is transitioning rapidly to the digital. Thus digital humanities scholars are at the leading edge of a transformation that will affect everyone, but ultimately I believe that the digital humanities will simply be the humanities. Most of the research sources will be digital, as will the publishing environments. Scholars will need to devise methods to harness abundant information, explore new questions, and represent their ideas in electronic publications. In the face of skepticism of the value of the humanities, many digital humanities projects demonstrate how the humanities can be more interactive, interdisciplinary, and engaged, enabling scholars and the public alike to create and share knowledge (Davidson, 2008).
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Collaborative Approaches to the Digital in English Studies


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ACKNOWLEDGMENTS

I would like to thank Leah Krevit for her help with this chapter, as well as the interviewees for contributing their insights and expertise.
Supporting Digital Scholarship in Research Libraries: Scalability and Sustainability

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NOTES
This is the peer-reviewed version of an article published in the Journal of Library Administration, 53(1), 2013, special issue “Digital Humanities in Libraries: New Models for Scholarly Engagement.”

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Issue URL: http://www.tandfonline.com/toc/wjla20/53/1
Article URL: http://dx.doi.org/10.1080/01930826.2013.756689

Recommended Citation

Keywords
digital scholarship, digital humanities, library services, leadership, organizational culture, scalability and sustainability

ABSTRACT
New York University Libraries and our partners in Information Technology Services offer effective enterprise-wide technology solutions for many academic practices, but we are still working to solve the "faculty website problem"—providing services for digital scholarship and publishing in a way that is both scalable and sustainable. This article describes our study of NYU scholars' needs and digital scholarship support at other research institutions, and then introduces a service model we developed for supporting such services (which may include digitization, hosting of research data, digital publishing, the development of software for scholarly practices, and more). We then discuss the
challenges to research libraries of implementing our service model in a scalable, sustainable way, by addressing project and tool selection, staffing, and organizational change.
INTRODUCTION: THE FACULTY WEBSITE PROBLEM

At New York University, as at other large research institutions, we are working hard to support faculty and students who increasingly expect sophisticated new services for digital scholarship.\(^1\) NYU Libraries, with our colleagues in Academic Technology Services (ATS, a unit of NYU Information Technology Services), offer tools and support teams for activities including high performance computing; geographic information systems; quantitative and qualitative data analysis; data finding and management; the digitization, creation, manipulation, storage, and sharing of media content; repository services; digital preservation; streaming media platforms; digital journal publishing; online collaboration; and intellectual property consultation. These are enterprise-level services, offered to as many members of the NYU community as possible.

Despite this breadth of services and expertise, we find ourselves challenged to respond effectively to what we have come to call “the faculty website problem”—an ever-growing number of requests for web-based spaces and tools to collaborate on scholarly research and share the results. Despite the fact that scholars often describe their needs with the catch-all term “website,” such requests actually represent a diverse set of activities which may be achieved in a variety of ways: with a wiki or basic blog, with more complex tools like a custom-designed database with public or private web access, with tools for collaboration with colleagues at NYU and beyond, integration with platforms elsewhere, or some combination of all of these. Support for these projects can be equally varied, and may require anything from a single consultation about available enterprise-level tools, to semester-long training and advice for a course’s student projects, or an open ended commitment to implement a new tool or manage a scholarly digital collection.

Over the years we have approached these needs in several ways. In the late 1990s and early 2000s, Academic Technology Services had small, discipline-focused computing groups who supported specialized faculty projects in the humanities, arts, social sciences, and sciences. Because of the idiosyncratic nature of faculty projects, the significant time required to plan and accomplish their long-term research initiatives, and the need for ongoing care, development, and migration of resulting websites and databases, these computing groups could only support a few faculty per year. In the mid-2000s, in an effort to provide technology services to more users, NYU Libraries and ATS jointly committed to offering enterprise-level academic tools (e.g., wikis, blogs, streaming services, file storage, repository services) and correspondingly robust support services for the widest array of faculty and students.

While emphasizing commodity tools and services has allowed us to provide a broad clientele with relatively easy-to-use solutions for many digital research needs, this standardization has come at the expense of supporting the kinds of innovative, web-based collaboration, communication, and publication activities that are becoming a regular part of scholarly practice across the disciplines at NYU and beyond. Current areas of scholarly exploration include the use and development of new tools and methods for multimodal and collaborative publishing (e.g., Scalar and MediaCommons), open peer review (e.g., MediaCommons Press), and data analysis and visualization (e.g., topic modeling, mapping and timeline tools). So far, our work in these areas is in early development.

To continue developing services that respond to changing scholarly practice, Dean of Libraries Carol Mandel asked us in April 2011 to better define NYU scholars’ needs, to investigate how other universities, especially their research libraries, are supporting new web-based forms of collaboration, communication, and publishing, and to then propose a service model that might be adopted at NYU Libraries. We conducted research from April through November 2011, and submitted a report in December 2011. In this article we describe our findings and offer a high-level model for deploying scalable and sustainable digital scholarship services. We then discuss some important institutional and organizational challenges to research libraries and offer recommendations for providing effective digital scholarship support.

GATHERING DATA

NYU Scholars’ Needs

To learn more about NYU scholars’ needs (including both faculty and graduate students), we partnered with subject specialists to identify and interview eleven NYU faculty who are experimenting with technology for their research and publishing. We also

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2 NYU’s Digital Library Technology Services has developed tools and platforms relevant to digital scholarship (e.g., MediaCommons, a network and publishing platform for scholars in media studies, http://mediacommons.futureofthebook.org/) but the DLTS group’s primary focus is on processing, enabling access to, and preserving digital materials from the NYU community and collaborating partner organizations.

3 Scalar, in beta development by the Alliance for Networking Visual Culture, is an open source authoring and publishing platform that’s designed to make it easy for authors to write long-form, born-digital scholarship online. Scalar enables users to assemble media from multiple sources and juxtapose them with their own writing in a variety of ways, with minimal technical expertise required. See http://scalar.usc.edu/scala

4 MediaCommons Press is part of the MediaCommons scholarly network. It uses the tool CommentPress (built on WordPress) to enable open online peer review. See http://mediacommons.futureofthebook.org/mcpress/

5 Services are sustainable when they can be efficiently maintained over time, and scalable when they can be provided effectively as demand increases.
performed a service gap analysis by reviewing recent technology support requests from scholars that we were either unable or only partially able to meet. Both sources of data revealed similar faculty needs and gaps in available services and resources. Scholars want help developing, using, and maintaining websites for storing and presenting their digital research content. Research may be used in various ways online: as a personal archive, to collaborate with students or colleagues, or to publish these materials via the web. Scholar requests for custom-built databases with web-searchable front ends indicate a need for interoperable tools and repositories that allow scholars to create, store, and work with materials in various formats (multimedia, images, text, annotation, etc.) and then provide easy online access to these materials. They want these sites to be dynamic (to add new content and functionality as needed) and to facilitate collaboration with colleagues. Faculty also need help for themselves and their students to learn new skills, methods, and tools, and they want support integrating them into their work.

Interviews with Peer Institutions

To understand how our peers support digital scholarship, we interviewed colleagues at fourteen institutions, focusing our questions mainly on services for online publishing and scholarly collaboration. We also asked about staffing, service location within the organization, and scalability and sustainability concerns. We discussed the same issues at conferences with colleagues from many other libraries. Among great variation in the tools, services, and staffing models our peers offer, we identified three basic approaches. All institutions we interviewed provide some version of these general types:

1. Digitizing Collections: Infrastructure for Digitization, Preservation, and Access

These services are driven primarily by library collections and focus on building infrastructure and workflows that may also be used for scholars’ projects or shared with other parts of the library, making efficient use of staff time and equipment. Project selection can be closely aligned with library strategic priorities, user demand, or other criteria. However, these services do not address scholars’ needs for the kinds of collaborative, multimodal digital services listed above.

2. Digital Research & Publishing services

With a focus on scalability, these services support a wide range of needs with a small amount of customization and are typically available to most scholars. Examples include journal and conference paper hosting; institutional repositories; consultation on project planning, metadata, and digitization best practices; video and audio production; blogging, wiki, and content management platforms with a fixed set of templates and standard plug-ins for simple website creation; copyright and IP consultation. Many tools

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\(^6\) California State University, Los Angeles; Columbia University; Cornell University; Duke University; Emory University; Harvard University; Princeton University; University of California, Los Angeles; University of Chicago; University of Kansas; University of Michigan; University of Virginia; Yale University; and the Educopia Institute.
can be provided with minimal training to users and without ongoing intervention by the service team. Related reference-type consultations are handled on a regular basis. While requests for customized services cannot typically be accommodated, service teams may consider strategically undertaking a special project if it is likely to result in a first-of-a-kind, rather than one-of-a-kind\(^7\), solution, which might eventually be rolled out more widely.

3. Digital Scholarship or Digital Humanities Centers

These centers are scholar-driven with a strong research and development component and may not be affiliated with the library. They include high-touch collaborations among scholars for a limited number of projects per semester or year. Scholars and staff on project teams are true research partners in this model, and staff may also pursue research projects on their own. Such projects may result in tools or platforms that can be reused in other settings (for example, the open source library discovery interface Blacklight\(^8\), which grew out of a staff project at the University of Virginia’s Scholars’ Lab). But because of the tight integration between a scholar’s research methodology and its expression in digital form, the products may sometimes be idiosyncratic and thus hard to maintain over time without ongoing developer intervention.

No single service model mentioned here fully describes any of the organizations we spoke to, but we found it helpful to characterize services in these ways as the models suggest quite different approaches, staffing levels, and required skills. Furthermore, none of our colleagues felt confident that they had solved the problem of providing services for the breadth of digital scholarship needs in a way that was both sustainable and scalable. Like most of our peer institutions, NYU Libraries currently provides some services from each of these general types.

A HIGH-LEVEL MODEL FOR SCALABLE AND SUSTAINABLE SERVICES

Drawing on our understanding of practices and trends at peer institutions and our own faculty’s research and requests, we developed a high-level model to describe how an organization might support digital scholarship. We had several guiding principles in designing this 4-tier model. Services should be sustainable (so they can be maintained over time) and scalable (in order to benefit as many scholars as possible). Our experience suggests, and peer interviews confirmed, that one effective way to achieve scalability and sustainability is through service and tool standardization. There are other considerations–programmatic and strategic requirements–as we discuss in the next section. As well, these services should promote the development of reusable tools,

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\(^7\) Thanks to Rebecca Kennison of Columbia University for this useful distinction.

\(^8\) [http://projectblacklight.org/](http://projectblacklight.org/)
platforms, and methods, and facilitate the creation of preservable, reusable scholarly content to ensure the long-term value of and access to the institution’s research. This multi-level service model puts a strong emphasis on developing, maintaining, and integrating standard tools, platforms, and support services for a large community of users. The model should integrate current services and initiatives, and build out new service components only when necessary. Finally, these services should capitalize on staff knowledge and expertise, while providing an opportunity for staff to gain new skills.

The model we envisioned has four tiers, with the first (and most widely-used) at the bottom.

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**Tier 1: Enterprise Academic Tools**

These are enterprise-level academic tools that meet the basic computing needs of a vast majority of students and faculty. Examples include: learning management systems, wikis, video streaming, individual and shared file storage, and virtual computer labs. These tools are designed to meet academic and administrative computing needs, but do not necessarily lend themselves to scholars’ research requirements. Most offer little to no customization for individual projects.

**Tier 2: Standard Research Services**

Like the enterprise academic and administrative tools in Tier 1, these services are designed to be available to as many scholars as possible. However, tools at this service

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*Proposed Model for Digital Scholarship Services*

1. **Enterprise Academic and Administrative Tools**
   - LMS, wikis, blogs, text scanning services, multimedia production lab, media streaming services, file storage, email, etc.

2. **Standard Research Services**
   - Institutional repository, data analysis tools, copyright consultation, standard platforms for web-based publishing and web exhibits, etc.

3. **Enhanced Research Services**
   - Custom-designed UI, custom-designed DMD interface; bulk data loads, etc.

4. **Applied R&D**
   - Grant-funded, first-of-kind, deploy at tiers 2 or 3

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*Tier 1: Enterprise Academic Tools*

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*Tier 2: Standard Research Services*

Like the enterprise academic and administrative tools in Tier 1, these services are designed to be available to as many scholars as possible. However, tools at this service
level are designed specifically to support research and scholarship. Examples include:
journal and conference-paper hosting tools (e.g., Open Journal Systems or BePress),
CMS and web-hosting platforms (e.g., WordPress), and web exhibit platforms (e.g.,
Omeka). Though certain tools or platforms may enable a large number of configuration
choices, this service level does not offer that option. Rather, to the extent possible, tools
should offer a fixed set of templates, so users can pick the format, style, or functionality
that best meets their needs. For example, an institution-wide WordPress service could
give users the choice of a limited number of design templates and approved plug-ins. If
services at this level are well designed and supported, a majority of scholars could rely
on these sustainable alternatives to one-off solutions.

**Tier 3: Enhanced Research Services**

This level builds on Tier 2 and includes the ability to offer some custom
configuration of the standard services described there. Tier 3 provides select scholars
with staff support for more sustained consultation and customization that go beyond the
standard services and templates. Services might include designing a special interface to
a standard tool or providing custom-tailored metadata options for a repository. In addition,
this level could include short or long-term project consultations with scholars on project
planning, grant seeking, or digital methodologies. Services in Tier 3 could lead to more
in-depth partnerships at service Tier 4. Though the goal will always be to help as many
scholars as possible, access to Tier 3 services, requiring more staff time and support,
will be necessarily selective and a well-defined selection process is required to manage
demand. Selection processes for these services will vary from institution to institution;
criteria can range from focusing on VIP faculty, to partnering with a particular department
or program, only accepting projects that come with grant funding, or offering funds for
which scholars may compete. Whatever selection process is chosen, it needs to be well
understood by staff and potential project partners so decisions demonstrate a strategic
approach to services.

**Tier 4: Applied Research and Development**

This level is more experimental and aimed at developing methods and
infrastructure with possible (but not certain) future research value. The focus is on
partnership with innovative scholars, ideally leading to reusable products or integration
among existing tools. A key objective is to create “first-of-a-kind” tools, platforms,
methods, or integrations that meet emerging research needs, and to implement them in
a cycle that supports use, testing, and improvement. Ultimately, the goal is to enable
such services, methods, or tools to be rolled out as Tier 2 or Tier 3 services. Work in Tier
4 is highly selective, mostly grant-funded, and extremely staff intensive.

This tiered model provides a way for organizations to recognize their existing and

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9 These services complement existing library research services such as subject specialist research assistance, the
library catalog, etc.
desired services as a spectrum of methods for supporting digital scholarship, ranging from enterprise-level tools to experimental, resource-intensive initiatives. Articulating how the institution’s services fall into the four tiers will help library staff and leadership consider the organization’s strengths, gaps, and research needs, and determine how to best invest time and effort to strategically develop new services. In the next section, we address some challenges of implementing this model.

CONSIDERATIONS FOR IMPLEMENTATION

This high-level service model is not prescriptive; it can be applied in a variety of ways, depending on the given organizational context and structure. We believe it could be implemented with many different initiatives, tools, or services to achieve the desired level of engagement and support. Similarly, it can rely on a wide range of possible staffing arrangements. In planning to offer services for digital scholarship, institutions must be guided by local considerations such as user needs, strategic priorities, and existing organizational structures and services.

However, in order to implement scalable and sustainable services, there are certain programmatic and strategic requirements without which these initiatives may fail.  

Scholars’ needs for digital scholarship support are inherently diverse; in attempting to meet them without considering scale and sustainability, we risk developing narrowly focused or short-lived solutions that are difficult to maintain over time and with infrastructure that cannot be repurposed to benefit other projects. None of the peers we consulted have fully solved this problem, but they shared many helpful approaches. We are giving their ideas considerable thought as we develop and refine our own services. In this final section, we describe some of the most significant challenges to scalability and sustainability and propose some methods for addressing them.

Selection and Scoping

Though we talk about them as related goals, scalability and sustainability should also be considered individually when evaluating service options. There are times when one may be a more important consideration than the other. For instance, a valuable

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10 This past summer, Miriam Posner, The Library Loon, and Mike Furlough, among others, had a thoughtful discussion via their blogs about the institutional challenges to supporting digital humanities in the library. (Miriam Posner expands her original blog post as an article in this issue). They identified common impediments that cause incipient digital humanities services in libraries to falter and scholars and staff to become frustrated with the services offered. Their insightful observations complement the implementation considerations we derived from our research in 2011 and our subsequent work in this area. Posner, “What are some challenges to doing DH in the library?” retrieved from http://miriamposner.com/blog/?p=1274; Library Loon, “Additional hurdles to novel library services,” retrieved from http://gavialib.com/2012/08/additional-hurdles-to-novel-library-services/; Furlough, “Some institutional challenges to supporting DH in the library,” retrieved from http://www.personal.psu.edu/mjf25/blogs/on_furlough/2012/08/some-institutional-challenges-to-supporting-dh-in-the-library.html
service might be sustainable at a given staffing level, but not scalable to a larger clientele without adding significantly more resources or using a different technology. To get the most out of institutional investment in new initiatives, it’s important to identify the intended audience, define the scalability and sustainability goals, and select tools, services, and projects strategically to meet these goals. For services intended to be scalable, our model advocates offering tools that offer a limited range of alternative interfaces and functionality but can be run and supported efficiently and thus offered to a large number of users (see Tier 2 in our proposed service model above). The City University of New York, for example, is developing the Commons in a Box, a content management system for blogging and collaboration, with a set of design templates and plug-ins for different needs. Columbia’s Center for Digital Research and Scholarship offers a standard software platform and a tiered service model for journal publishing, with the basic service available at no charge and customization options provided for a fee. Such approaches provide useful alternatives for patrons, while building in constraints (templates, fee structures) that ensure the service can be supported with the resources available.

Once a tool or platform is selected for implementation, service definitions are critical to setting user and staff expectations for their use. According to the ITIL (IT Infrastructure Library) service management framework, a service definition or Service Level Agreement (SLA) typically specifies details of service hours and availability, functionality, service and customer support levels, customer and service provider obligations, as well as any associated fees. SLAs should also help staff and scholars understand the differences among services. For example, a training service should clearly state when and how training may occur, who is served, and what level of training is to be expected. And training to use tools must be clearly distinguished from, say, engaging in a long-term project with a scholar. When services are well defined and understood by all involved, it is easier to carefully assess the needs of a potential scholarly project and determine whether it can be met with an existing service (Tier 2 in

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11 Commons in a Box is described as, “a new open-source project that will help other organizations quickly and easily install and customize their own Commons platforms.” [http://newscommons.gc.cuny.edu/2011/11/22/the-cuny-academic-commons-announces-the-commons-in-a-box-project/](http://news.commons.gc.cuny.edu/2011/11/22/the-cuny-academic-commons-announces-the-commons-in-a-box-project/)

12 The CDRS tiers of journal service are described at [http://cdrs.columbia.edu/cdrcore/services/which-service-level-is-right-for-my-journal/](http://cdrs.columbia.edu/cdrcore/services/which-service-level-is-right-for-my-journal/) More information about their journal services may be downloaded from [http://cdrs.columbia.edu/cdrcore/services/texture-publications/](http://cdrs.columbia.edu/cdrcore/services/texture-publications/)

13 For more information about the IT Infrastructure Library (ITIL) see [http://www.itil-officialsite.com/AboutITIL/WhatisITIL.aspx](http://www.itil-officialsite.com/AboutITIL/WhatisITIL.aspx)

14 Service Level Agreements are defined here: [http://www.knowledgetransfer.net/dictionary/ITIL/en/Service_Level_Agreement.htm](http://www.knowledgetransfer.net/dictionary/ITIL/en/Service_Level_Agreement.htm)
our model) or if it requires consideration as a special project (Tiers 3 or 4). The traditional reference interview process provides an excellent model for these types of evaluations. For instance, a faculty member approached us about a “digital humanities project” that amounted to the need for a wiki where documents could be shared with students—a request easily met with a service already in place that could support the project as it evolved. More complex projects require a more substantial investigation before they can be selected, and will rely on the staff member who is conducting the initial interview to know where to refer the patron, or being empowered to assemble a team to discuss the request.

Having a well-developed project selection process allows organizations to make informed choices about how to strategically deploy staff on more experimental initiatives. Portfolio management—the process of documenting and assessing both projects and the services within an organization—provides a broad overview of the organization’s work and enables service gap analysis, resource allocation, and project selection, and can thus facilitate strategic alignment. (Vinopal, 2012) We believe that project selection should be undertaken as part of an active portfolio management process to ensure scalability and sustainability. All projects in Tier 3 must, by definition, be selected, since those services cannot be offered widely. And for Tier 4, an organization may want to leverage its project selection process to identify “stretch” projects that will help it explore new areas and develop new capacities that may eventually benefit many other scholars. To ensure the return on resource investment, these “first-of-a-kind” projects must be selected strategically to fill in known gaps in the service portfolio. Success with this approach requires that decision makers: 1) understand the organization’s service portfolio and service gaps; 2) have articulated the strategic priorities of the organization, in order to develop services that meet those goals; and 3) have a well-understood decision making process for selecting initiatives, assigning resources, and moving new projects forward. Some of those we interviewed have a regular meeting at which projects are assessed for their fit with organizational goals, skills, and staff time. Others assemble project assessment teams ad-hoc as requests arrive. However, without clear selection criteria, an overview of the project and service portfolio, and a strong understanding of project needs, this ad hoc method can result in a bulging portfolio and difficulties completing work on schedule. Once projects are selected, many institutions develop written agreements with project partners to clarify responsibilities and define project scope. These agreements are similar in some ways to SLAs, described above, but focus on the specific project rather than a broad service. Project agreements may stipulate the length of time any resulting systems (e.g., a specially-designed website) will be supported, by whom, and what kind of ongoing support is to be expected (for example, bug fixes only, ongoing development of new functionality, platform and content migration, etc.).

Situating Services and Staffing

Our research indicated that services supporting digital scholarship can be positioned within the library in any number of ways: they might be established as a
separate, new unit or department; fully integrated into the existing organization, with staff members from many departments spending some of their time on digital services; or managed in a hybrid approach, with a small core staff who draw support from subject specialists, metadata experts, etc., on an ad hoc basis, depending on project need. Sometimes grant funding is used to hire staff for initial projects, with positions evolving into permanent lines as need is demonstrated and budgets allow. All of these approaches have implications for service sustainability and scalability.

No matter how these services are configured within the library, it is important that they eventually become an integral part of the holistic service environment of the organization. In their report “New Roles for New Times: Digital Curation for Preservation,” Walters and Skinner emphasize the library-wide transformation required to build what they call “the trio of strong infrastructures, content, and services” to support digital scholarship. (2011)

While launching digital scholarship services as a separate unit or department with dedicated (and possibly new) staff may afford the unit flexibility and speed to develop quickly, consideration should be given to the relationship between that unit and the rest of the organization. If the eventual goal is to foster a new level of organization-wide engagement with emerging research practices and needs, then incubating new services among a small group can potentially limit the development and contributions of other staff. As a consequence, when service needs grow, it may be challenging for staff outside the new unit to support the services in an integrated way.

On the other hand, a staffing approach that will rely from the start on the participation of the whole organization may create problems of dilution and diffusion. Scattering responsibility for the initiative across the organization can inhibit focus and may also negatively affect staff participation, especially so if this work is in addition to staff’s responsibilities for existing services. As well, library-wide staffing for new services would require a very clear message about priorities and goals for the organization, the departments, and the individuals involved, addressing questions such as: How do the new services build on existing work? What new skills are staff expected to acquire? What current work may become a lower priority? And, who has the authority to delegate this new work to staff across various departments? This last question is particularly important, as existing reporting structures can prove particularly resistant to cross-departmental collaboration. This amount of organizational change requires significant time, which might hinder an effective digital scholarship presence on campus.

A third option is a hybrid model that falls somewhere between the “separate unit” and the “fully integrated” approaches described above. One way to implement this model is to identify current staff who are best situated (because of knowledge and skills) to help develop digital scholarship services, then free them up to lead the initiative, without necessarily creating a new unit. The organization could then incorporate other staff or
hire new staff strategically and incrementally as service direction and definition are established. These efforts could be supported by ad hoc reliance on subject specialists, archivists, metadata experts and others as needed, with more staff being trained and brought in to the services as time goes on. According to a survey of ARL libraries conducted in 2011, this provisional model is common among libraries developing support for digital humanities. (Bryson, et al., 2011) Our research suggests that it applies to general digital scholarship services as well. This incremental approach to staffing and service development has advantages, in that it can respond flexibly to fast-developing needs. Being small and somewhat apart from the existing organization during start-up phase, service providers can take a more exploratory, experimental approach to their work and then bring their experiences and conclusions back to the organization for larger-scale implementation. For example, staff may spend time developing strategic partnerships or running small test projects to learn what works and what does not. During the initial phase of service design, it is especially important to assess work being done and to use these early experiments and experiences to document needs and the resources required to meet them. Assessment activities can include: determining success criteria, evaluating client satisfaction, identifying what did and didn't work, calculating staff hours spent on development and support activities, estimating costs and possible efficiencies, and considering next steps. It is equally important to share these assessments at the appropriate level of detail with the rest of the staff, so that experience and learning are shared, and the services’ evolution is understood.

While effective in a time of rapid change in service needs and financial constraints, ad hoc service provision should be seen as a tactic on the way to a longer-term strategy for robust and scalable service design and support. The authors of the ARL Digital Humanities survey note, "as demand for services supporting the digital humanities has grown, libraries have begun to re-evaluate their provisional service and staffing models. Many respondents expressed a desire to implement practices, policies, and procedures that would allow them to cope with increases in demand for services." (Bryson, et al., 2011) Scaling up these services and keeping them going over time can be challenging for staff. Like the “fully integrated” approach above, this hybrid model requires clear direction from library leadership about expectations and priorities; otherwise those assigned to initiate these services may have difficulty summoning the project and service support from colleagues who are already fully occupied with their own work. Additionally, if services in this area rely primarily on fellowship- or grant-funded staff, it can be very challenging to sustain them once staff leave or funds are spent.

**Funding**

Like the other service support considerations discussed above, funding approaches for digital scholarship services are diverse, including hard funding, fees for some or all services, and internal or external grant funding. Special funds are frequently required for projects and services that are offered in Tiers 3 and 4, since these are more staff-intensive and may require advanced technology skills. Some institutions require
scholars who are proposing projects to come with grant money in hand. Others partner with scholars to help them secure funding. Another model is for those providing digital scholarship services (e.g., a digital scholarship center) to receive institutional funds that they then award as grants to researchers through a competitive project selection process. As with service definitions and project selection criteria, funding models should be well defined and clearly understood by all involved.

**Strategic Vision**

Noting how innovative digital initiatives and services successfully develop at some institutions and not at others, a colleague of ours has asked: “What can you do if my library director gets it and yours doesn’t?” This simple question cuts to the heart of the matter: grassroots innovation and a few enterprising, proactive staff are no substitute for library leadership providing sustained vision, guidance, and support for these new initiatives. The scalability and sustainability of library initiatives depend not only on careful choices about technology deployment, well-developed service descriptions, and effective project selection and portfolio management, but also on staff having a clear understanding of how and why they are investing their time and talent in complex new services.

It is critical to identify strategic priorities that align with the larger institution’s mission and goals, and to clearly articulate what the organization will and will not focus on. With such an array of options (tools, services, platforms, service models) no organization can undertake them all. Library leaders need to select organizational priorities, make them known, and fund them. Without focus, nascent efforts can become muddled and ineffectual. To foster cross-library engagement with this new service domain, leadership should ensure that it is understood across the organization as a strategic priority, and create a shared vision of how these new services relate to the library’s mission and goals and can be effectively integrated with existing ones. It is also important to frankly acknowledge the challenges of providing stable ongoing services while remaining responsive to emerging needs. Implementing project and portfolio management to document and track the organization’s services and projects can help to guard against taking on more work than can be accomplished at any one time.

**Authority and Time to Accomplish**

The staff who are specifically engaged in developing services for digital scholarship have particular needs arising from the way these services are situated within the organization. For a start, it is critical to identify staff with the appropriate knowledge and skills, and to give them the time to explore digital scholarship needs and establish the appropriate services. In addition, they must be provided with sufficient professional development support to maintain currency with rapidly evolving technology and standards. Furthermore, as we have said, because digital services necessarily rely on a wide range of expertise, staffing for them is frequently ad hoc in nature. A common
scenario is for projects to be managed by a digital services person with project support staff who all report to others. As a result, those charged with creating digital scholarship services often have considerable responsibility to accomplish initiatives without the authority to mobilize the resources needed to succeed. This is the particular challenge that evolves from building services that are not housed in a traditional department or unit but instead are more interstitial and rely on cross-organizational support for staffing.

It is critical that new service managers have the authority to accomplish their work within the scope of the vision and direction that leadership sets out. Given the inherently ambiguous nature of new service requirements, digital scholarship service leaders need the authority to make decisions, to direct the work of involved staff, and to establish a process for decision-making and communication about priorities up and down the hierarchy. Everybody involved in these ventures, even in an ad-hoc capacity, needs to understand his or her role and responsibility in the project or service’s success. Because the implementation of innovative new services requires a concomitant change in organizational mindset and practice, higher-level administration may need to intervene when work “gets stuck.” It is not enough for library administration to remind department managers or their staff about organizational priorities in the abstract; they must recognize the time required for this work and help staff set priorities and allocate enough time to participate in this new initiative.

**Guidance**

Establishing new ventures requires even more guidance and feedback from leadership than maintaining existing services. Those developing new digital scholarship initiatives will need a process for regularly communicating with library leadership about progress and priorities, and for seeking direction at critical junctures. Implementing our tiered services model, for instance, will require a selection process for projects at Tiers 3 and 4, which are more staff-intensive. As well, goals with clear measures of progress and success should be established, so that projects and services can be regularly assessed, and changes implemented as needed. The steering process can take many forms, including regular meetings with a designated steering committee or ad hoc meetings with the library director or other appropriate manager. No matter what process is enacted, it should be clearly articulated, so there is no confusion about how and when staff should report, how much autonomy they have in decision-making, and when they should seek feedback. What is important is that everyone involved in the service development process, from top-level leadership down, should understand how the new service will be guided, how service priorities will be set, who makes which decisions, which success criteria and assessment measures will be used, and how questions will be answered when problems arise.

**CONCLUSION**
Over the course of this article we have highlighted challenges to and strategies for building scalable and sustainable digital scholarship services. More and more scholars want to adopt digital tools, platforms, and practices for research and teaching, and these technologies and methodologies evolve rapidly. As the nature of scholarship changes, research libraries’ practices will also adapt in order to partner most effectively with scholars. New models for librarian-scholar collaboration include much more librarian engagement with the entire research process than ever before. From grant seeking, project planning, data collection and organization, and metadata creation, to data analysis and visualization, content dissemination, and long-term archiving, libraries have significant roles to play in developing and sustaining effective practices in digital scholarship.

The organizational challenges required for a research library to become and remain engaged with this quickly evolving scholarly landscape are not inconsequential. This requires not just a one-time organizational change, but also the development of an organizational culture that is inquisitive, adaptable, responsive, and that welcomes change, one that is willing to try new things, assess their success, and sometimes simply move on. As new opportunities, roles, and responsibilities emerge, library leadership must take an active role in articulating a strategic vision, defining priorities, addressing the connections between new services and established ones, facilitating horizontal as well as vertical communication and collaboration, and building a staff that are lifelong learners with evolving job descriptions. Our success in supporting new scholarly practices hinges on our ability to scale and sustain this kind of organizational change.

REFERENCES


Promotion and Tenure for Digital Scholarship

Laura Mandell

An Open Letter to the Promotion and Tenure Committee at Texas A&M University, Department of English, upon their request for information about how to evaluate digital work for promotion and tenure.

Evaluating Digital Scholarship

The first thing to do in evaluating digital scholarship is to ask the scholar who has produced it to submit it, if at all possible, for peer review. There are several avenues for doing so. First, any electronic scholarly edition can be
submitted to the MLA Scholarly Editions Committee for peer review, and junior faculty should be encouraged to do so. The kinds of editions that will pass peer review by the SCE could be very print-like, so the fact that a digital edition did not receive the SCE seal is not completely indicative of its value as research, about which I’ll say more below. Another venue for peer-reviewing is Nineteenth-century Scholarship Online (NINES) for nineteenth-century electronic scholarship. That NINES model is being expanded: my own 18thConnect peer-reviews eighteenth-century digital projects, and three other peer-reviewing organizations are coming into existence: MESA for medieval, REKn for Renaissance / Early Modern, and ModNets for Modernists.

There are also digital journals. In its “Statement on Publication in Scholarly Journals,” the MLA writes:

The electronic journal is a viable and credible mode of scholarly publication. When departments evaluate scholarly publications for purposes of hiring, reappointment, tenure, and promotion, the standing of an electronic journal should be judged according to the same criteria used for a print journal.

If a digital journal has a peer-reviewing system and an illustrious editorial board of premier scholars, articles published in that digital journal should be valued as highly as those published in print journals, and language to that effect should be incorporated into departmental promotion and tenure guidelines.

Practically speaking, we access ALL journals digitally, via JSTOR and Project Muse among other databases, and there is no difference between the value of printed and digital journals due to medium alone. Levels of prestige are no longer measurable by print and digital forms of publication, if they ever were. Thus the faculty who publish in Praxis (an online, peer-reviewed journal hosted by Romantic Circles) are from Berkeley, Princeton, Duke, etc. — institutions that we aspire to emulate. There are differences in prestige among digital journals just as there are among journals in print. External reviewers and period specialists should be asked to rank the journals according to all the ordinary ways of doing so — rejection statistics, contributors’ profiles, editorial board composition, and circulation statistics or other measures of disciplinary centrality — but in thinking about prestige, mode of access should be ignored.

Similarly, materials published digitally that have been peer-reviewed by NINES or 18thConnect pass through editorial boards as illustrious as those of any major press. Not only that, but technological review committees for these peer-reviewing organizations insure that the resources which pass peer review meet the highest standards for digital materials: these are library, archival quality, not web sites of the sort that anyone could mount. Letters from the directors of these organizations tell promotion and tenure (P&T) committees “equivalents”: a database may in fact be more like an article in terms of work and impact than like a book, it may resemble an edition more than argument, or in both cases vice versa.

Finally, prizes and awards can indicate the value of a resource. They are not exactly a substitute for peer review, but they do locate the resource within the field. The Blake Archive won the “Distinguished Scholarly Edition” award for 2003 from MLA — not best DIGITAL edition, but best edition per se.

I would now like to offer some ideas about how to judge digital scholarship in the absence of these more obvious signs by defining it.

**Definition of Digital Scholarship**

In effective digital research, digital media are not incidental but integral to the scholarly work. Digital scholarship is not, in other words, simply scholarship that takes place in digital media: all the digitized journal articles in JSTOR and Project Muse do that, and in fact all publications either now or will shortly have some kind of digital manifestation, even books. Most e-books might as well be books. In fact, it would be a lot more convenient if they were: the printed codex never needs to be recharged. If publishing a work in paper involves no loss of functionality, then the candidate should have published it in paper, with some exceptions discussed below. The implications of this principle are twofold. First, this knocks out of the running any digital project in which a scholar acts as a “content provider” and drops his or her work off at the door of IT Services. Second, it means
that digital scholarship by its very nature requires collaboration, and so we must have peer-reviewing mechanisms that take that into account.

Let me just emphasize the potential catch-22 here: if someone publishes something online that is really, in its core idea, a print artifact, members of P&T committees might be justified in thinking, “This candidate only made a digital edition because no one would publish this work.” But conversely, if a candidate pursues digital scholarship for the sake of finding out what can be done in new media, his or her research requires collaborating with designers, computer programmers — real collaboration, of the sort sponsored each year through summer fellowships funded by the National Endowment for the Humanities (NEH) and sponsored by the online journal *Vectors*. In that case, P&T committees threaten to say “collaboration doesn’t count.” It is because new media require collaboration that the provosts and deans at the NINES Summer Institute composed a document about authorship: please go to “Whitepapers and Documents” at [http://institutes.nines.org](http://institutes.nines.org).

To get back to the first half of this catch-22, however, it is indeed sometimes the case that “no one would publish” scholarship that deserves to be published. I am technical editor of Lynda Pratt’s amazing e-collection of Robert Southey’s Letters coded and published by Romantic Circles, and I have a great story about why those letters were published digitally. Lynda was being interviewed on the BBC about her work. Linda Bree, acquisitions editor for Cambridge Univ. Press in the field of Romantic Studies, was listening to the interview, and began to walk to the phone to call Lynda with an offer for publication. The interviewer asked Lynda the extent of the collection. It is huge: we have 877 letters tei-encoded and up in Romantic Circles, and we have only published parts I and II of the eight-part edition. Upon hearing Lynda Pratt describe the scope of her edition, Linda Bree of Cambridge UP hung up the phone before calling her. I have had trouble publishing editions of poetess poetry and criticism. They are lesser-known writers and poets, the publishing of whom no press can risk financially. In these cases, the digital edition may in fact closely resemble a print edition, but the editing must be as rigorous as with any print edition.

Editorial rigor involves different things in the digital world than it does in the world of print, though of course the two are connected. Digital Electronic editions will ideally fulfill about 70% of the guidelines for vetting electronic editions offered by the MLA Committee on Scholarly editions, including:

1. Use of a coding standard, such as TEI (the set of xml tags and validation schemas offered by the Text Encoding Initiative Consortium);
2. Database integrity (ways of determining whether what is in a field is right);
3. Solid design principles so that the resource promotes rather than deters thinking;
4. Attempts to render the work interoperable with other digital resources.

For something larger than an edition, a digital archive for instance, one needs to ask, does the digital archive make available what one would expect such a resource to provide? (This is comparable to asking, “Why didn’t a book on this topic discuss X?”)

More generally, in assessing digital scholarship, it may help to think of digital research as “curation,” a term that has been much discussed in the digital humanities and library communities recently. Typically, scholars in literary history, for instance, go into the archive and emerge with an argument backed up by particular texts and images that have been winnowed out of a mass of data that the scholar examined. If one thinks about a monograph in a particular subfield of a discipline as a lens for bringing the past into focus by bringing this particular text to the fore and relegating another to background information — a kind of organizing that even occurs in New Literary History, for all its radical leveling of genres and canons — then what a scholar does online in creating a thematic research collection is not so distant from monograph writing after all. Based on a particular reasoned theory, that person selects some materials and deselects others. Whereas in the case of the monograph, this “filtering” is done for the sake of making one particular argument, curating textual data in online research environments involves making possible a number of arguments, all of them nonetheless theoretically inflected by what has been brought into the limelight and relegated to obscurity.

Digital archives are close enough to monographs and editions that judging their value as research can be fairly straightforward.
Here follow two examples of some items that might not look like research or scholarship that in fact ARE such in the field of digital humanities, accompanied by arguments as to why these particular works ought to be valued highly by P&T committees.

**A. The HyperCities Project**

![Screenshot of HyperCities Berlin](image)

**HyperCities** director Dr. Presner’s original mapping project involved using Google maps and overlaying historical maps in order to present Berlin, both what one would find there now and the monuments of its past. But the project evolved into a platform that anyone could use to launch and record mappable histories.

![Screenshot of HyperCities Egypt](image)

HyperCities director Dr. Presner’s original mapping project involved using Google maps and overlaying historical maps in order to present Berlin, both what one would find there now and the monuments of its past. But the project evolved into a platform that anyone could use to launch and record mappable histories.

Todd Presner’s work on the HyperCities mapping project has, ever since its first appearance in *Vectors*, taken the digital humanities world by storm. *Vectors* is not just a journal that publishes what we call “digitally born” projects, those for which digital media are intrinsic rather than extrinsic. *Vectors* directs an NEH Fellowship program, bringing scholars for six weeks of the summer to the University of Southern California’s Institute for Multimedia Literacy where they collaborate with computer scientists and graphic designers to create digital resources. As editor Tara McPherson points out, these projects are often later funded by the NEH with other
grants, and of course receiving grant funding is one important indicator that digital scholarship constitutes valuable research. Another indicator is the number of speaking engagements to which a scholar is invited in order to present their project: Dr. Presner has been invited to speak about HyperCities worldwide.

As a digital project, HyperCities does precisely what is held up as most valuable about digital technologies in the book *Digital Humanities* from MIT Press, that he has co-authored with Jeffrey Schnapp, Johanna Drucker, Peter Lunenfeld, and Anne Burdick: it expands the public sphere and allows humanists to participate in it along with others whose concerns, needs, and capacities for selecting and shaping data are considered as equal to if not more important than the concerns of experts. It transforms humanities expertise into a platform for enabling discussion, contestation, and what the education manuals have infelicitously called “life-long learning.” By promoting data curation — which is to say, allowing groups of people to use the HyperCities platform in order to create HyperCities Now, HyperCities LA, and HyperCities Iran — this platform, which originally presented the history of Berlin, gives people a structure for organizing huge amounts of data: twitter, photo, and YouTube streams as they respond to crises of historical moment or document the day-to-day.

It is tempting to see Dr. Presner’s development of this research platform as service rather than research, as merely enabling others to investigate rather than itself being new scholarship. Presner defines the methodological affordances offered by HyperCities, the kind of research that it enables, as “thick mapping,” obviously playing upon Clifford Geertz’s ethnographical notion that was taken up by New Historicists, “thick description.” In the platform’s interactivity with social media, HyperCities promotes interactions among a genuinely global public sphere. This means that software used by and for people all over the world is itself causing people to learn and information to embody a methodological principal coming from the humanities.

By counting a professor’s development of a platform as research, we legitimize as scholarship building software to promote the activities of citizen scholars in the ways that humanists see as valuable. I would like to suggest any de-legitimization of such work, any denigration of interventions in the public sphere by humanities scholars in the academy, is profoundly suspicious, on an ideological level, insofar as such denigrations contribute to marginalizing the humanities and eroding our impact on the world at large.

But the thing to know when such projects emerge is that those software programs and platforms which are capable of harnessing, fostering, and designing massive amounts of non-scholarly, extramural cultural production, using principals that humanists have developed, that get others involved in critical thinking of the sort we perform and teach — doing that takes a huge amount of serious, intellectual work, well beyond the purview of simple technological development. If one defines research in the digital humanities as discovering and creating resources that empower people, direct tasks, and structure information according to articulated and articulable humanities principles, then HyperCities is research in the field of digital humanities. It needs to be recognized as such by those doing research in humanities disciplines with which it overlaps but to which it is not equivalent. Any department wishing to participate in supporting the digital humanities needs to be prepared to value HyperCities along with a monograph published by Duke University Press. In fact, it is getting more and more common to see a digital resource such as the Trans-Atlantic Slave Trade Database spawning or accompanied by a book from a major university press, as well as to see presses undertake to publish digital resources.

**B. Voyant: Reveal Your Texts**
I wish to give just one more example of an out-of-the-ordinary research project in digital humanities for which someone should be tenured and promoted: software. Geoffrey Rockwell, a philosopher, and Stéfan Sinclair, a literature scholar, developed a series of tools that linguists might use to analyze texts and then visualize the results. These tools are part of TaPOR, a portal to which scholars can go. No one came. Next, after many usability studies and false starts, they developed what they were calling the Voyeur window. (Stéfan is French Canadian and so didn’t know the connotations in English until someone pointed it out to him.) Voyant is a window where you can load up texts and then see them analyzed, immediately, in a number of tools. The most amazing thing about this new software program is that it allows you to embed a window in a digital article, and this window provides a place where live textual analysis is possible. This is one of the first minor ways of changing what an article can do digitally from what it can do in print, but it is a huge step, in my view. Throughout their careers, Rockwell and Sinclair have consistently argued that literature professors can use tools developed by computational linguists for qualitative literary analysis, for close reading. The Voyant window enacts this argument:

1. you do not have to be an expert in computational linguistics to launch the tools or understand what they are doing — the interface makes all that possible;
2. the text is kept front and center in the interface as that which is most important about any analysis. Once again, we have here digital humanities research buttressed by careful theorizing, software that counts as research precisely insofar as enacts humanities principles.

If you go to http://hermeneuti.ca/voyeur, you will come to a wiki providing two major texts. In one, the tool is explained via an instance of it use in argumentation, “The Rhetoric of Text Analysis;” the other is an instruction manual. Both of these — constituting the equivalent of a book — are major publications in the field of digital humanities. One can see precisely who wrote and revised what on the wiki’s history pages, and therefore once can see how intensive and fruitful co-authoring can be.

How could faculty not in the digital humanities judge the importance of The Rhetoric of Text Analysis and the Voyant Manual to the field of digital humanities as a whole? That two workshops on it were held at DH2010 and DH2011, the Digital Humanities Conferences with a 30 to 40% acceptance rate held at King’s College London and Stanford University, respectively, is a clue, but understanding Voyant’s impact would be easier with the help of an expert in the field of digital humanities. One request that comes up continuously in discussions of rewards for digital scholarship is that P&T committees need access to the names and addresses of experts in the field who could consult with them as well as write external evaluation letters. I’m part of a group called “dhcommons,” and we are working on developing a database of faculty experts in the field.

In closing, I offer the following resources:
Groups that are formulating Guidelines for Promotion and Tenure Committees regarding Digital Scholarship

1. The MLA Committee on Information Technology is currently revising their guidelines to make them more up to date. You can see the original document plus suggestions for revision, or offer your own suggestion.
2. Profession 2011 offers a cluster of essays on the topic of Evaluating Digital Humanities Scholarship.
3. For three of the MLA conferences spanning 2009-2012, the Committee on Information Technology has sponsored workshops for chairs and candidates on evaluating digital scholarship. Resources and information available here: http://wiki.mla.org
4. In 2010, NINES was awarded an NEH Summer Institute grant in order to write documents on the topic. Attended primarily by Provosts and Deans during the summer of 2011, the Institute for 2012 will bring in primarily Department Chairs. The documents that have been written so far are available here: http://institutes.nines.org.

Thank you.

Sincerely,
Laura Mandell

Originally published by Laura Mandell in 2012.

About Laura Mandell

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GAMES AS NARRATIVE PLAY

![Image of a game scene]

Imagine you're in a one-man space shuttle traveling through the heavens at the speed of light. You and your tiny ship are totally engulfed in darkness, except for the luminance of an occasional passing star.

Suddenly, without warning, there's a brilliant flash straight ahead. You check the radar screen. Nothing. Pretty soon there's another flash, and another. Next thing you know the flashes have turned into one gigantic force field of some kind and it's dead ahead. You check the radar screen, still nothing.

The colors in this mysterious force field are so bright, they're almost blinding. And they seem to be in layers. But the strangest thing is that nothing shows up on the radar screen. What could that mean? Is it possible to travel through this mysterious force field or will you crash and be destroyed? And what about the layers? If you make it through one, can you make it through the next, and the next? It's decision time and there are only a few seconds to think about it. Turn back or blast ahead and try to make it through the layers of this brightly colored force field. It's up to you.—Atari Super Breakout Game Program Instructions

Introducing Narrative Play

Consider the card game War as an epic battle between the forces of good and evil, waged with a deck of cards and the laws of probability. Imagine Wipeout XL as a future sport circa 2097, in which corporate-sponsored, gravity-defying hoverships speed through impossible race tracks and hurl reality-warping weapons at each other for the pleasure of bloodthirsty fans. Experience Super Breakout as a conflict between a brave one-man space shuttle and a mysterious force field of blinding intensity, a gigantic array of color and light. Light up the engine. Energize the laser blaster. Check the radar screen. Blackness, a flash of light, and then . . . you are playing the game. The story, your story, begins.

Playing a game means interacting with and within a representational universe, a space of possibility with narrative dimensions. In Oddworld: Abe's Exoddus, players fight the Glukkons of the rapacious Magog Cartel to save their fellow Mudokens from a life of slavery in the mines of
Necrum. In Driver: You Are the Wheelman, players take the role of Turner, a cop who goes undercover to infiltrate the Castaldi family, the underworld’s most dangerous organization. In Monopoly, players are ruthless land barons vying for total economic domination of Atlantic City.

Formed by rules and experienced through play, a game is a space of possible action that players activate, manipulate, explore, and transform. When we frame this space of possibility as a narrative space, a special set of questions arise: Where do narratives in a game reside? How can one design games as narrative experiences? What kinds of narrative experiences do games make possible? What is the role of narrative in the design of meaningful play? We address these questions within this schema, *Games as Narrative Play*.

Each of these questions emphasizes a design-centric relationship between narratives and games. Because this chapter’s potential terrain is so vast, we keep our investigation tightly focused. We do not ask, for example, “Are games stories?” or “How do we create better narratives?” These kinds of questions focus more generally on the nature of narrative itself, rather than on the role of narrative as experienced through game play. In this chapter, it is not a question of whether games are narrative, but how they are narrative.

Part of the challenge of talking about the experience of narrative in games are the many shapes it can take. Particularly in digital games, there is a proliferation of forms, often within a single game. For instance, how do players experience the “narrative” of DOOM? Is it by way of the “backstory” that we read on the back of the game box, concerning a lone soldier staving off an invasion of Earth by extra-dimensional demonic creatures? Do the opening title screen and between-level story updates play a role in the narrative experience? Is it through the play itself, a narrative structure that demands split-second timing, management of resources, navigation of space via POV and top-down maps, and a horrible death followed by rebirth at the last save point? What about the qualities and attributes of the game’s characters, setting, and plot? As we discover, each of these elements contribute to the narrative play of a game in their own unique ways.

This schema is tied tightly to the chapters that precede and follow. *Games as the Play of Meaning, Games as Narrative Play,* and *Games as the Play of Simulation* together explore the ways that games operate as systems of representation. In *Games as the Play of Meaning,* we further developed our ongoing discussion of how games generate meaningful play through the process of signification. In this chapter, we pull back to look at larger questions of games and the experience of narrative representation. In the next chapter on simulation, we zoom back in to investigate the more atomic structures of games as representational systems, linking together signification, simulation, and storytelling.

**Narrative Tensions**

Using other media as starting points, we may learn many things about the construction of fictive worlds, characters... but relying too heavily on existing theories will make us forget what makes games games: such as rules, goals, player activity, the projection of the player’s actions into the game world, the way the game defines the possible actions of the player. It is the unique parts that we need to study now.—Jesper Juul, “Games Telling Stories?”

The intersection of the terms “narrative” and “game” has been surprisingly contentious in the study and design of games. In recent years, scholars and students of literature, film, and electronic narrative forms such as hypertext have gravitated toward the study of computer games. As disciplines outside of game design have studied games from the perspective of their own fields, debates have arisen over who has the right to
make statements about games and narrativity, and exactly how to make such statements. These turf wars are symptomatic of the difficulty inherent in studying external media in the context of one's own discipline. Jesper Juul is correct in reminding us of the danger of relying too heavily on existing theories, particularly theories borrowed from other fields. For example, using literary theory to argue that all games are (or aren't) narratives ultimately doesn't offer much utility for game design.

Discussions of games as "interactive narratives" predictably fall into polarizing debates about linear vs. non-linear storytelling, of games as stories or stories as games. Some say that games and narrative are mutually exclusive concepts; others that some games are narrative whereas others are not. Consider the following excerpts from an online discussion of games and narrative by game designers/theorists Greg Costikyan and Brenda Laurel:

Greg Costikyan: A story is best envisioned as "beads on a string," a linear narrative, whereas a game is best envisioned as a triangle of possibility, with the initial position at one apex, and possible outcomes along the other sides, with myriad, ideally infinite paths between initial state and outcome. To the degree that you try to make a game more like a story by imposing arbitrary decisions, you make it less like a game.

Brenda Laurel: I don't think the interactive game changes the popular understanding of what a story is. In popular culture, people talk about characters and worlds in relatively media-independent ways. In common speech, the name "story" actually refers to the central bundle of potential created by characters, worlds, situations, histories, and so forth, rather than to a specific instantiation (for example, Star Trek, Care Bears, Myst).

While both Costikyan and Laurel make compelling points, the question underlying each of their statements is whether or not games are narratives. Our position in this schema is that the concept of narrative offers just one way of looking at games. Again, the question is not if games are narrative but how they are narrative. It is certainly possible to categorize all games as narrative objects—or as non-narrative objects—but as game designers we must ask how we can use such an understanding to generate meaningful play.

Over the last few years, several models regarding games and narrative have emerged. In "Games Telling Stories? A Brief Note on Games and Narratives," Jesper Juul summarizes these trends by identifying three arguments writers and scholars commonly make supporting an intrinsic connection between games and narrative:

1. We use narratives for everything.
2. Most games feature narrative introductions and backstories.
3. Games share some traits with narratives.

The first argument offers a holistic view: we use narratives to make sense of our lives, to process information, and tell stories about a game we have played. Therefore, no genre or cultural form (including games) falls outside the idea of narrative.

The second argument centers on the story context provided by a game's opening cinematic or textual introduction. (You are in a galaxy far, far, away...). Backstories position a player in the context of a larger story; a player's action in a game is the means by which the larger story is realized. In Super Breakout, for example, the backstory written in the program instructions places players within a one-man spaceship, hurtling through the deep blackness of space, faster than the speed of light. The player encounters a mysterious force field, which blocks his way. Can he pass through it or
will it destroy him? This text provides a narrative context within which the player acts, blasting away at the force field in order to resume his journey. Without this context, a player’s actions in the highly abstract game of Super Breakout might lack narrative motivation. Although his actions certainly have interactive meaning—one pixel interacts with another, one action has a discernable and integrated outcome—they lack a designed experiential context within which these more formal meanings are framed as a story.

The third argument, that games share some traits with narratives, is exceedingly broad. This argument holds that games, like narratives, have quest structures, are experienced linearly, offer reversals of fortune, and contain other elements common to some, but not all narratives.

According to Juul, all three of these approaches have been used to justify a narrative approach to understanding games. Directly or indirectly, they all form a part of our own investigation of games as narrative play. However, unlike the approaches Juul summarizes, we are coming to the questions of games and narrative from a game design orientation. In previous chapters, we have framed and re-framed games from many points of view. Seeing games as information, conflict, pleasure, or meaning can help game designers to design meaningful play. The same is true when we look at games as narrative play.

A Framework for “Narrative”

Before we go any further, let’s define the key term of this schema, narrative. Rather than coming up with our own definition, we borrow one from literary theorist J. Hillis Miller. In his essay “Narrative,” he outlines a handful of components that constitute a narrative:

There must be, first of all, an initial situation, a sequence leading to a change or reversal of that situation, and a revelation made possible by the reversal of the situation. Second, there must be some use of personification whereby character is created out of signs—for example, the words on the page in a written narrative, the modulated sounds in the air in an oral narrative. However important plot may be, without personification there can be no storytelling. Third, there must be some patterning or repetition of key elements.

Miller’s model for understanding narrative contains the following elements:

• Situation: A narrative has an initial state, a change in that state, and insight brought about by that change. This process constitutes the events of a narrative.

• Character: A narrative is not merely a series of events, but a personification of events though a medium such as language. Miller doesn’t mean character in the usual sense of fictional persona, but rather the process by which “character is created out of signs.” This component references narratives as not just events that take place in the world, but as represented events, events that occur via systems of representation.

• Form: Representation is constituted by patterning and repetition. This is true on every level of a narrative, whether it is the material form of the story or its conceptual themes.

Miller goes on to note that “even narratives that do not fit this paradigm draw their meaning from the way they play ironically against our deeply engrained expectations that all narratives are going to be like that.”

How do games relate to Miller’s definition of narrative? From a formal perspective, they fit the definition very well. Take Chess, for example. Chess has a beginning state (when it is set up for a game), changes to that state (the game play), and a resulting insight (the outcome). It is a personified representation, a stylized depiction of war, complete with a
Miller's definition of narrative is succinct, but it is also very abstract. All games are narrative by this definition, as is literature, theater, and film. Many other kinds of experiences also fall into the wide net Miller casts, some of them activities or objects we might not normally think of as narrative, such as a marriage ceremony, a meal, or an argument. All contain situation, character, and form of the sort that Miller outlines. (A meal, for example, has a beginning, middle, and end, it comes to pass through systems of culinary representation, and it involves formal patterning on many levels.) The cleverness of Miller's definition lies in the fact that it is so inclusive, while still rigorously defining exactly what a narrative is. Miller's model helps us understand exactly which components of a game come into focus when we consider them from a narrative perspective.

Miller's definition is in some ways a formal approach to narrative. Events, characters, and patterned action describe the qualities of the narrative object, rather than the experience of that object. Because *Games as Narrative Play* falls within our primary schema PLAY, our intention is not just to arrive at a formal understanding of narrative (What are the elements of a story?) but instead an experiential one (How do the elements of a story engender a meaningful experience?). In our schemas based on PLAY, our concern is with the experience of players: their internal state of mind, and the relationships they form with each other and with the dynamic system of a game. If we shift Miller's definition of narrative into an experiential framework, we can begin to discuss narrative play in familiar terms. Everything we know so far about the experiential components of games—that they are complex sensual and psychological systems, that they create meaning through choice-making and metacommunication, that they sculpt and manipulate desire—are tools for crafting narrative experiences.

These experiences emerge from the design of events, actions, and characters. Take our analysis of Centipede, from *Games as the Play of Experience*. The taut interaction between the game's five elements—mushrooms, centipedes, spiders, scorpions, and fleas—provides a formal framework filled with the possibility of narrative play. Each type of creature interacts with the mushrooms in different ways. Accordingly, the personification of each creature's interaction, the way that it becomes a meaningful representation, is based on its designed relationships. Spiders eat mushrooms, for example, whereas scorpions poison them. When shot, the deadly centipede's segments transform into mushrooms, an evolutionary action that changes the state of the creature from insect to landscape. Although these interactions are formal on one level, players experience them within a narratively descriptive space. How do we design such a space? How can we design game events as narrative events? What kinds of personifications do game actions allow? Next we begin to address these questions by looking in detail at one game, through an experiential application of Miller's framework.

**Thunderstorm**

We first introduced the dice game Thunderstorm in *Games as Systems of Uncertainty*, where we investigated the dramatic uncertainty created through the game's formal structure. We now look at the game again, this time with an eye toward narrative play. Thunderstorm embodies a very simple narrative. Players await the approach of a thunderstorm. If they play well their houses will be safe from the storm; if not, a powerful bolt of lightning will destroy their homes. Beware the player that fails to roll a 1!

Although Thunderstorm is a game of pure chance, the design
of the experience crafts narrative drama on many levels. The experience of the game’s “story” is intrinsically structural, tied directly to the game events. The roll of the dice not only controls the rate at which a player’s house is built, but simultaneously the speed at which the storm approaches. As the game progresses, players build their houses step by step. Every time a player rolls a 1, he or she skips house construction that turn, stalling the inevitable approach of the storm. Once the house is built, the drama heightens, as each time a player rolls the dice there is a chance that lightning will strike. The climactic narrative drama is enacted in that final roll, when lightning strikes, destroying the house. The finish could not be more dramatic.

Thunderstorm provides a many-layered narrative experience. Dramatic tension emerges from the varying rates at which players build their houses. At different moments in the game, some players may be “safe” from the storm (at least momentarily), while others sit poised at the front line of its fury. These positions can change quite quickly, depending on the outcome of the dice rolls as they progress around the circle. Snapshots of the game in progress would reveal constant shifts and adjustments to which house was closest to being built—and thus destroyed.

The translation of a player’s performance into a drawing of a house is a distinctly narrative component of the design that makes all of the rich story elements possible. Although the game could have players keep track of their progression in other ways (counting to six, collecting six cards, losing six pennies, etc.), none of these methods would support the story framework of the game nearly as well. By having players draw pictures of the houses that the storm will destroy, the game’s design provides a context that grants narrative meaning to the uncertain outcome of the dice roll. The drawn houses personify the formal events of the game, in Miller’s sense of “character created out of signs.” Additionally, players build their houses in full view of everyone else. This use of public information helps to maintain a sense of narrative coherence through shared experience. The drama of one player’s experience is ultimately linked with their ability to see how close the storm is to destroying everyone else’s house.

The narrative of Thunderstorm also dovetails nicely with the game’s structure of pure chance. As players roll and pass dice, they enact a fable about the folly of hubris and the inevitability of fate. As quickly as men and women might build houses—symbols of domestic civilization—nature will inevitably destroy them. Although it is satisfying to slowly build your house, it is at the same time a march toward destruction, a race in which the winners are executed at the finish line. Like the word guessing game Hangman, in which a hanging corpse is drawn line by line with each incorrect guess, completing the image is synonymous with death. The poetic irony of Thunderstorm is that the game’s image isn’t a negative icon of mortality as in Hangman, but a positive image of construction. In Thunderstorm, the meek player prevails, the most timid builder rewarded for his or her lack of speed, the game ending in the aftermath of the deadly storm, with only one complete or nearly complete house left standing.

The formal patterning that emerges from the core mechanic of Thunderstorm supports narrative experience on both macro-and micro-levels. The moment-to-moment rhythms of rolling, drawing, and passing the dice set up patterns of events, which are experienced as a story of an approaching storm. As the game progresses and players are eliminated, the circle closes until there is only one house left. The moment-to-moment rhythm of lightning striking individual houses is different every game, but inevitably, as the circle closes, the narrative pace quickens as fewer players remain alive. On a macro-level, the narrative pattern is one of construction and destruction, of movement and stasis. The overall result is a
surprisingly rich narrative experience.

**Two Structures for Narrative Play**

Throughout the rest of this chapter, we extend these formal notions of game interaction into the particularities of narrative game experience. As the example of Thunderstorm makes wonderfully clear, it is the dynamic structures of games, their emergent complexity, their participatory mechanisms, their experiential rhythms and patterns, which are the key to understanding how games construct narrative experiences. To understand game narratives, it is essential to analyze game structures and see how they ramify into different forms of narrative play.

We can identify two broad structural rubrics for understanding the narrative components of a game:

- **Crafted Interactive Story**: Players can experience a game narrative as a crafted story interactively told: *the characters Jak and Daxter are saving the world.*

- **Emergent Experience**: Players can engage with narrative as an emergent experience that happens while the game is played: *Jak and Daxter’s story arises through the play of the game.*

Both of these points of view, crafted interactive story versus improvised play experience, place narrative within the context of interactivity. Specifically, these viewpoints represent two ways of understanding how a game system produces narrative. The best terms we have found for these two structural relationships between games and narrative come from a talk by Marc LeBlanc at the 1999 Game Developers Conference. According to LeBlanc, game narratives can be “embedded” or “emergent.”

**Embedded** narrative is pre-generated narrative content that exists prior to a player’s interaction with the game. Designed to provide motivation for the events and actions of the game, players experience embedded narrative as a story context. The narrative of Jak and Daxter saving the world, for example, is a narrative embedded in the game system; it is experienced through player interaction but exists formally apart from it. It is the embedded narrative that gives Jak a reason for collecting Precursor Orbs and Power Cells; without the pre-generated storyline the game would feel like an abstract fetch-the-next-item quest. The embedded narrative also provides the major story arc for the game, structuring a player’s interaction and movement through the game world in a meaningful way.

Embedded narrative elements tend to resemble the kinds of narrative experiences that linear media provide. In Jak and Daxter, the embedded elements are the “pre-scripted” moments and structures that are relatively fixed in the game system. Any player, for example, that begins the game for the first time will see the same introductory cinematic. The first time a player encounters the Mayor of Sandover Village, he or she will hear the same prerecorded bit of dialogue. Embedded narrative elements can take a variety of forms and be reached through a variety of means, but regardless of how they are experienced, embedded narrative elements are fixed and predetermined units of narrative content, like text on the page of a Choose-Your-Own-Adventure book.

But not all narrative in games takes the form of pre-generated, embedded content. Narrative can also be **emergent**, which means that it arises from the set of rules governing interaction with the game system. Unlike embedded narrative, emergent narrative elements arise during play from the complex system of the game, often in unexpected ways. Most moment-to-moment narrative play in a game is emergent, as player choice leads to unpredictable narrative experiences. In the section of Misty Island where Jak battles the Balloon Lurkers, the narrative experience does not consist of pre-scripted sequences of dialogue, animation,
and camera movements. Instead, the game rules allow the player to hop on a Zoomer to try and defeat the Lurkers and gather resources through skillful maneuvering. The exact narrative experience of a particular game, whether it is Jak easily dispatching the Lurkers, or whether it is a series of crushing defeats that leads to an eventual victory, depends on player interaction.

Emergent narrative is possible because of the way games function as complex systems. As the name implies, emergent narrative is linked directly to our earlier explorations of emergent complexity and meaningful interaction. For example, emergent narrative arises from interactions that are both coupled and context-dependent. These two terms, which we introduced in *Games as Emergent Systems*, describe interactions between elements in a complex system. When interactions within a complex system are coupled, it means that the elements of the system are linked recursively. Like bees in a hive, the elements in the system act together to perform in ways that single elements cannot. A player's moment-to-moment actions as Jak are linked to all other actions taken over the course of the game. Is it time to finally explore that strange-looking island just offshore? Perhaps you should go back to the village, because Jak's health is a bit low. On the other hand, you only need a few more Orbs to unlock the next level. Do you take the risk? How will the story unfold? Because actions in a game are linked to one another, one change in the system can create another change, giving rise to narrative patterns over the entire course of the game.

Interactions in emergent narratives are also context-dependent, which means the changes that occur are not the same every time. Instead, the exact outcome of an interaction depends on what else is happening in the system at any given moment. The first time the player fights a Lurker, perhaps it goes badly and the player has to beat a hasty retreat. The player's overall interactive pattern might shift from bold exploration to cautious stealth, the appearance of a Lurker signaling a terrifying threat. Later on in the game, when the player is skilled and powerful, a single Lurker no longer poses a danger; running into one would be a routine or even amusing encounter. Within emergent narratives, coupled interactions produce global patterns across a system; context-dependent interactions ensure that the exact arrangement of these narrative patterns dynamically changes over time.

Both embedded and emergent game elements contain characters, events, and patterns, and so both are narrative by Miller's definition. LeBlanc is not the only game designer to make such a structural distinction and tie it to the design of game narrative. In his article "Formal Abstract Design Tools," Doug Church comes to a similar set of conclusions:

> The most obvious uses of story in computer and video games can be found in adventure-game plot lines. In this game category, the story has been written in advance by designers, and players have it revealed to them through interactions with characters, objects, and the world.

But story comes into play in NBA Live, too. There, the story is what happens in the game. Maybe it ends up in overtime for a last-second three-pointer by a star player who hasn't been hitting his shots; maybe it is a total blowout from the beginning and at the end the user gets to put in the headliners for their moment of glory. In either case, the player's actions during play create the story.

Church's two examples closely mirror LeBlanc's categories of embedded and emergent. According to Church, embedded strategies such as those found in adventure games are the "most obvious uses of story in computer and video games." They are more clearly narrative because they more closely resemble what we normally think of as a story experience. As Church puts it, these games contain "plot lines . . . characters, objects, and the world." But that doesn't mean that emergent
narratives, such as in a sports game like NBA Live, can't be just as important in generating narrative experience. Ultimately, the unique narratives games produce come from a balance of both of these approaches.

Embedded elements are narrative structures directly authored by game designers that serve as a frame for interaction. Emergent narrative approaches emphasize the ways that players interact with a game system to produce a narrative experience unique to each player. Some games, such as the classic adventure game The Secret of Monkey Island, emphasize embedded, content-based narrative. As Church points out, the structure of an adventure game, with its fixed settings and puzzles, lends itself to embedded narrative content that a player unlocks piece by piece over time. Other games, such as The Sims, embody a more system-based design approach, in which the game rules represent a space of emergent narrative possibility that plays itself out differently every time.

Virtually every game combines embedded and emergent elements. The Secret of Monkey Island is not entirely pre-scripted, like a slide show: there are many routes to take through the game, making for a limited kind of emergent experience. The Sims, conversely, has an overall setting that resembles suburban southern California. This pre-generated, embedded narrative frame contextualizes all of the emergent events that happen during play.

A common digital game design approach that combines embedded and emergent narrative elements is a mission-based game structure in which the larger narrative frame is pre-generated but most of the moment-to-moment game outcomes are determined through emergent means. The single-player web game Spybotics: The Nightfall Incident uses an overarching cyberpunk narrative that does not change from game to game. However, as a player makes her way through the game story, traveling from node to node on the network, she uses her accumulated inventory of programs to fight “databattles,” the outcomes of which are not determined in advance. The introductory animation, pre-scripted narrative, appearances of characters, and the map of the network itself are all forms of embedded narrative content. However, the way that the player chooses to make her way across the network, the hacker programs she decides to purchase, and the experience of strategically deploying them at each node, represent the emergent elements of the narrative. The total narrative experience of the game includes both embedded and emergent approaches, woven together within a single game structure.

**Narrative Goals**

*Within narrative use order and reorder the givens of experience.
We give experience a form and a meaning.*—J. Hillis Miller,

*“Narrative”*

Embedded and emergent structures are useful ways of conceptualizing narrative structures in games. But for narrative play to be fully engaging, it is important to remember the core principles of meaningful play. In the next several sections we take a look at some of the basic elements of games, including goals, conflict, uncertainty, and core mechanics, to see how they can be put to use in the design of narrative play.

One fundamental building block of narrative game design is the **goal** of a game. Goals not only help players judge their progress through a game (how close are they to winning), but also guide players in understanding the significance of their actions within a narrative context. In Super Breakout, for example, the goal is to “break out” of the force field by destroying as many colored blocks as possible. The goal describes the nature of player interaction within a narrative context, making the interaction meaningful. The outcome of the interaction is clear on a formal level (blocks are
destroyed) as well as on a narrative level (the space ship breaks through the force field!). In this example we see again how embedded narrative can provide a framework that makes the more immediate game play narratively meaningful.

In addition to the embedded narrative arc of the game, narrative play can occur on the moment-to-moment, emergent level as well. In the Hostage Rescue mode of multiplayer Counter-Strike, players compete in teams as either counter-terrorists or terrorists. Each team has complementary goals: to find and rescue the hostages or keep them from being rescued, over a series of rounds. The larger narrative arc of the game swings in tempo with the success or failure of each round, as one of the teams emerges as victor. But narrative is also experienced each moment of the game, as players make decisions regarding their interaction with teammates and opponents. Where are the hostages hidden? Why are the terrorists so unorganized? Can you count on your teammate to cover you as you sneak into enemy territory? With half your team down, will you be able to rescue enough of the hostages to beat the terrorists? Counter-Strike players constantly interact with one another through the narrative frame of counter-terrorist military operations. The collaboration and competition of the game experience, defined by the intertwined goals of each team, shape moment-to-moment player behavior and narrative experience.

Level or mission-based structures in games also provide important narrative goals for players. Completing a level means not only reaching an objective, but also passing through one episode of a larger story. As the player moves through multiple levels, the succession of completed goals creates narrative coherence. Game levels offer players access to specific areas of the narrative world, each level populated by unique events, objects, and characters that create a particular narrative tone and texture. Spybotics: The Nightfall Incident proceeds as a series of levels, in the form of network nodes that the player must defeat. The enemy programs at each level increase in difficulty, as do the abilities of the hacker programs under the player’s control. More than just ramping up challenge, these new game elements enlarge the emergent narrative possibilities. As a result, the player’s expanding palette of strategic actions corresponds with an expanding palette of narrative experience. Each successfully completed node rewards the player with messages and updates from the game’s cast of characters; as the play unfolds, the level structure also drives the embedded cyberpunk storyline of espionage, sabotage, and betrayal. The Sims Hot Date Expansion Pack uses both levels and goals to shape the game’s narrative. Going on a date is a narrative experience composed of several smaller events. A romantic date has several distinct components:

- **Getting ready to secure a date:** A player must prepare her Sim by making sure that the Sim has adequate Energy and that her Sim’s Motive values are at their maximum. Mood, an aggregate of all Motive scores, plays a big role in the duration of the date and the success of each interaction during a date. Because a date’s overall success is entirely based upon the sum of interactions between Sims, a large number of bad interactions results in an unsuccessful date.

- **Getting a date:** A Sim can get a date by asking one of her housemates, accosting a visitor, calling a friend or acquaintance, or by randomly meeting someone downtown. Whether a Sim accepts the proposal of a date from another Sim depends on a Relationship score, which develops through social interactions. Sims can joke, flirt, apologize, tease, and scare each other in an attempt to accomplish the goal of getting a date.

- **Sharing one or more activities:** A date consists of a set of carefully considered interactions and events, designed by
the player to maximize the Relationship score of the two Sims. A poorly designed set of events will inevitably lead to bad interactions—and a bad date. A rejected kiss at the bar, for example, immediately ends a date. Each kind of event players choose to include in their date has its own set of narrative expectations. Trying on clothes in a store, for instance, offers a very different narrative experience than a dip in the hot tub!

- **Going home together (optional):** The ultimate end to a date is to get a Sim to come home for some shenanigans on the Love Seat or in the Love Tub. In order for this to occur, however, a player must carefully manage Energy resources as well as maintain a high Relationship score throughout the date. Achieving this goal affords clear narrative resolution.

- **Saying goodbye:** If the date goes well, a Sim might invite a date to move in, or even to get married. With either of these outcomes, the new Sim becomes a member of the household. There is also the possibility that the date will end badly, meaning that the Sim’s Relationship score has bottomed out. The player has some choice in defining his or her own goals for a date, but the final outcome is determined by the events and interactions that have taken place up to that point, and are emergently generated. This concluding step in the larger narrative event of the romantic date provides a snapshot of the overall experience, giving the player a sense of narrative closure.

Level or mission structures allow players to feel the details of a story while the game designer maintains control of the larger narrative experience. A game’s goal, or series of goals, is part of the narrative context that makes up the game. When goals are well-designed to support narrative play, a player’s interaction with the game world becomes consistently meaningful. As usual, the discernability and integration of meaningful play is critical. The elaborate multi-step process of going on a Sims date is only meaningful because of the complex system that supports and links player actions. If every date ended the same way no matter what actions the player took, there would be no reason for the player to engage deeply in the decision-making process. Because each step of the process plays a role in determining the outcome, the experience of a Sims date provides genuinely meaningful narrative play.

**Conflict**

Goals in a game are never easy to achieve. As players struggle toward the goal, conflict arises. Game conflict provides both opportunity for narrative events and a narrative context that
frames the obstacles a player must overcome. Players in a game of Thunderstorm must overcome the obstacle of failing to roll a 1 in order to stave off the approaching storm. In the rhythm-action console game Um Jammer Lammy, players must overcome the obstacles of challenging rhythmic structures and hair-raising slapstick adventures to make sure Lammy makes it to her rock-n-roll gig on time. Overcoming conflict in a game is one way narrative events advance.

Because conflict presumes a struggle between opposing forces, in a game there should always be some element that works against player success, an element that acts to try and ensure the failure of the player. This role is often taken by a villain character, a competing player or team, or may be embodied in the game system as a whole. From a narrative perspective, this element motivates and contextualizes player action. It does not make much narrative sense to knock down rows of colored blocks if the behavior of those blocks has no connection to your presence in the game world. Once you identify those colored blocks as a force field designed by the forces of evil to stop your advance through the universe, you are much more motivated to enter into a conflict with them. Your action becomes meaningful within the narrative frame of the game. In traditional storytelling, the internal conflict of a character often shapes the kinds of experiences encountered by the audience. Internal conflict reveals a character’s vulnerability, which is usually exploited by those who wish to see the character fail. Lex Luthor knows Superman is vulnerable to kryptonite and in love with Lois Lane. The trick to using game conflict as a narrative game design tool is to tie it closely to the formal game structure itself.

In the strategy board game Settlers of Catan, the narrative premise is that the players are competing to colonize a small island, establishing their own networks of roads, settlements, and resources. Players can trade resources with each other, and conflict quickly arises out of the tension between diplomacy and self-interest. Every trade you complete helps you, but it also helps the opponent with whom you traded. If you drive too hard a bargain, no one will trade with you, which means you won’t be able to acquire the resources you need to prosper: You need a Brick resource to build that next stretch of road and connect your settlements, but the only player willing to trade with you is about to win—what action do you take? In Settlers of Catan, narrative conflict, social conflict, and strategic conflict are tightly intertwined. As you make strategic decisions, you are building social relationships, which themselves have narrative implications for the emerging story of the game.

The conflict of a game infuses every moment of its play. To maximize the narrative play in your game, you must pay close attention to how the conflict in your game is narrativized. When game conflict provides a narrative context for action, your players will help you tell your game’s story, infusing their own actions with narrative meaning. Even in a relatively abstract game like Settlers of Catan, the conflict provides a narrative space where players can flesh out the game’s story and take on narrative roles. In our own experience with the game, slang terms such as “Mountain King,” “Road Baron,” and “General” emerged to describe play strategies focused on controlling mountain resources, building long roads, and constructing a large army. This is transformative narrative play: a game conflict enriched by a narrative level of meaning that emerges from the social, strategic, and representation structures of the game. We are not saying that players engage with Settlers of Catan in order to role-play fictional characters. But narrative play is clearly part of the game’s appeal. Without its narrative framework, designed to function in concert with the game conflict, Settlers of Catan would feel like an exercise in number shuffling.

Uncertainty

Uncertainty is another requisite quality of meaningful play. If
a game is certain, if the outcome is known in advance, there is no reason to play in the first place. But uncertainty is also a narrative concept, for the element of the unknown infuses a game with dramatic tension. In Thunderstorm, the narrative of the approaching storm is only complete once the storm has destroyed every house but one. If it were known in advance which player would win, there would be no real need for a narrative device. In The Drome Racing Challenge, an online multi-player racing game, players customize racing cars and prepare a racing strategy, then select an opponent online and race. During a race, players do not directly control their cars, but instead watch their preparations play out as an Anime-style animation that depicts each moment of the race, event by event. The fact that players do not know the result of the race until the animation has played out makes viewing the race highly dramatic. Despite the fact that a player might have the utmost confidence in his or her race strategy, there is always the chance to lose.

The dramatic tension of Poker, too, gains its bite from the uncertainty of outcome. Bluffing contributes to the narrativity of the experience, heightening the potential for deceit. As players enter into the psychological space of the bluff, narrative tensions mount. Does she really have the hand she says she has, or is she bluffing? What if she isn't bluffing? Can she still be beaten? He just made a large bet, so he must have a good hand. But he bluffed last round, and he wouldn't try that same trick twice in a row. But maybe that's what he wants me to think....

The mechanics of betting heighten the feeling of uncertainty. Players with strong hands wage higher bets against uncertain outcomes, whereas players may limit bets when the degree of uncertainty in a game feels too great. As players fold and the circle of active players shrinks, narrative tension grows. Although players may have good hands, the outcome remains uncertain until all bets are made and the cards are called. This moment can be quite dramatic, particularly when a hand has been well-played.

Even in role-playing games, which often lack a final game outcome, the uncertainty of each action, each encounter, and each adventure plays a crucial role in building narrative engagement. Experienced tabletop role-players will shun game masters with reputations for being too easy or too hard. In these cases, certain death or certain success removes the enjoyable uncertainty of the game. On the other hand, when role-players feel like they are truly uncovering mysteries and exploring strange new areas of their worlds, powerful narrative play can result. As with the use of conflict, successful use of uncertainty in a game story ties the narrative elements to the formal system of the game. Do you dare explore the dank dark cave, with its legends of horrible monsters and priceless treasures? Should you first consult the oracle at the top of the mountain for advice, risking starvation during the long journey? Do you spend your last few gold coins hiring a few extra guards to accompany you? Each of these choices involves not just dramatic narrative outcomes, but different uses of the role-players’ limited resources. As players make a choice and its uncertain outcomes slowly unfold, new choices present themselves, each emerging option cloaked in its own narrative uncertainty.

Core Mechanics
Whereas uncertainty tends to affect the larger trajectory of a game’s narrative arc, core mechanics represent the essential moment-to-moment activity of players. During a game, core mechanics create patterns of repeated behavior, the experiential building blocks of play. Designing moment-to-moment play as narrative play means paying attention to exactly what players are doing in your game, how their choices and outcomes are represented, and how these moments fit into larger narrative frames.

Recognizing games as narrative experience means considering
them not just as bits of plot that are arranged and rearranged through interaction, but instead considering them as an ongoing activity in which a player engages with a core mechanic to make meaningful choices and explore a space of possibility. Often, interactive narratives are diagrammed as points connected to lines, with each point representing a piece of text or a segment of video that is accessed by the player.

What this kind of formal approach to interactive narrative leaves out is how a player moves from point to point in the system. This is where the core mechanic comes into play. In designing games, you aren't simply creating content. You are creating a set of actions, a series of stylized behaviors. What are your players actually doing from moment to moment in a game? More importantly, how can you craft these core mechanics to most effectively embody the narrative experience you have in mind? A number of examples follow.

In the unusual virtual creature game Seaman, the player interacts with the title character Seaman by talking into a microphone that attaches to the Dreamcast controller, enacting a wonderfully conversational style of play that literally involves speaking, looking, and listening. Because the game's story casts the player as a scientist observing and interacting with a strange form of life evolving in a fishtank, these core mechanics are entirely appropriate to the narrative of the game. Even when the player is using the controller buttons to take action, the game design creates evocative mechanics of interaction. Grabbing Seaman and lifting him up out of the virtual fish tank is accomplished by a slightly awkward, single-handed button combination that creates a hand gesture very much like grabbing a fish with your forefinger and thumb. The core mechanics of Seaman not only let the player access new content, but actually force the player to perform the narrative of the game from moment to moment.

The default rules for Mind's Eye Theater, the live-action version of the role-playing game Vampire: The Masquerade, resolve actions by means of Rock-Paper-Scissors. Although this system is convenient for the real-world context of a LARP (where it would be awkward and time-consuming to pull out dice and scoresheets to resolve every conflict), many role-playing groups have opted for different resolution mechanics better suited to the narrative content. For example, some player groups simply translate rock, paper, scissors into more appropriate content (devil, angel, human); instead of using hand signals, they use sets of elaborately designed custom cards. Flashing an image of a devil before your opponent in order to resolve a psychic attack suits the dark Goth narrative of Vampire much more than making the schoolyard gesture of scissors. This game design solution keeps the formal system of Rock-Paper-Scissors completely intact, while modifying the experiential component of the core mechanic for dramatic narrative effect.

**Narrative Space**

The last several sections of this chapter have utilized fundamental game concepts, reframing them in narrative terms to shed light on the intersection of game design and storytelling. Goals, conflict, uncertainty, and the core mechanic are all general elements of games that game designers can use to craft meaningful narrative experiences. Another familiar game concept that we can understand narratively is the space of possibility. Game designer Warren
Spector connects this concept to narrative when he states that “games create ‘possibility spaces,’ spaces that provide compelling problems within an overarching narrative, afford creative opportunities for dealing with these problems and then respond to player choices with meaningful consequences.” Spector’s description of a game’s “possibility space” links the embedded “overarching narrative” of a game to the emergent actions and outcomes of moment-to-moment play.

So far in this book, we have invoked the space of possibility metaphorically, to mean an abstract decision-space or a conceptual space of possible meaning. But what if we consider the space of possibility literally—as an actual 2D or 3D space in which a game takes place. In other words, one way to think of the space of possibility is as an actual narrative place. In Berzerk, the space of the game consists of a series of connected rooms, seen from a bird’s eye view. The checkerboard pattern of a Chess board mathematically slices the space of the game into discrete modules of equal dimension, whereas the elegant grid of the Go board uses the intersection of points to describe the territory of play. In Super Mario 64, the three-dimensional space of the game is composed of concealed rooms, magical trapdoors, and secret worlds that create a vast landscape of mysterious hidden places.

The spatial features of a game have a strong impact on creating the narrative space of possibility. As game scholars Henry Jenkins and Kurt Squire explain, Volleyball, for example, takes place within a court 60 ft × 30 ft, divided in the center by a net 8 ft high. The only objects that exist in this space are players—six to a side—and a ball. The game play emerges from the interactions made possible by the players’ positions within the spatial grid. Players occupy designated spatial positions on the court which guide and constrain player action. How and when players touch the ball, for example, is a product of their positions within the grid. The net that divides the court engages narrative play as well, for it articulates the space of friend and foe, of teammate and opponent. Across this net, dramatic narratives of attack and defense occur each time a player serves the ball.

The organization of spatial features in a game is critical to the design of a game’s narrative space of possibility. If you want your players to form strong social relations, make sure to create narrative spaces that support social interaction. The spatial design of a house or restaurant in The Sims defines the type of social interactions that can occur there. If a player designs a bar that doesn’t allow the bartender access to the cash register, no drinks can be served. Without the action —outcome of ordering and serving drinks, a slew of narrative interactions fail to materialize. In Black & White, the spatial features of the game world change in relation to the actions of a player, placing the consequences of player action in a narrative of moral choice. The world at the beginning of the game is an image of Edenic innocence. As a player moves through the world, taking actions and making choices, the world changes to reflect the moral nature of these choices. “Bad” choices darken and scar the world, whereas “good” choices transform it into a flowering garden. The story of good and evil is metaphorically both reflected and enacted within the spatial features of the game world. Even the way that the player moves through the world of Black & White, by “grabbing” it with the game’s hand-cursor and pulling it into view, emphasizes the unusually intrinsic connection between...
the player and the space of Black & White.

**Case Study: A Loopy Core Mechanic**

In LOOP, the player uses the mouse to draw lines and capture butterflies moving about the screen. The formal core mechanic, drawing lines around shapes, is framed as a narrative act (catching butterflies) with which players take action in the game world. In LOOP, there is a strong fit between core mechanic and game narrative. The looping action of drawing lines with a mouse metaphorically evokes the swooping gesture of catching butterflies with a net. One could imagine an abstract version of LOOP as a game without butterflies, in which the player is simply drawing lines around colored geometric shapes—but the framing of the player’s action as butterfly catching adds layers of narrative meaning to the core mechanic, creating a story context that incorporates other aspects of the game as well.

Each level in LOOP gives the player a limited amount of time to catch a certain quota of butterflies, or else the game ends. LOOP communicates this time limit by the condensed representation of a single day: the rising and setting of the sun. This narrative device ties the core mechanic of the game to an episodic structure. A clock, hourglass, or even just numbers counting down could have been used to mark the passing of time, but these design solutions do not complement the narrative context of the game. Each “day,” players have a chance to collect more butterflies. Once the sun sets, providing that players have managed to catch enough butterflies, the colorful insects disappear until the dawn of another day when it is time to catch some more. As the level of difficulty steadily increases, the dramatic tension is heightened. Because of the intense concentration required to collect as many of the increasingly agile butterflies as possible, the sun seems to set faster and faster with each passing day. It doesn’t of course—it only feels that way!

Every five levels, a player has a chance to catch a special butterfly and reach a bonus level. These levels are set at nighttime and feature a rising moon as a timer instead of a setting sun. Bonus levels do not have a quota of butterflies to catch and therefore provide a more relaxed context for the core mechanic within the overall rhythm of the game. These nighttime levels reframe the core mechanic in a narrative context opposite to that of the daytime levels. In this way, the narrative framing works hand in hand with the formal game structure to maximize narrative meaning from the simple core mechanic.

**LOOP**

The patterns of behavior created through the core mechanic of LOOP support narrative play in a number of ways: by situating play within a repeating framework of a day by linking the formal interaction of looping to the narrative context of butterfly catching, and by creating numerous levels of choice, from the number and kind of butterflies captured within a single loop to the pace at which the collecting occurs. In addition to the elements of narrative play tied to the core mechanic, there are a number of embedded narrative components as well. These include the butterfly-catching main character Ada; her procedurally generated dream poems that appear on bonus levels; and the visual motif of a book that links the act of butterfly catching to writing and storytelling. These narrative contexts add yet more meaning to the player’s interaction, forming an overall system of play that results in an experience full of narrative possibility.
CHAPTER 1

ORGANIZATION OF RECORDED INFORMATION

This chapter gives an overview of the field of the organization of recorded information. Terms used here that might not be readily familiar to the person new to the field of organizing information will be explained in later chapters. In the meantime the reader will find definitions of most unfamiliar terms in the glossary of this book.

THE NEED TO ORGANIZE

There seems to be a basic drive in humans to organize. Psychologists tell us that babies’ brains organize images into categories such as “faces” or “foods.” Small children do a lot of organizing during play. With some individuals the need is much stronger than with others. Those who operate on the maxim “A place for everything and everything in its place” cannot begin to work until the work surface is cleared and every stray object has been put in its place. That is, such a person has to be “organized” before beginning a new project. But even those whose work spaces appear to be cluttered or chaotic have some organization in their heads. Such persons usually have some idea, or perhaps certain knowledge, of what is in the various piles or collections of “stuff.” Regardless of one’s personal style, however, human learning is based upon the ability to analyze and organize data, information, and knowledge.

We organize because we need to retrieve. Kitchens are organized so that cooking equipment is easily accessible and foodstuffs and spices can
be used as needed. Workplaces are organized so that appropriate records are retrievable and work can be done. Learning processes are organized so that relationships among ideas can be used to assist the learner in recalling the learned material.

Retrieval of information is dependent upon its having been organized. Information is needed in all aspects of life—for example, for health reasons, to understand each other, to learn about one’s relationships, to fix things that are broken, or simply to expand your knowledge. Some of this information has already been assimilated and is in one’s knowledge store, while other information has to be sought. If it is not organized, it is difficult, if not impossible, to find. So we have all kinds of tools that are organized to aid in the process of finding information that we need: in telephone books, directories, dictionaries, encyclopedias, bibliographies, indexes, catalogs, museum registers, archival finding aids, and databases, among others.

Organization of information also allows us to keep usable records of human endeavors for posterity. Libraries, archives, museums, and other types of institutions have been doing this for many years. (This book does not deal with organization in commercial enterprises that have put together collections for the purpose of sale, rather than collecting for posterity.)

THE NATURE OF INFORMATION

I have sometimes given students the following list of terms and then asked them to place the terms in order from the lowest level of thinking to the highest: understanding, data, knowledge, wisdom, information. Clifford Stoll, in his book *Silicon Snake Oil: Second Thoughts on the Information Highway*, discussed these words that we use to indicate different levels of comprehension symbols. His order, indicating symbols from the least meaningful to the most meaningful, is: data, information, knowledge, understanding, wisdom. Which of these are we organizing in libraries, museums, archives, and the like? There is a running argument between those who believe we are organizing information and those who believe we are organizing knowledge. My prejudice is evident from the title of this book. It seems to me that I can use my knowledge to write a book, but until you read that book, understand it, and integrate it into your own knowledge, it is just information. That is why I believe we organize information—so that others can find it, read or otherwise absorb it, and use it to add to their own store of knowledge.

Notice that in the preceding paragraph, I said that you read, understand, and then integrate into your own knowledge. So I’m not sure about Stoll’s putting understanding after knowledge. I think those two may be intertwined. You need to have some understanding in order to incorporate something into your knowledge, but you must have a certain amount of knowledge in order to understand new things.

According to several dictionaries, knowledge exists in the mind of an individual who has studied a matter, understands it, and perhaps has added to it through research or other means. The same dictionaries indicate that information is the communication or reception of knowledge. Such communication occurs in great part through the recording of the knowledge in some fashion. People write, speak, compose, paint, sculpt, and in many other ways attempt to communicate their knowledge to others. This book, for example, is a representation of my knowledge; but it is not a complete representation of my knowledge of this subject. It is, no doubt, an imperfect representation, in the sense that some concepts may not be explained as clearly as I truly understand them. However, it is not a representation of the reader’s knowledge until the reader has read and understood it. That is, it is information that can be placed into a scheme of organization from which it can be retrieved for study by those interested in increasing their knowledge of the subject.

Thus I have chosen to use the term information rather than knowledge as my expression of what I believe we organize when we organize for the benefit of other people. This is not a rejection of “organization of knowledge,” however. The knowledge existing in the brains of people is being harnessed in many situations. I work on organizing my own knowledge every time I write. The knowledge of reference librarians is used in an organized way when they assist patrons in answering questions. “Knowledge management” has recently come into use in the administration of organizations and is discussed below.

THE NATURE OF THE ORGANIZATION OF RECORDED INFORMATION

As mentioned earlier, this book addresses the organization of recorded information, as other means are necessary to “organize” information that has only been spoken, heard, or thought about. Recorded information, however, includes much more than text. Video and audio recordings, pictures, cartographic representations, and Web pages are all examples of recorded information that is not just “text.” Therefore, instead of using words such as book or item to refer to the organizeable unit of information, the term information package is used in this book.
Ronald Hagler, in his book *The Bibliographic Record and Information Technology*, has identified six functions of bibliographic control. His listing reflects the purpose of his book—that is, the emphasis is upon the work of librarians. However, the list, presented and elaborated below, with wording altered to be inclusive of all recorded information, reflects the major activities involved in the organization of recorded information.

1. **Identifying the existence of all types of information packages as they are made available.**

A book may be published or a Web site may be established, but if no one knows of its existence except the person(s) involved in its creation, it will be of no informational use to anyone. Existence and identity can be made known in many ways: publishers’ announcements, e-mail announcements, reviews, subject-related listings, to name a few. Most publishers create catalogs listing their products along with abstracts for them. Reference tools such as *Books in Print* are products of this activity. Some online journals send regular e-mail announcements, outlining contents, to let readers know when a new issue is available. Some news organizations allow people to sign up to receive e-mail announcements about new information available at the organization’s Web site or about how to order recordings of special programs, and so on.

2. **Identifying the works contained within those information packages or as parts of them.**

In the majority of cases one information package is equal to one work. However, a collection of short stories or a grouping of artistic works may be considered to be an information package as a whole, or each individual story or artistic work may be considered to be an information package. It depends upon how much granularity is desired. A Web site that is all about a famous person may have individual digitized works of the person, biographical material, accounts of the person written by contemporaries, accounts of events contemporary to the person’s life span, and other parts. The writings about the person and the events may be important works in their own right and may need to be identified separately.

3. **Systematically pulling together these information packages into collections in libraries, archives, museums, Internet communication files, and other such depositories.**

The activity of creating collections has been thought of traditionally as the province of institutions such as libraries, archives, and museums. But collections have always been created in many other situations: for example, personal collections made up because of an intense interest in a particular kind of information, office collections of internal information and information needed to carry out the work of the office, university departmental collections of materials needed for teaching in a particular discipline, and so forth. Now that it is easy to make these collections known publicly, lists are being provided at Web sites.

Collections often include electronic resources not held locally. Many institutions purchase the right to allow the users of their collections to search a resource online. Some resources are accessible only online. Others are also available in print. Part of the organizing process is determining whether such resources need to be added to one’s collection in some permanent way.

4. **Producing lists of these information packages prepared according to standard rules for citation.**

Lists created in the process of describing information packages include bibliographies, indexes, library catalogs, archival finding aids, museum registers, and Web directories. These are important to the retrieval of individual information packages, because if one is looking for a known item, especially a tangible one that needs a physical location, it is necessary to find it listed somewhere. Such lists may be in print or electronic form.

5. **Providing name, title, subject, and other useful access to these information packages.**

The activity that adds the most value to the usefulness and retrieval potential of a collection is the provision of authority-controlled name, title, and subject access points to the descriptions of the information packages. Keyword access can be provided more or less automatically and "on-
the-fly”—that is, any information in electronic form can be found by searching for a word that appears in the electronic information package. However, as the size of the collection being searched increases, results of keyword searches become less and less satisfactory. More satisfactory retrieval comes from being able to search for names, titles, and controlled vocabulary that have been created under authority control, usually by humans. If a person has been identified by different forms of name, and if that name is brought under authority control, then a search for one form of the name will retrieve information packages related to the person regardless of which form of name appears in a particular package. If a work has been given different titles in its different manifestations, a search for one of the titles will retrieve all. If a system uses controlled vocabulary, a search for a word with more than one meaning (which encompasses most English words) will allow differentiation among the various meanings and will direct one to broader, narrower, and related terms. It will also bring together under one term all the synonymous terms that may be used to express a concept.

Authority-controlled access is of little use unless systems are designed to take advantage of it. Therefore, a major part of organizing information is designing systems for searching and display that will allow information-seekers to find easily what they need and want.

6. Providing the means of locating each information package or a copy of it.

Location of information packages has been, for at least a century, a value added by institutions with collections. The catalogs or other lists created in these institutions give information on the physical location of the information package, if it has not been taken out by a patron or is not being used by someone on the premises. In many library online catalogs, circulation information is available so that if an item has been taken out of the library, that information is available with the location information. Bibliographic networks (e.g., OCLC, RLIN) allow one to find out which locations physically own a particular item. Many library, museum, and archival catalogs are available on the Internet. One can learn from these which locations own an item, whether it is on loan at a particular location (usually a library, as archives and museums generally do not circulate items from their collections), and often whether an item is on order and when it is expected to arrive.

Traditionally, bibliographies and indexes have not given location information. Bibliographies list information packages that exist somewhere, but seldom tell where. Indexes give the larger work in which a smaller work being listed can be found (e.g., in which journal an article can be found), but do not give the physical location of the larger work. All of this is still true for tangible resources, but for electronic resources found on the Internet, it is becoming more common to give the location (e.g., the URL) in any listing that includes the electronic resource. However, the instability of URLs makes it difficult to keep them current.

ORGANIZATION OF INFORMATION IN DIFFERENT ENVIRONMENTS

There are many environments in which there is a desire to organize information so that it will be retrievable for various purposes and so that at least some of it will be kept for posterity. The ones to be discussed here are libraries of all types, archives, museums, and art galleries, the Internet (including digital libraries), data administration environments, and knowledge management environments.

Libraries

We consider libraries first because they have the longest tradition of organizing information for the purpose of retrieval and for posterity. As mentioned earlier, the process begins with collections. Collections in libraries are created through the process called collection development. Collections of tangible information packages are developed most often in three ways: (1) librarians learn about existence of new works through reviews, publishers' announcements, requests from users of the library, and the like, and then order appropriate materials; (2) gifts are given to the library; and/or (3) approval plans, worked out with one or more vendors, bring in new items according to preselected profiles. And, of course, journals keep adding to the collection's size unless subscriptions are dropped.
When new materials arrive for addition to the collections, physical entities have to be arranged in some fashion. They may be placed on shelves in the order in which they come in, or they may be placed in some more meaningful order. They could be placed in alphabetical order, the way that many fiction and biography sections are arranged. Most, however, are arranged by classification.

Classification of materials is part of the process of cataloging, which is usually the first activity following receipt of the materials. Cataloging of individual items involves creating a description of the physical item; choosing certain names and titles to serve as access points for getting to the description in the catalog; doing subject work on those names and titles; choosing subject headings and classification notations to represent the subject analysis; and creating call numbers (location devices), usually by adding a Cutter number to the classification notation to make a unique set of letters and numbers to identify the particular physical item. Most records thus created are encoded with the Machine-Readable Cataloging (MARC) format so that they can be displayed in the Integrated Library Systems (ILS) that most libraries use.

Finally, physical items have to be "processed" so that they can be housed with the collections. This involves removing or adding book jackets, placing security strips in or on items, placing call number labels and barcodes on the items, sending an item to the conservation/preservation department if it is an older item that is not in good shape, and so forth.

The two major results of the cataloging process are arrangements of collections and the creation and maintenance of the catalog that provides the major access to the collections. The catalog is able to show what exists in the collection written by certain authors, having certain titles, or on certain subjects. It also collocates (i.e., brings together) all of the works of an author and all the editions of a work, and all works on a subject, even though they might not be brought together in the collections. Finally, the catalog provides some kind of location device to indicate where in the collection the item will be found, assuming it is not circulating to a user.

Before online catalogs existed, the library's main card, book, or Computer Output Microform (COM) catalog typically was supplemented by other catalogs. Catalogs for departmental libraries, serial record holdings, special formats catalogs, and shelflist containing location information for specific copies of an item were the most common. All of these have been incorporated into one database in most online catalogs. In addition, most online catalogs are part of integrated systems, which means that circulation information can accompany each catalog record.

Until recently the online catalog continued to contain records only for items physically held by the library system. As libraries have entered into cooperative relationships, this principle of telling "what the library has" has eroded. In union catalogs that contain records from libraries of more than one institution, the concept was expanded to "what at least one of the cooperating libraries has." More recently, the addition of Internet records has meant that a number of catalogs now contain records for "what the library can give access to," including "what the library has."

Online catalogs also can be gateways to outside systems such as bibliographic networks (e.g., OCLC, RLIN) that can tell where an information package may be found if it is not in the local catalog. The item can then be requested through interlibrary loan (ILL). In addition, bibliographic and text databases can be accessed from a catalog gateway. Many of these have become document delivery systems. A major addition to online catalogs has been access to the World Wide Web (referred to hereinafter as the Web). Many libraries are cataloging Internet resources that seem to be important for the users of that catalog, and a URL in a catalog record can be hyperlinked to the Web for immediate access to the information package represented by the catalog record. As mentioned earlier, a major challenge has been keeping the URLs up-to-date.

Another influence on the organization process in libraries is found in the reference process. Libraries are organized so that information can be retrieved. In the reference process the success of the organization is tested. If it is found to be difficult to use, some of the organization process must be redone. Administrative services in libraries also must be concerned with the organization of information. Administrators are responsible for technological decisions that are directly affected by the organization of the recorded information in that setting. Conversely, administrators' decisions affect the future, in which electronic chaos will result if organization of information is not supported.

Archives

Libraries became more and more standardized throughout the twentieth century, with many information resources in a library being duplicates of resources in another, but this is not the situation in archives. Archives usually consist of unique items. Therefore, it once was thought that standardization was unnecessary. Archives could not take advantage of copy cataloging (i.e., using catalog records created by other agencies) because they were not cataloging materials that were also owned elsewhere. More recently, however, archives have seen significant standardization movements.
Organizations of Information in Different Environments

Archives preserve records of enduring value that document organizational or personal activities accumulated in the course of daily life and work. Organizational records consist of such things as annual reports, correspondence, personnel records, and the like. Personal records might consist of such things as correspondence, manuscripts, and personal papers, or might be a collection of memorabilia or a scrapbook. Even though materials in archives often are thought to be "old," this is not necessarily so. Further, archival materials can be in many different formats: texts, graphic images, sound recordings, moving image recordings, on paper or in analog or digital formats.

Archival materials have been organized for centuries. Unlike library materials, archival materials are arranged and described in groups. Until the last few decades, each archives chose its own way to organize the information, particularly regarding level of control and depth of description. There have been several major schools of thought through the years as to how organization of archival information should be done. The one that seems to have prevailed states that the basic principles of organization are provenance and original order. Provenance is the originator (i.e., the corporate body or individual) that created, gathered, and maintained the collection before it was sent to the archives. The term provenance is also used to show the ownership history of a particular artifact or collection of archival information. Original order is the order in which the originator of an archival collection kept or created the collection. Most archives now keep the contents of individual collections within the archives as a whole in original order, and the collections are maintained according to provenance.

Standardization and cooperation have come to the archival world in part because of increased interest in research involving documents and archival collections housed all over the world. In addition, interest has grown, especially in the academic community, in entering descriptions of archival collections into the same databases with library catalog records. It has now become possible to easily share knowledge of the existence of these collections on the Internet.

Descriptions of archival materials can take one or more different forms. An accession record summarizes information about the source of the collection, gives the circumstances of its acquisition (which are more fully described in the donor file), and briefly describes the physical data and contents for a collection. A finding aid gives a detailed contents note of the historical and organizational context of the collection and continues by describing its context, perhaps providing an inventory outlining what is in each box. It may also contain physical details such as the presence of brittle or fragile materials. A catalog record is a much shortened version of a finding aid.

Archival materials are generally held in closed stacks, accessible only to staff. There is no public browsing and so the arrangement does not need to be classified as is usually true in an open stacks library. Any classification given, in any case, would be so broad as to be almost useless, due to the varied nature of each collection.

When the archival world became interested in placing its catalog records into bibliographic databases in the 1980s, a MARC format for archival and manuscript control (AMC) was developed (MARC-AMC). Despite some lingering problems, the format continues to be used to code archival catalog records (now with the name "mixed materials" instead of AMC). In the last few years the SGML/XML-based Encoded Archival Description (EAD) standard has been developed for the purpose of encoding finding aids so that they can be displayed on the Web.

The organization of archival information is necessary for use, whether that use is for administrative, historical, or personal reasons. It is also useful for archives that wish to mount exhibits either in something like an academic setting or perhaps on the Web. If collections are well organized and documented, an exhibitor can use this to find appropriate additions to the exhibit.

Museums and Art Galleries

Museums and art galleries are combined here, because the kinds of art galleries that are being discussed (e.g., National Gallery of Art) operate in ways similar to museums. Art galleries that display art for the purpose of sale are not covered in this book.

Although libraries and archives both contain some visual material, the vast majority of the collections of museums and art galleries consists of visual material in two- or three-dimensional form. These collections traditionally have been organized for internal use only, but recently research needs have been given attention. Even when the needs of distant researchers are taken into account, curators may be reluctant to contribute some data because it may represent data created by individuals in the course of their research and may not yet be published.

Museum or gallery art works or artifacts are acquired through an institution's acquisitions department. As is done in archives, accession records are created, although the practice in natural history museums differs somewhat. In natural history museums, artifacts are acquired largely from
fieldwork, and a preliminary field record is made. If it is decided to keep
the objects in the collection, accession records are created. In some cases
of similar objects are described as a single lot that is given a single
accession number. Curating of individual objects, which may not happen
for some time, results in departmental-level catalog records with their own
numerical sequences.

In museums other than the natural history type, items are regis-
tered after being accessioned. Registration is a process much like cataloging
in libraries and archives. The register serves as a catalog in that it establishes
the organizational control over the art works and artifacts. A fairly recent
development is the use of bibliographic utilities for the organizational con-
trol of art and artifacts, although records thus created are still not neces-
sarily accepted in the museum community.

In museums, as in archives, provenance is important information
and is essential in determining the name of the object. Both provenance
and condition must appear with all other information about the object in
the catalog or registration record. An aspect of creating records for mu-
seum objects and art that is very different from creating records for text is
that the objects are often imperfectly known at the time of accessioning
and registering. There may be an accumulation of conflicting information
over time.

Description of visual material is often more difficult than descrip-
tion of textual material. There is more reliance on the perceptions of
the person doing the describing. Often there are no words associated with items
at all; it is necessary for the describers of such items to use their own words.
A single record has many more fields than does the usual library catalog
record. Some fields that might be needed for art objects that are not used
in libraries are: Material content, Technique(s), Studio of origin, Type of
equipment used, Color(s), Texture, Design symbolism, Provenance, Exhib-
tion history, Installation considerations, and Appraised value. Even with
additional fields, it is not possible to anticipate all the uses a researcher
might find in art or artifacts. A street scene from a century ago may be
useful to historians, architects, urban planners, cultural historians, medical
researchers, sociologists, students of photography, or others. Systems are
being developed that start with queries that use the text of the description;
then query results allow the searcher to browse surrogate images.

Subject analysis is also more difficult for visual materials—an im-
ge does not tell in words what it is about. Additionally, the line between
description and subject analysis is harder to draw. One might describe a
work of art as being a painting of a woman in a blue dress holding and
looking at a baby—this is a description. But if one gives the subject of the
work as “Mary and Jesus,” one has crossed the line into interpretation (un-
less this is in the title of the work given by the artist). And if one uses a
description like “love of a mother,” one is definitely interpreting.

A barrier to cooperative cataloging has been the firmly held no-
tion that museums hold unique objects. This is perhaps less true of natural
history collections than other museum and art collections. Although each
specimen of a bug or bird is unique, each represents a class of organisms
that can be identified to the genus and species level. There would have to
be copy-specific notes, but this does not preclude the idea of cooperative
cataloging for cooperative access. However, as was true of libraries when
cooperative cataloging was first introduced, museum curators fear a loss of
individual control and level of detail. They have been reluctant to give up
their local terminology and organization in order to participate in a bibli-
ographic utility. This is changing, however. Chapter 7 describes some co-
operative museum projects currently under way.

Besides its major collections, the museum or art gallery can also
have an archive, a records management program, and a library. The library
may contain published materials that document or relate to the museum
or art gallery collections. As with archival materials, the museum/art gallery
collections are accessible only to staff. Much of the collection is stored be-
hind the scenes while only some of it is on display at any one time. Behind
the scenes, the items are numbered in a way so that they can be retrieved
as needed. Persons responsible for the exhibits must make heavy use of the
system of organizational control. In addition, these collections are increas-
ingly being used for research by persons with diverse research needs.

The Internet

The Internet has been likened to a library where all the books
have been dumped on the floor and there is no catalog. For several years
efforts have been made to find a way to gain some control over the Internet;
however, one cannot yet say that it is organized. There is so much change
so fast that efforts begin may be out of date in a few months. At the end
of the 1990s, it was estimated by a number of Internet specialists that a Web
year was six to nine weeks. In other words, the amount of change that
happens in society in a year happened on the Web in six to nine weeks.
With the fall of the “dot com” milieu and with other stabilizing factors, the
rate of change has slowed. Nevertheless, getting a handle on organization
is still a challenge.

Several different approaches are being taken in the attempt to
organize the Internet. Libraries have attempted to use traditional means
for the organization. Some librarians, for example, have compiled bibiliog-
raphies of Web sites. Some of these bibliographies eventually have become “gateways” to the Internet. Librarians have been part of the team of people who have been working on a metadata standard called the Dublin Core. OCLC, a major library-oriented bibliographic network, established CORC (Cooperative Online Resource Center) in the late 1990s in order to provide a way for libraries to catalog online resources cooperatively and to have ready access to a database of metadata describing important Web resources. CORC has now been absorbed into OCLC’s Web interface for cataloging—called Connexion. In Connexion, cataloging can be done either in traditional MARC/AACR2 format or in Dublin Core format. An important feature of Connexion with regard to organizing the Internet is its provision for development of pathfinders for certain subjects.

Much work on organizing the Internet has been done by persons other than librarians. Search engines, for example, have been developed by computer and programming specialists. Most people appreciate search engines, even though they may be frustrated that the search engines are not more selective and precise. Most programs or agents (e.g., robots, spiders, etc.) sent out to find sites to add to the indexes of search engines are able to index text only; graphics and pictures can be recognized as such, but cannot be interpreted unless they have textual labels. In addition to that, these programs cannot analyze a site’s purpose, history, policies, and so forth. In order to improve the situation, work on various kinds of metadata (i.e., information about information) is ongoing and important; appropriate information could be gleaned by robots from metadata that has been added to a site by its author or by someone trained in describing and analyzing information packages, although at this time, misuse of metadata (e.g., addition of keywords that are popular words but have nothing to do with the content of the site) has kept search engines from making use of it. Properly used, though, metadata can include information about non-textual parts of a site, information about the site’s purpose and history, information about the contents of the site, and the like.

There is software that automatically classifies and indexes electronic documents, but automated tools categorize information differently than people do. The search site Yahoo! classifies by broad subject areas using human indexers. This approach has been popular, although not completely successful as a classification. A research project at OCLC is improving an approach to automatic classification using the Dewey Decimal Classification. Researchers for “InfoMine” (digital library) are developing systems to automatically assign Library of Congress Classification and Library of Congress Subject Headings.

Although some believe that organizing the Internet is impossible, the parts of it that are important for retrieval and for posterity will be brought under organizational control. It is human nature, and the principles learned over centuries of organizing print information can be used to speed the process of organizing electronic resources. The current effort to create a “Semantic Web,” wherein data on the Web will be defined semantically and linked to relevant data for the purpose of more effective discovery of information, is a case in point.

**Digital Libraries**

The Internet has given us the means for creating digital libraries and for making them accessible. Digital libraries vary greatly in content and methods of organization; all have some kind of organization, although not necessarily traditional library organization. Just exactly what can be called a “digital library” has been a matter of debate. Throughout the 1990s there were many experiments that were referred to as digital libraries. For example, at the simplest level were collections of links to resources related to a particular subject; sometimes, such collections (really bibliographies) were coordinated among individual librarians at cooperating institutions in such a way that a particular library would agree to cover certain subject areas, and then the locations of all the collections of URLs were brought together on reference Web pages at each institution. But “digital library” quickly came to mean collections in which a site provides digitized information resources with an architecture and a service for the retrieval of such resources. By the mid-1990s it was recognized that a digital library must contain an organized collection, which may be partly physical, but is at least partly or wholly electronic; it is not exclusively a set of pointers to other material; and it must be created for a particular audience, group of users, or community.

Moving into the twenty-first century, Christine Borgman stated: “Digital libraries are an extension, enhancement, and integration both of information retrieval systems and of multiple information institutions, libraries being only one. The scope of digital libraries’ capabilities includes not only information retrieval but also creating and using information.” She emphasized that digital libraries are for communities of users and that they are really extensions of the physical places where resources are selected, collected, organized, preserved, and accessed, including libraries, museums, archives, and schools. This is echoed in a white paper sponsored by Sun Microsystems that defines a digital library as “the electronic extension of functions users typically perform and the resources they access in a traditional library.” This paper emphasizes the importance of digital libraries in the growth of distance learning. Distance alternatives for lifelong
As mentioned above, development projects include work toward automatic assignment of Library of Congress Classification and Library of Congress Subject Headings.

Another example of a cooperative project is the program of the museum community that resulted in the Art Museum Image Consortium (AMICO). As museums increased their digitizing projects, they found that they needed help with the increasing amount of time required to meet demand from students and researchers. AMICO operates a digital library that includes multimedia objects that portray fully documented works of art from member institutions.

As the emphasis is shifting from experimentation to mainstream implementation, focus is changing to emphasize standardization, organization, usability, and production of commercially available packages to be used by institutions just entering the digital library arena. Several library automation companies offer digital library solutions, and some multimedia management technology companies offer packages that include distance education course development (with inclusion of the means to create digital library support for a course or set of courses). For example, Endeavor Information Systems, creator of the "Voyager" integrated library system, offers "EEncompass," a package including the means to accomplish object management, collection management, license and rights management, linking, and search and discovery. Similar products are offered by Ex Libris, Sirsi, and VTLS. An example of a generalized multimedia management system's product is Artesia Technologies' "TEAMS" product, which is described as a "digital asset warehouse." It allows the integration of media files with Web content management, digital rights management, customer relations management, and e-learning.

Organization of digital libraries is being accomplished with such tools as metadata, XML/RDF schemas, ontologies, and taxonomies. These are described in later chapters of this book. Provision of access to digital libraries is increasingly through "portals" that give access through a unified user interface to disparate sets of information sources. Portals provide users with a way to locate all the information content that they have the authority to access. The portal server presents an authentication screen to the user; if the user name and password are accepted, the user can have access to whatever resources are allowed by the user's status. An academic institution, for example, may have licenses for its users to access many different digital databases. Formerly, one had to learn the access protocol for each database and enter a different user ID and password. Through the controlled access of a portal, an authorized user may be able to search these databases by just clicking to enter them, and may even be able to search several of them at once. A library portal may have access links for local resources, remote
resources, reference help, and personal patron information, for example. Local resources may be divided into books, journals, databases, digital collections, and course reserves, and all of these may be accessible through searching the catalog. Remote resources may contain links to other libraries, subscription databases, remote digital libraries, or Web-accessible resources. Reference help may include online reference tools, links to online search engines, and a virtual reference desk with either real-time or e-mail access to a reference librarian. Personal patron information may include lists of materials borrowed, saved searches, and personalized alerts.

**Information Architecture**

Just as architects must determine the needs of the people who will use a space and then create a pattern that will fulfill those needs in order to design buildings or other structures that will serve people’s needs in addition to being beautiful, so must information architects determine the uses to which information will be put and create patterns for paths to finding needed information in addition to creating attractive interfaces to the information. Information architecture, then, is much more than Web design, but its development and emergence as a “field” is closely associated with the creation of Web sites. Andrew Dillon defines information architecture as “the term used to describe the process of designing, implementing, and evaluating information spaces that are humanly and socially acceptable to their intended stakeholders.” He says he purposely leaves the definition “open so that we cover the organizational, blueprinting, and experience aspects, and allow for IA [i.e., information architecture] roles to cover these aspects.” There is still disagreement in this emerging field about what is covered, but there does appear to be some agreement upon a desire to manage documents and provide easy access to information based upon a design of user experience, including interface and navigation systems as well as useful and pleasing graphic design.

Information architects reject the notion that information architecture is a new approach to the organization of information that has been practiced in libraries, archives, and museums for a long time. But the parallels are striking. Librarians have long understood the necessity of selectively acquiring information packages and then organizing them in ways that will aid users in gaining access to them as needed (even though one may not know all future uses to which the information may be put). In 1998 Louis Rosenfeld and Peter Morville identified the following as the job of the information architect:

- Clarifies the mission and vision for the site, balancing the needs of its sponsoring organization and the needs of its audiences.
- Determines what content and functionality the site will contain.
- Specifies how users will find information in the site by defining its organization, navigation, labeling, and searching systems.
- Maps out how the site will accommodate change and growth over time.

By 2002 the situation had evolved enough that Rosenfeld and Morville expanded their explanation to say that the process of information architecture must go through the following phases: research, strategy, design, implementation, and administration. Research includes a review of background materials, gaining an understanding of the goals and context of the organization, examining the existing information architecture, content, and intended audiences, and finally conducting studies necessary to explore the situation. Strategy arises from contextual understanding developed in the first phase and defines the top levels of the site’s organization and navigation structures, while also considering document types and metadata schema. Design involves creating detailed blueprints, metadata schema, and the like, to be used by graphic designers, programmers, content authors, and the production team. Implementation is where designs are used in the building, testing, and launching of the site—organizing and tagging documents, troubleshooting, and developing documentation occur in this phase. Administration involves the continuous evaluation and improvement of the site’s information architecture. The strategy and design phases are the ones that require a thorough understanding of the theoretical underpinnings of the organization of information, including understanding of metadata; provision of access points with all the attendant relationships among them; subject approaches by categories, classification, or alphabetical labels; and the system design that will allow display of results in a logical and usable fashion (i.e., the principles covered in the rest of this book).

**Data Administration**

Data administration is the terminology applied to the control of the explosion of electronic information in offices and other administrative settings. It has its roots in the office filing systems that developed through
out the twentieth century. These systems have been highly affected by developments in technology—typewriters, photocopiers, and computers (starting with sorters and collators)—and are often referred to as records management systems. Records management systems are often related to archives, as that is where an organization’s records may be deposited when their useful operating life has passed.

As was true in other parts of our society, data administration once involved the keeping, filing, and maintaining of paper records. It was a simpler time, but also a frustrating time, because usually only one copy of a record was filed in only one place. The file labels of one records manager were not necessarily logical to the next. As information began being entered and stored in electronic files, access points (the file labels) became invisible. This was not an immediate problem as long as the people who developed the electronic files documented what was contained in them. The situation became more complicated when powerful personal computers began to allow persons to store and file their own information on their desktops. A problem of continuity developed when these personal files were abandoned.

For many years various operations were automated, each with its own system. For example, payroll, general ledger, accounts payable, inventories, and other such systems were automated separately. During the 1980s, integration of these systems took place with the result that the systems had many redundant data fields with little documentation of their content. These fields seemed to be meant to contain the same information, but what was actually there was often different (e.g., name given in full in the payroll file, but middle name shortened to an initial in the faculty file). The situation is being solved by database management systems such as Oracle, which has software that accomplishes data warehousing, data integration, security, and more.¹⁹

Data administrators have dealt with their information explosion by using principles of organization of information. The units that need to be organized in the administrative electronic environment are such things as directories, files, programs, and at another level, such things as field values. Organization can be by system (e.g., payroll, budget) or by type of record (e.g., person names, registration records). Data administrators must keep track of information that crosses system boundaries (e.g., person names cross boundaries when the same names are entered into several different files). There must be methods for handling concepts that have the same names but different purposes (e.g., the concept of “part-time” in a university can have different definitions depending upon whether one is talking about payroll, faculty, graduate students, or undergraduate students).

Keeping all these things straight is often done through a process called “data modeling.” It can either be used as a precursor to database design or as a way to integrate the myriad systems developed over time by persons who are no longer with the corporate body. Data modeling designs a system using a series of related models. The process is to develop a conceptual model of the records management activity in the particular setting; then a logical model is developed that includes more detail; and finally, the logical model is translated into a physical data model that can be implemented as a database management system. If the data model is updated and adjusted to fit changes in the conceptual model, it can serve for a long time as the basis for the organization of information in an organizational setting.

A person’s individual office organization is another matter. A major factor in one’s personal office organization seems to be the use to which particular information packages will be put or have been put. For example, if an item is to be referred to in order to write a letter in the immediate future, it will be located at hand; items that have just been finished with will be filed. Also, the form of the package can be a determining factor: books may be shelved, while papers relating to the books may be placed in file folders. In one’s electronic information store, it is necessary to develop electronic folders, subfolders, and so forth, if one is to be able to find a particular file again in the future. An important aspect of office organization is that some such office collections will be deposited in archives for posterity.

Knowledge Management

Everyone has heard the phrase “Knowledge is power.” Originally, the phrase applied to individuals and implied that persons who increased their knowledge would be able to increase their power in society. During the 1980s it came to be understood that the same idea applied to organizations. At that time, there was much “downsizing” of organizations in order to reduce overhead and increase profits. In the process it became obvious that the organizations lost important knowledge as employees left and took their accumulated years of knowledge with them. In the same period there was much technological development that was seen at first as a way to save costs by replacing human workers. Again, though, the knowledge held and applied by the humans was not all replaced by the machines. For an organization to survive, knowledge is brought to bear in the challenges the organization faces. Management of that knowledge increases its "power.”

Knowledge management came into being as an attempt to cap-
in the organizing information business are those of describing, classifying, and retrieving what has been stored. In the context of knowledge management, this means that the organization’s knowledge must be sorted out, labeled (i.e., described), and classified into different “subjects” or groups if it is to be retrieved when needed.

Most knowledge management so far has consisted of content management, which tends to focus on knowledge that has been made explicit without necessarily knowing what tacit knowledge is still “unmanaged.” In order to move into the next generation of knowledge management, Snowden says we must recognize that knowledge can only be volunteered, not forced out. There is always more than can be sold, and most important, human knowledge is contextual—that is, knowledge is triggered by circumstance. Snowden believes that the next stage of knowledge management requires understanding the context as well as the content.29

CONCLUSION

This chapter has discussed basic needs to organize, defined organization of information, and presented an overview of a number of different kinds of organizing environments. The following chapters discuss in more detail the processes that have been developed for the organization of information, those that are being worked on, and the issues that affect their implementation.

NOTES

All URLs accessed June 2003.


5. Ibid., p. 42.


7. Ibid., p. 35.

8. Ibid., p. 28.


11. Ibid., p. 25.


16. Ibid.


SUGGESTED READINGS

General


Organization of Information in Libraries


Organization of Information in Archives/Manuscripts


Organization of Information in Museums/Art Galleries


Organization of Information in the Internet


Organization of Information in Digital Libraries


Organization of Information in Information Architecture


Organization of Information in Data Administration


Organization of Information in Knowledge Management


CHAPTER 2

RETRIEVAL TOOLS

This chapter discusses retrieval tools, which are basic building blocks in the organization of recorded information, addressing the following questions: Why do we need retrieval tools? What are the basic retrieval tools, their formats, and their functions?

THE NEED FOR RETRIEVAL TOOLS

Retrieval tools are systems created for retrieving information. They contain records that are surrogates for information packages. That is, each surrogate record (also called a description or metadata) gives enough information, such as author, title, and date of creation, so that it can serve as a short representation of an information package. Surrogate records are arranged or retrieved by access points. An access point can be a name, title, or subject term chosen by an indexer (also called a cataloger in some settings). In online systems an access point can be almost any word in a record if keyword searching of every word (that is not a stopword) is allowed.

Retrieval tools are essential as basic building blocks for a system that will organize as much of the world's recorded information as possible. A dream of being able to provide access to all recorded information has existed since 1892, when Paul Odet and Henri LaFontaine organized a conference to create Universal Bibliographic Control (UBC). They wanted to create a central file that would include surrogate records particularly for scientific articles in all the scientific journals of the world. The magnitude
early a decade ago, I wrote an article for EDUCAUSE Review about digital game-based learning (DGBL) and the challenges it faced.1 I suggested that once proponents of DGBL were successful in convincing people that games could play a role in education, they would be unprepared to provide practical guidance for implementing DGBL. Just as when the person shouting to be heard at a party is suddenly the center of attention at the moment there is a lull in the conversation, we DGBL proponents had everyone’s attention—but not much to say. In the article I also suggested that our sometimes overzealous defense of videogames (hereafter often referred to as “digital games”) ran the risk of overselling the benefits (and underreporting the challenges) of using digital games in formal education.
Digital games, I said then and still believe today, are effective as embodiments of effective learning theories that can promote higher-order outcomes. Our inability to provide guidance in doing so a decade ago was ceding the DGBL front to digital games as tools for making didactic, instructivist learning (i.e., lectures) more “engaging.” DGBL, I suggested, was effective because it supported powerful learning strategies such as situated learning, authentic environments, and optimized challenge and support (scaffolding). What was needed was a renewed focus on (1) research about why DGBL is effective and (2) guidance on how, when, for whom, and under what conditions to integrate digital games into formal education.

I was not the only one with these ideas, but my timing and the venue combined to reach many people. That 2006 article has been cited more than 1,000 times since then.

Yet though these ideas continue to resonate with many people, much has changed in terms of research, practice, and to some extent, my own beliefs about the future of DGBL.

Where Are We Now?

Perhaps the first place to start is with the title of this article. I continue to use the term digital game-based learning, coined by Marc Prensky in his 2001 book by that title. Since then, many other terms have arisen to describe the study and practice of digital games: serious games, ludology, educational games. So why still use DGBL? I think Marc got it right in 2001. Although it is true that game today connotes videogames, there are games that are not digital (e.g., Monopoly). Unless all analog games (e.g., card games, word games, and board games) cease to exist, we will still need the term “digital” as a necessary modifier. I also believe that “game-based” is required because digital game learning would privilege the role of the game in ways that are not always accurate. And of course, learning is necessary to distinguish the purpose of games for education rather than for advertising (advergaming), health (games for health), or social change (social impact games). Learning also captures the cognitive change process that results from the interaction of learner, content, and strategies, much as gameplay is the result of the interaction of the player with the mechanics of the game.

On the other hand, one thing that has changed in the article title is the absence of the term digital natives, also coined by Prensky in 2001. I now think that Prensky (and the rest of us) got this wrong. A funny thing happened on the way to the revolution: we found out that digital natives are not who we thought they were. Educators are surprised to learn that a significant percentage of gamers (23%) play videogames less than one hour per week. As a result, the influx of digital natives into professional teaching positions neither ushered in an educational revolution nor produced the expected incoming classes of “restless” digital natives in higher education.

What Have We Learned about DGBL?

There is no point in arguing for the adoption of digital games to promote learning if there is no evidence that they can be effective in doing so. In 2006 I noted that reviews of the literature from the previous twenty years suggested that digital games could improve learning. Today it is fair to question whether such research (now twenty or more years...
older) amounts to sufficient evidence for a change in educational practice.

Do Games Teach?
The question of whether digital games teach has been answered definitively by DGBL research since 2006. Digital games have been shown to promote general educational skills such as spelling and reading; domain-specific learning outcomes in physics, health, biology, mathematics, medicine, and computer science; and a wide range of cognitive abilities including spatial visualization, divided attention, and knowledge mapping. On average, a well-designed game improves learning by between 7 and 40 percent over a lecture, effectively erasing the difference between failing students and those working at a “B” grade level. Several meta-analyses in the intervening years have also found advantages for digital games over conventional instruction, including “significantly higher cognitive gains . . . versus traditional teaching methods.” Most recently, a meta-analysis of digital games found that learners in game-based instruction performed 0.33 standard deviations (as much as one full letter grade) better than learners in non-game-based instruction in general.

So, the question of whether digital games can teach or not seems to be settled science. But that is not the only question we should be asking. A better question is, what can digital games best teach, and why?

Digital Games for Different Outcomes
Among the inclusion criteria for the studies examined in the meta-analysis noted above was that each study had to address at least one 21st-century skill: critical thinking, problem solving, collaboration, effective communication, motivation, persistence, or learning to learn. These skills lie in stark contrast to many “traditional” learning outcomes, which tend to focus on mastery of facts and conceptual knowledge. Many DGBL experts now believe that the true power of digital games lies in their ability to promote these 21st-century skills through the learning strategies that digital games support and the unique way in which these strategies are synergized through gameplay.

Among these skills, problem solving may be one of the most important. Problem solving is at the highest taxonomic outcome level, making it one of the most difficult to teach. Less than 2 percent of U.S. classroom instructional time is spent on problem solving, which may explain why more than 70 percent of the rest of the world does better in this area. Problem-based learning (PBL) has been shown to be effective in promoting problem solving, but it is often not used because it is difficult and time-consuming. In the typical approach to teaching problem solving, students study prerequisite skills (e.g., facts, concepts, definitions, and principles or rules), and only after they have mastered that material do they tackle problems in a given domain. PBL turns this process on its head and presents the problem upfront as a way to generate prerequisite knowledge, thus making that learning relevant.

Digital games, it turns out, are themselves a form of PBL. Digital games are marketed on the basis of a problem to be solved: for example, an ancient civilization that seeded the galaxy with humanity’s forebears has returned to wipe us all out, and the survival of the human race depends on one soldier—you! Like PBL, digital games present a problem up-front—one that the player has no idea how to solve and for which the player has not mastered most of the prerequisite skills. Games also, like PBL, make learning directly relevant. The problem the game-player faces from the start requires learning only what he/she needs to survive.

Many serious games (digital games designed to teach) promote problem solving and other 21st-century learning outcomes. Citizen Science, from Kurt Squire and Filament Games, helps students learn science in authentic, if fantastic, contexts (e.g., reducing pollution in a local lake by time traveling). Triad Interactive has built and tested several similar STEM games to teach mathematics (PlatinumMath; Contemporary Studies of the Zombie Apocalypse) and natural science (Project NEO).

The increased availability of high-quality serious games theoretically leads to a corresponding increased capacity to promote problem-solving skills. Yet just as in 2006, serious game proponents may have everyone’s attention—but they do not necessarily have the research to guide the design (or claims) for digital games to promote problem solving. There are at least eleven different kinds of problems, for example, delineated by structure (ill- to well-structured), cognitive composition (logical, analytic, strategic, systems, and metamodular thinking; analogical reasoning), and required domain knowledge. We do not yet know enough about how the specific design characteristics of different digital games interact with their ability to support these different kinds of problems or the cognitive skills each problem requires. In another article, my colleague and I have proposed a framework that may serve as a first step in this process, but it will require the combined efforts of many DGBL researchers and digital games to provide empirically derived heuristics to promote problem solving through digital games.

DGBL Practice
In 2006, I suggested that there were three ways to use digital games in learning
environments; have students design
digital games; build digital games from
the ground up to teach students specific
content and skills (i.e., serious games); and
integrate commercial off-the-shelf (COTS)
digital games into the existing
curriculum. I maintained that integrat-
ing COTS digital games was the most
practical approach because it would
allow us to generate a large body of
digital game-based learning (DGBL)
research to understand how and
why digital games are effective for learn-
ing. That research could, in turn, provide
good design heuristics and principles for
digital game-based learning (DGBL) practice. Finally, the combination
of a large body of DGBL practice and
design heuristics might then persuade
commercial game companies to build
high-quality digital games for learning
in sufficient quantities to transform
education.

So what have the intervening years
revealed about my predictions regarding
these three approaches, and what other
approaches have arisen?

**Students and Game Design**

Despite the prevalence of long-lived
development tools such as Scratch,
GameMaker, Gamestar Mechanic, Python,
Alice, and Adventure Maker and their
newer counterparts Inkle, Pixel Press, and
Tynker, having students build digital
games remains a challenging means
of DGBL for most public education
can learn to create products in a process
that requires learning-related skills
Problem-based learning: A review of litera-
ture on its outcomes and implementa-
tion issues along the way (e.g., writing
marketing materials and instructions;
designing logos and artwork; perform-
ing mathematics calculations). Although
the maker movement is not about video-
games per se, it is a compatible approach
that shares the same conceptual focus in
that tools like Minecraft and MinecraftEdu
blur the line between being a maker and
being a game maker.

**Serious Games**

Building digital games from the ground
up is still the most promising DGBL
strategy and still the hardest to do. How-
ever, a confluence of several factors has
made this DGBL strategy far more preva-
lent today than I predicted in 2006. First,
just as teachers who wanted to have stu-
dents build digital games have benefited
from more powerful, numerous, and
easy-to-use design tools, so have those
who want to build digital games for stu-
dents. Tool sets like Torque, Unreal
Engine, and the almost universally adopted Unity
3D have allowed nonexperts to build
digital games that rival all but the lat-
est console games for functionality and
beauty.

At the same time, academics have
become better at creating games, again in
part because of more acces-
sible and more powerful
tools but also because of
practice—the results of
which they publish and share with each other. The
design teams built during
teaching process are far
more interdisciplinary than
can be the best married to instruc-
tional outcomes. One of the
key ideas that has emerged from this synergy is evidence-centered design (ECD). ECD is a method for embedding assessment into the very fabric of a game—what Val Shute has termed “stealth assessment.” Its use in digital games arose out of the prevalent mismatch between game tasks and assessment methods found in early serious game development. For example, content experts would sometimes build a game to promote problem solving but then use paper and pencil pre- and posttests, which are best suited to measuring decontextualized factual and conceptual knowledge. Other attempts to build digital games to teach factual and conceptual knowledge routinely resulted in poorly designed games in which the content interrupted or prevented engaging gameplay.

Once instructional designers began to study how to align game strategies with appropriate outcomes and assessment tools, it became clear that the game must both teach and assess at the same time, in the same ways, and without disruption. ECD allows this by specifying first what the outcomes are supposed to be (the competency model), then the behaviors that would demonstrate competency (the evidence model), and finally the tasks that would generate the evidence for, and against, that competency (the task model). Digital games that use ECD dynamically collect and analyze data related to all three models and use statistical procedures like Bayesian networks to analyze where the learner is in terms of learning through the game, thus assessing and adapting to the knowledge level of the player.

Interdisciplinary design teams have also included game designers themselves. Interest in videogames has generated at least 150 game design degree-granting programs at the undergraduate and graduate levels, according to the Princeton Review. Although critics suggest that the number of graduates of such programs far exceeds the industry demand, these programs have been a boon to academic game designers, who have found that the value of individual specializations in team member expertise (e.g., content, instructional design, game design) is exceeded only by the synergistic (if sometimes contentious) result of interdisciplinary design.

Of course, no amount of progress or increased popularity would have made much difference had it not been for a simultaneous public and governmental emphasis on science, technology, engineering, and mathematics (STEM) education. STEM jobs are among the fastest-growing segment of the U.S. economy, yet the supply of potential majors is insufficient to meet demand. Performance on tests of STEM areas is poor, and students are not selecting related majors in high-enough numbers. Many who choose to pursue STEM majors often switch to other majors, and the problem is particularly acute for minorities and women. At the same time, shifts in related standards such as the Common Core and the Next Generation Science Standards have emphasized the very kinds of outcomes and strategies (e.g., inquiry-driven learning or learning to think like a scientist; demonstrating science in real-world contexts) for which digital games are ideally suited. In response, public and private funding agencies have begun to actively solicit proposals to promote STEM outcomes and recruitment, and higher education has followed the lead. Not all of these solicitations have specifically sought digital games as interventions, but many DGBL researchers have proposed and been awarded funding for digital games.

There are so many serious games available today that the problem is no longer one of capacity. The problem now is access. How do teachers find serious games? How can they know whether serious games are of high quality and/or geared for their audience and grade level? Several groups have begun to build clearinghouses for those who want to distribute or find serious games for use in schools. GlassLab provides empirical data about the efficacy of different serious games as well as ECD expertise for designing serious games. ThinkZone, a new project, will help serious game developers connect with schools by organizing serious games into a searchable database by content area, grade, setting, and other characteristics.

Serious games remain relatively rare compared with textbooks and lectures, but they have been closing the gap quickly. Because they are increasingly of high quality, meet future standards, and can potentially reach an unlimited number of students, serious games may yet signal the advent of a minor revolution in K–20 education.

COTS

The third DGBL approach that I delineated in 2006 focused on the integration of digital COTS games. I suggested that this approach would provide high-quality digital games (in the absence of well-designed serious games) and instruction (thanks to the teachers who would design lesson plans around them). Today, this process remains the most practical for teachers to do and is the most prevalent approach overall. Every year since 2003, I have taught a games class in which K–20 teachers have used a detailed design process to develop lesson plans for nearly every grade level and subject. Teachers share such game-based lesson plans on dozens of websites. However, full lesson plans
that address significant topic areas (often requiring one to two weeks) and that do so by taking advantage of the power of digital games to situate learning at the problem-solving level remain relatively scarce. Even with good models for doing so, designing COTS DGBL is still more time-consuming than designing “traditional” instruction—time that teachers continue to find hard to come by. Further, although Common Core may increase the need to demonstrate critical thinking, current assessments do not yet measure such outcomes.

Still, COTS DGBL is a practical means for an individual teacher to integrate digital games in order to address the standards that all schools will be using in the next few years.

Gamification
In addition to the three approaches that I discussed in 2006, one new DGBL approach has gained steam: gamification. The process involves applying game mechanics and principles to non-game environments (e.g., education and business). It differs from DGBL in that there are (usually) no digital games involved at all. Rather, the metrics and processes of a “typical” class or training seminar are replaced by corresponding game mechanics. For example, digital games allow players to solve challenges in multiple ways, ensure early successes when skills are low, and award bonuses and achievements that provide additional “powers” as expertise builds. A typical class provides only one option for each major assignment (e.g., a paper), presents high-stakes assessment (an opportunity for success) after several weeks, and takes points away for every assignment submitted (since each is worth a set number of points and few get every point available). Gamification, on the other hand, creates multiple assignment options—more points than are required to demonstrate mastery—and creates frequent assessment opportunities that are graduated in difficulty. Other aspects of digital games such as having learners create “characters” with different skills and attributes, recasting assignments as “quests” that are connected by a cohesive narrative, and setting major projects and assignments as “boss” monsters that require teamwork to overcome are also mapped to existing course designs. At its best, gamification can make significant improvements in educational quality by adopting the effective synthesis of learning strategies used by digital games.

While gamification has great potential, it is unfortunately often misused and poorly implemented. Many educators mistake the trees for the forest and focus solely on surface-level design features such as leaderboards, experience points, and badges, without regard for the contextual interplay of player, game, and narrative. According to the noted game researcher Ian Bogost, such superficial focus “confuses the magical magnetism of games for simplistic compulsion meted out toward extrinsic incentives.”20 Superficial gamification relies on extrinsic motivators for those who are not necessarily already motivated to engage with a content or task, rather than activating intrinsic motivation as many digital games do. Extrinsic motivators lead to weak effects that dissipate over time once the motivators are withdrawn, making them a poor substitute for existing teaching practices. This may partially explain the positive but short-term effects of many empirical studies of gamification.21

Gamification may have the most potential for adoption and diffusion across public and private education and training environments, but as with COTS DGBL, there is no shortcut for good design. Gamification is more than the sum of its parts and requires careful design and attention to detail if it is to be more effective than typical instructional approaches. There is no question that gamification could have a significant and immediate impact on K–20 education; whether educators and trainers recognize this and take the time to develop high-quality gamification DGBL remains to be seen.

Implications for Education
In 2006, I proposed that higher education hire instructional designers and DGBL experts as faculty and staff to help others learn how to build high-quality DGBL. I suggested that this was
necessary because digital natives would expect it when they arrived on campus. Obviously, this did not happen, perhaps in part because digital natives were not who we thought they were. At the risk of hubris, however, I prefer to think that the revolution has merely skipped a generation and that now is when the digital game natives are getting restless. As DGBL adoption, especially of serious games in K–12 schools, continues to accelerate, higher education will potentially face thousands of students who have had gameplay as a part of their formal education. The serious games being developed today are very effective learning tools, and even those who do not play such games for fun will appreciate their power in a way that most of us in higher education do not currently share.

It’s not just schools that we’ll have to thank for the rise of these digital game natives; digital gaming is becoming a cultural sports phenomenon that is predicted to eclipse the NHL and NFL in terms of audience as soon as 2017. E-sports—tournaments in which videogame players compete against each other in public venues—are changing the way younger generations view videogames. E-sports competitions are even played in real-life stadiums filled with spectators. In addition, e-sports have begun to make their way into higher education. Colleges and universities now have competitive e-sports teams that compete with teams from other schools, just as has been done with traditional sports. Some are even offering athletic e-sports scholarships to students who compete in intercollegiate competitions.

If I am right that the revolution skipped a generation, what should we do to prepare for this potential influx of digital game natives? First, as I argued in 2006, we should hire instructional designers to help improve our curriculum. DGBL is no panacea. It will not work and is not practical for all learners, all content, all the time—any more than are lectures or textbooks. Instructional designers will help us see when DGBL is and is not appropriate; they can help ensure that we use the right tools for the right situations. They will also help us avoid poor DGBL designs, which digital game natives will see through immediately. I have worked in public universities and colleges for twenty-three years, during which time I have watched instructional design become more prevalent—and also better known and respected—in higher education. But even though institutions have been consistently hiring instructional designers during this time, we do not have anywhere near enough to make a meaningful difference.

It is also not enough to hire just any instructional designer. Institutionally, we should invest in instructional designers who have experience with DGBL, including gamification. Gamification is potentially the biggest impact we can make across our institutions right now, and if we get it wrong, we may not get a second chance. In addition, colleges and universities should consider hiring or supporting game designers, perhaps graduate teaching assistants from our own game-design programs, to help inform the game design that our faculty do now and will do in the future. This will help faculty become more competitive in securing the grants that are increasingly important in today’s world of dwindling state support. These game designers may even help build our own digital learning games as the ease of use and the cost of doing so continue to rise and fall, respectively. This may be the most critical for STEM programs, given the intense focus on STEM game design today, but we should not ignore other areas.

It may not be practical, desirable, or necessary to employ DGBL across the curriculum, but it will be practical, desirable, and necessary to have a broad range of DGBL solutions and opportunities available. Gamification can establish a kind of DGBL baseline that can be supplemented in key areas by serious games. But since not all students will be digital game natives when they arrive in K–12 or college/university classrooms, institutions should also consider building DGBL into orientations and technical support areas so that students new to DGBL can get the help they need to be successful. Summer workshops, special events, and special-topics courses can use digital games for learning and for fun to build capacity and interest in DGBL. E-sports competitions—whether intramural, athletic teams, or special events—are also a relatively easy way to meet the expectations and interests of digital game natives and to raise awareness and acceptance of games in education among faculty, staff, and administration.

New Challenges and Goals for the Next Decade

Several key DGBL questions remain unanswered, and some important, not-yet-addressed processes will continue to hold our field, and the implementation of DGBL, back. Research on aggression and digital games has given rise to a new area of emphasis in DGBL: the study of player experience. It is insufficient to ask what the “effects” of digital games are on players; we need to study how players make sense of their experiences with digital games. For example, a soldier playing a first-person shooter to help recode her experiences in a way that reduces PTSD will have a very different
experience than will a fourteen-year-old boy who likes to compete against his friends in a capture-the-flag mode of the same game.

To truly understand the conditions under which people's attitudes and beliefs (including aggression) can be influenced, we need to study these kinds of outcomes carefully, in addition to examining how outcomes like problem solving (in all its variations and forms) are promoted by different kinds of game mechanics. Likewise, we need to design careful, thoughtful experiments to see which kinds of game mechanics best align with which kinds of learning strategies, and we need to include more longitudinal designs in order to observe long-term DGBL outcomes such as attitudes, beliefs, and problem solving.

Finally, and perhaps most important, we must adopt interdisciplinary approaches to the study of DGBL. The answers to the most complex questions come at the intersection of multiple fields rather than from within any single one. Academics too often stay in their own silos of expertise, and whereas this gives us tremendous insights and tools that we can bring to bear on significant problems, it also often blinds us to potential breakthroughs and related work in other fields. In 2010, when I edited a book on the interdisciplinary study of digital games, I solicited proposals from as many disciplines as possible, including from authors whose main area of research was not digital games. I shared copies of the chapters among all the writers so that they could benefit from the relevant aspects of each other's work. The resulting book represents twenty-two different disciplines and authors from seven countries. Such interdisciplinarity is crucial to the work that must be done in DGBL. Some of the best research on player experience is being done by media scholars in Belgium and the Netherlands. Research on aggression and on artificial intelligence is being conducted by psychology faculty, game aesthetics research by artists and human factors experts, social construction of meaning and identity by linguists, and narrative construction by rhetoricians. DGBL cannot advance without the contributions of all—not individually, but collectively across multiple domains and countries.

In changing our practice as we strive to meet these challenges, we must also work to avoid repeating the mistakes of the past. The time for proselytizing is over, and we must guard against being pulled back into old habits. There is still a tendency among DGBL proponents to oversell the benefits of digital games. The truth is that DGBL is simply not appropriate for all outcomes, all learners, all the time. There remains a place—even a need—for lectures and workbooks. Why build a game to teach the multiplication table if flashcards already work well for students? On the other hand, why try to lecture to students about solving problems and learning to see the world as mathematicians and scientists do? When such outcomes are our goal, we should argue vigorously for the use of digital games; when digital games are not appropriate, we should be just as vigorous in saying so.

One area that presents a particular challenge to DGBL is the violence and aggressive behavior in videogames. Unfortunately, in their zeal to counter arguments that violent digital games necessarily lead to violent people and
should therefore be heavily restricted, DGBL proponents have occasionally appeared to take the equally untenable position that violent digital games cannot lead to violent behavior. It is simply not possible to argue, on the one hand, that digital games can be a force for social good by changing people’s beliefs and actions and, on the other, that no harm can come from the very same mechanisms. Space does not allow even a brief overview of the main issues involved, although I have attempted to do so in another EDUCAUSE Review article. In short, I believe that the concerns regarding violent videogames leading to violent behavior are unsupported by violent crime statistics and empirical research but that some videogames could indeed lead to aggressive behavior under the right conditions (e.g., length of exposure, lack of social mediating factors, mental disability, age).

Conclusion

What will DGBL look like in another ten years? Who knows? Maybe the digital game natives won’t have arrived after all. Or perhaps they will be very different from what we are expecting—just as today’s digital natives are not what we expected in 2006. Or maybe DGBL will help usher in a new era of effective (though not entirely game-based) teaching. What we do know today is that we have the evidence and the design tools to demonstrate that digital games are powerful learning tools. Whether we choose to take advantage of the opportunity before us is a completely different question.

Notes


2. This number is according to Google Scholar, which tracks the number of times an article has been cited by others in Google Scholar (794 times), and my ResearchGate account, which also tracks citations of uploaded work (390 times).


13. See http://schools.ny.gov/SchoolPortals/02/M422/default.htm and http://qz.org. QL has consistently performed as well as or better than its peers in New York and has the highest possible score in closing the achievement gap between English language learners and students with special needs compared with other students—results that are mirrored by the performance of minority students in the school, more of whom test at or above proficiency than students in almost every other school in New York.


20. In June 2015, Wembley Arena hosted the League of Legends Championship Series, which had already sold out Los Angeles Staples Center in 2013 and the 40,000-seat World Cup Stadium in Seoul in 2014. In fact, the number of viewers for the latter, albeit online rather than TV, was second only to the NFL Super Bowl. See http://www.riotgames.co.uk/rise-esports-secs-pro-gaming-reach-scale-ntl-by-2017-says-betting-company-unikrn-1504181 and http://espn.go.com/espn/story/_/id/13059210/esports-massive-industry-growing.

21. For example, Harvard, Florida State, San Jose State, and California State, Fullerton all have competitive videogame teams. A recent competition between the last two was watched by more than 92,000 people online, and Robert Morris University Illinois now offers athletic scholarships for its competitive videogame team (http://www.nystimes.com/2014/12/09/technology/esports-colleges-breeding-grounds-professional-gaming.html?_r=0).

22. See, for example, the work of Steven Mallett [https://www.aaaantwerp.be/nl/personeel/steven-mallett/], Wannes Ribbens (https://www.researchgate.net/profile/Wannes_Ribbens/publications), Bob De Schutter ([https://aims.msu.edu/faculty_staff/bob-de-schutter/]), and the Game Experience Lab ([https://www.gameexplab.nl]).


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A Letter to the Humanities: DH Will Not Save You

APRIL 19, 2015 / ADELINE KOH

I am often asked about the digital humanities and how it can update, make relevant, and provide funding for many a beleaguered humanities department. Some faculty at underfunded institutions imagine DH is going to revitalize

Adeline Koh will be teaching the Identity track for Digital Pedagogy Lab in August 2015. To find out more about her track and to enroll, visit Digital Pedagogy Lab’s main page.

I am often asked about the digital humanities and how it can update, make relevant, and provide funding for many a beleaguered humanities department. Some faculty at underfunded institutions imagine DH is going to revitalize
their discipline — it’s going to magically interest undergraduates, give faculty research funding, and exponentially increase enrollment.

Well, the reality is this: what has until recently been commonly understood as real “Digital Humanities” is already belated and is not going to save humanities departments from ever bigger budget cuts and potential dissolution.

Yes, of course, everyone will tell you that there are multiple debates over what actually defines Digital Humanities as a field, whether it is a field or not, yadda yadda yadda. But the projects which have until very recently dominated the federal digital humanities grants — the NEH grants, the ACLS grants, among others — are by default, the definition of the field, or the “best” the field has to offer. This means that until very recently [http://www.neh.gov/divisions/odh/grant-news/announcing-17-digital-humanities-start-grant-awards-march-2015](http://www.neh.gov/divisions/odh/grant-news/announcing-17-digital-humanities-start-grant-awards-march-2015) and with few exceptions [http://dhdebates.gc.cuny.edu/debates/text/16](http://dhdebates.gc.cuny.edu/debates/text/16), the list of awardees rarely includes digital work that focuses more on culture than computation, projects that focus on digital pedagogy, or digital recovery efforts for works by people of color.

If you look through the projects that have been funded in the last decade you’re going to see a lot of repeated themes. Heck, even when you look at the roster for who is being invited to give DH talks and what they are talking about, you see many of the same names and the same topics. You’re going to see a lot of emphasis on tools. A lot of emphasis on big data analysis. A lot of emphasis on computation, and the power of computation. What aren’t you going to see as much of? Emphasis on why computing, the conditions under which computing is manufactured, a cultural analysis of the ideologies of computing. Why is that?

Because “digital humanities” is currently defined [http://dhdebates.gc.cuny.edu/](http://dhdebates.gc.cuny.edu/) in many existing works as coming out of a field previously known as “humanities
This field is cast as the primary antecedent for what is now called the digital humanities, immortalized by the publication of the *Blackwell Companion to Digital Humanities*, in which the term switched from “humanities computing” to “Digital Humanities,” the use of DH in forming the Alliance of Digital Humanities Organizations as an umbrella global organization, and the development and naming of the NEH ODH branch. “Humanities computing” projects have primarily focused on digitization of canonical texts, text encoding and markup, the creation of tools to facilitate humanities research, and more recently, “big data” and ways to study it, such as “topic modeling.” Uniformly, advocates of DH as humanities computing have argued that DH is, in the words of Matt Kirschenbaum, “more akin to a common methodological outlook than an investment in any one specific set of texts or even technologies.”

This focus on methodology is important, because throughout the majority of Humanities Computing projects, the social, political and economic underpinnings, effects and consequences of methodology are rarely examined. Too many in this field prize method without excavating the theoretical underpinnings and social consequences of method. In other words, Humanities Computing has focused on using computational tools to further humanities research, and not to study the effects of computation as a humanities question.

But “digital humanities” in the guise of “humanities computing,” “big data,” “topic modelling,” “object oriented ontology” is not going to save the humanities from the chopping block. It’s only going to push the humanities further over the precipice. Because these methods alone make up a field which is simply a handmaiden to STEM. Think about this: Why would you turn to a pseudo-STEM field that uses
STEM methods to answer your questions, rather than to STEM directly? Indeed, when I brought up “critical making (http://opendesignnow.org/index.php/article/critical-making-matt-ratto/)” – what some consider to be the perfect marriage of “yack” and “hack” (http://nataliacecire.blogspot.com/2011/10/when-dh-was-in-vogue-or-thatcamp-theory.html) — with my engineer spouse, he commented, “Isn’t engineering already ‘critical making’?” “Critical making,” in Matt Ratto (http://opendesignnow.org/index.php/article/critical-making-matt-ratto/)’s definition, is “processes of material and conceptual exploration and creation of novel understandings by the makers themselves.” After mulling over my husband’s remark, I realized that engineering is indeed already practicing critical making as its DH practitioners prescribe it — arguably better than they are. But in relation to the humanities, engineering does not integrally inspect critical identity categories, access and privilege in the process of making, issues that designate what the humanities considers to be “critical.”

Another thing: if you want to start a DH program to save your probably very underfunded humanities department from extinction, trying to practice DH the way resource-rich, research-oriented institutions do might be prohibitively expensive. Big data analysis, 3-D printing, tool-building: these are expensive endeavors to undertake, even on a small scale. Because of their mission and resources, the majority of non-wealthy, non-R1 institutions are going to concentrate on smaller scale projects involving undergraduate students. These are not normally the sorts of projects that receive federal funding for DH.

So this is what I want to say. If you want to save humanities departments, champion the new wave of digital humanities: one which has humanistic questions at its core. Because the humanities, centrally, is the study of how people process and document human cultures and ideas, and is fundamentally about asking critical questions of the methods used to document and process. And because these questions can
and should be dealt with by people in departments who care about research with undergraduates, by people without the resources to develop the latest and greatest cutting edge digital humanities tool (which, quite frankly, will be enveloped by commercial industries in the blink of an eye.)

So instead of pouring more money into tool building or the latest and greatest 3D printer, let’s not limit the history of the digital humanities to humanities computing as a single origin point. Let’s consider “sister fields” to the digital humanities as actually foundational to the digital humanities. Consider work with undergraduates and digital pedagogy (Rebecca Frost Davis, Kathryn Tomasek, Katherine D. Harris, Angel David Nieves, Janet Simons, Jesse Stommel, Sean Michael Morris (about:blank)) as foundational to the field. Consider the work of scholars who engage media studies as foundational — especially as they deeply engage with questions of race and ethnicity, gender and sexuality, ability and the digital (Lisa Nakamura, Anna Everett, Alondra Nelson, Tara McPherson, Elizabeth Losh, Alexandra Juhasz, Wendy Chun, Cathy Davidson, Fiona Barnett, David Theo Goldberg, David Golumbia, Martha Nell Smith, Cheryl E. Ball, Edmond Chang).
Anastasia Salter, Carly Kocurek, Jessie Daniels, Amy Earhart, Anne Cong-Huyen, Alexis Lothian, Radhika Gajjala, Carol Stabile, Nishant Shah, Michelle Moravec, Monica Mercado, Simone Browne, Moya Bailey, Brittney Cooper & the Crunk Collective. Consider Sandra Harding and the postcolonial and feminist work of Science and Technology studies foundational to the field. Consider HASTAC, FemTechNet and FemBot foundational initiatives, none of whom have ever received NEH funding for their operations, but have been instrumental to the recent shift in federal digital humanities awards towards the “H” in DH rather than the “D.”

The insistent focus on computing and methodology in the humanities without incisive, introspective examination of their social implications is devaluing the humanities. We shouldn’t be pouring federal money into building tools without making the ideological structure of the process explicit and their social effects and presuppositions open to inspection; we shouldn’t be funding the digitization of canonical (read: white, often male) authors without the simultaneous digitization of works by people of color, especially women of color. To do both is to betray some of the most important lessons which
the humanities has learned with the rise of women, gender and sexuality studies, race, ethnic and postcolonial studies and disability studies.

Instead, let’s reconsider what “core” digital humanities means. Let’s redefine what we mean by the “best,” most critical and seminal digital humanities research. Let’s open digital humanities research to people who don’t have the time and resources to learn a programming language like R ([http://www.r-project.org](http://www.r-project.org)), but are happy to use Wordle as an entry into literary texts as data. Let’s consider pedagogy central to DH. Let’s consider class, race, ethnicity, gender, sexuality, ability, nationality primary to and constitutional of the digital humanities, not simply the “diversity box” of politically correctness. Let’s remember the fringe fields and movements who did this in the past, but did not receive widespread support and funding, as part of the central history of DH. Only when we completely reconfigure and recenter the humanities in DH will we be able to talk about using the field to “save” humanities departments from extinction.

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TRAVERSING TECHNOLOGIES

A Future for Intersectional Black Feminist Technology Studies
by Safiya Umoja Noble

The most general statement of our politics at the present time would be that we are actively committed to struggling against racial, sexual, heterosexual, and class oppression and see as our particular task the development of integrated analysis and practice based on the fact that the major systems of oppression are interlocking.
—Combahee River Collective, 1986

When we are able to end hyper-criminalization and sexualization of Black people and end the poverty, control, and surveillance of Black people, every single person in this world has a better shot at getting and staying free. When Black people get free, everybody gets free. This is why we call on Black people and our allies to take up the call that Black lives matter. We’re not saying Black lives are more important than other lives, or that other lives are not criminalized and oppressed in various ways. We remain in active solidarity with all oppressed people who are fighting for their liberation and we know that our destinies are intertwined.
—Alicia Garza, Patrisse Cullors, and Opal Tometi, 2014
Introduction

Neoliberal narratives of digital technologies and the internet have flourished in information and internet studies and suggest that the web is a panacea of social liberation and empowerment. These ideas have been refuted with much evidence by critical theorists in the field, yet work remains to be done in shifting the complex, global patterns of capital that build the material infrastructures of the information and communications revolution at the expense of Black life diasporically.

Meanwhile, in other academic and political arenas, the struggle to recognize multiple, interlocking systems of oppression has been ongoing for roughly 40 years. Brittney Cooper has already offered a detailed analysis of intersectional theory, tracing the emergence of the term “intersectionality” and its problematics and possibilities. Yet the term remains highly pertinent to the field of information and communication studies, which has not sufficiently responded to nor benefitted from intersectional lenses such as Black queer feminist intervention. Indeed, systems of interlocking oppression have rarely been a framework of analysis in the field of internet studies, overlooked in favor of dominant and frequently technologically deterministic perspectives that ignore interlocking, structural, and globalized sites of oppression.

What is potent about Black feminism is its focus on the liberation of Black women globally, intentionally linking Black women in the West with Black women in the Third World, and making interdependent experiences shaped by race, gender, patriarchy, capitalism, and imperialism a driving imperative for liberation movements to end oppression. This through line—from the pan-Africanist movement of the early twentieth century, to the Combahee River Collective—powerfully resurfaced in the 2014 statement by the three Black and queer women who founded the #BlackLivesMatter movement. It is this lens that I wish to invoke in theorizing whether a liberatory, intersectional internet is even plausible, when contextualized in a Black feminist tradition.

In doing so, I explore the ways that the internet and its infrastructure are central to the myriad oppressive conditions facing Black life in the US and in the African diaspora. The goal of theorizing a liberatory, intersectional internet is to heighten awareness of how the global communications infrastructure is not just a site of communications affordance, nor is it made equally and equitably available to all people. On the contrary, it is implicated in a number of environmental and oppressive conditions for Black life. By making these connections more visible, my hope is to shift discourses away from simple arguments about the liberatory possibilities of the internet toward more critical engagements with how the internet is a site of power and control over Black life—a perspective relevant to scholars working in Black Studies, gender studies, and information studies.

Intersectionality was developed by many feminist, antiracist scholars and activists of color as a framework for deepening an analysis of power and oppression across multiple axes. Intersectionality, however, has been woefully under-engaged as a way of thinking about the political economy of the internet and has, in fact, been separated from its Black feminist roots. To echo the critiques that Black women have levied at feminist movements over time, the pervasive under-commitment to the concerns of Black women as we intersect
with, and are intersected by, technologies exemplifies a broader unwillingness among those promulgating mainstream discourses to engage with notions of racism, class, and sexuality in the fields of computer science, digital media studies, information, and technology studies.

We need more interdisciplinary research and theorizing about how a range of digital technologies are embedded with intersectional and uneven power relations, from the ways in which technologies are structured, through the range of engagements that happen on the web, to the materiality of digital communications infrastructures that include the role of the state and capital in the extraction, manufacture, and disposal of the digital.

**Racial Identity and the Western Internet**

Theorizing about the liberatory potentials of the internet for activism, communication, media-making, and culture is often the focus of research about the internet. Often, this research focuses on the United States and is without sufficient power critique. The study of race on the internet is not new and has been written about by many scholars who have argued that race is a meaningful part of the field, albeit under-theorized. The primary focus of research on race and the internet is in the US context and has largely engaged issues of representation and racial formation. In response to this, Jessie Daniels has called for more attention in the nascent field of digital media studies to critique what is truly missing; namely, discussions of white supremacy as the primary framework that structures research inquiries in the field.[6] Lori Kendall and André Brock, in particular, have also offered meaningful critiques of how normative presumptions of whiteness and maleness serve as a default identity of internet users.[7] Brock characterizes how technology design and practice are instantiated with racial ideologies:

> [T]he Western Internet, as a social structure, represents and maintains White, masculine, bourgeois, heterosexual and Christian culture through its content. These ideologies are translucently mediated by the [internet] browser's design and concomitant information practices. English-speaking internet users, content providers, policy makers, and designers bring their racial frames to their internet experiences, interpreting racial dynamics through this electronic medium while simultaneously redistributing cultural resources along racial lines. These practices neatly recreate social dynamics online that mirror offline patterns of racial interaction by marginalizing women and people of color.[8]

Brock argues that technology discourses normalize White masculinity as a presupposition for the prioritization of resources, content, and design of information and communications technologies (ICTs); in this, Brock's work is representative of recent important scholarship that calls attention to the culture of the internet and how racism operates or structures it. Jerry Kang's foundational 2000 paper addressing critical race theory and cyberspace was also among the first to look at the architecture of racial representation on the web, and the liberatory possibilities thereof, which unfortunately, were never fully achieved as envisioned by
early web theorists. Since that time, many new media scholars have continued to write about race online, addressing the complexities of multiple and simultaneous racialized and gendered identities that affect values embedded in the internet.

Nevertheless, the large-scale uptake of intersectional analysis as applied to the internet in its various forms had been notably missing, particularly in discussions of the internet's materiality. In recent years, there has been a shift: Black feminism, where once missing from information studies, is now being used as a theoretical framework for thinking about Black women’s representations and engagements online. Black feminist scholars examine digital technology phenomena by seeing how race, gender, class, power, sexuality, and other socially constructed categories interact with one another in a matrix of relations that create conditions of inequality or oppression.

Black feminist thought also offers a useful and anti-essentializing lens for understanding how both race and gender are constituted through historical, social, political, and economic processes, creating openings for challenging research questions and new analytical possibilities. As a theoretical approach, it challenges the dominant research on race and gender, which tends to universalize problems assigned to race or Blackness as “male” (or the problems of men) and organizes gender as primarily conceived through the lenses and experiences of White women, leaving Black women in a precarious and understudied position. Intersectionality has moved to the fore in Black studies, gender studies, sociology, and other fields; so much so that in some cases the concept and word have been divorced from Black feminist epistemologies and scholarship entirely. The word “intersectionality” is often invoked even as the Black, radical, queer, and feminist intellectual traditions from which the term was generated are silenced. It has rarely been invoked in information studies research, making this contribution to the scholarship even more important.

In previous research, both critical race theory and Black feminism helped me make sense of the ways that technology ecosystems—from traditional classification systems such as library databases to new media technologies such as commercial search engines—are structuring detrimental narratives about Black life and reproducing racist narratives that work in service of material disenfranchisement. I have used Black feminism to study the potency and problematics of the hypersexualized image of Black women and girls in Google searches and the implications of such for public information resources. In doing so, I show how Black women are located in a long and tragic history of misrepresentation that has material consequences in Black women's lives. The prevalence of derogatory images of Black women in the media is meaningfully tied to the real-world circumstances that demean the value of Black women's lives, and these images serve as justification for systemic exclusion and oppression. For example, the Center for American Progress reports a number of sobering facts about Black women's lives in the US:

- Black women receive 65% of new AIDS diagnoses
- Single African American women have a median wealth of $100
- African American women with children have zero median wealth
The poverty rate of African American lesbian couples is 21.1 percent versus 4.3 percent for White lesbian couples. African American women are three times more likely than White women to be incarcerated. According to the American Civil Liberties Union, Latinas and African American women are disproportionately affected both by crime (since they are more likely to be victimized) and by incarceration, especially those who are primary caregivers for their children.[16]

The kinds of economic and social precarity described above are tied directly to the legacy of enslavement and colonization, which persists in contemporary life for many Black women and children around the globe. Therefore, rather than follow the traditions in new media and information studies that primarily focus on racial representation without direct ties to the material conditions of oppressed people, I now co-locate my digital studies work with Daniels's call[17] for an analysis that foregrounds how white supremacy structures the internet as we know it in the West. In the context of the digital, this intersectional framing allows for questions—absent from other analyses—that link the processes and structures of hegemony, imperialism, and power to the material implications of the project we know as the internet.

**The Intersectional Internet Infrastructure**

I now move to theorizing the materiality of the internet through an intersectional analysis of the labor of extracting and disposing of digital technologies. This move from representation to other forms of materiality provides an important new contribution to moving the fields of information and communication studies toward research that examines the global distributions of resources that disproportionately and negatively impact Black life, and the lives of those in the Global South, in the material creation, use, and disposal of digital technology engagements.[18] To engage in these continued research efforts requires an expansion of our definitions of white supremacy to include how global flows of capital from US corporations and Silicon Valley structure labor markets and material infrastructures that are part of an oppressive system of digital technological engagements, largely hidden from view in the consumerist model of technology adoption.

In the US, Black women's participation with the digital is frequently evinced in neoliberal preoccupations with learning to code, or to enter science, technology, engineering, and math (STEM) fields, given and in spite of the low employment rates of Black women in Silicon Valley and across science and information technology fields. Rather than focus this paper on how Black women and girls can participate in such projects, a matter I take up elsewhere, I will say that these projects are largely an individualized, privatized approach to thinking about Black women's empowerment, in neoliberal fashion. Here, I instead focus on the “interlocking oppressions” that are now entering the collective consciousness of academics and activists, who are engaging in what I have previously termed a Black feminist technology studies approach to thinking through the implications of the internet as global communications infrastructure.[19] I focus on this because many African American digital technology projects are disconnected in their context, content, and intent from the materiality of ICT processes in the Black/African diaspora. Framed for a Western audience—commonly presumed as the intended target for many internet technologies and platforms—they are hidden from view. Further, the neoliberal project privileges the technology experiences of individuals over the collective, the
consumer over the producer, the African-American over the Black/African diaspora. Intersectional analysis allows for needed linkages between the labor and resources involved in the web and other global communications infrastructure projects that both facilitate, and are a source of, globalized extractive capitalism.

**The New Scramble for Africa: An Intersectional Analysis of the IT Sector**

In the new scramble for Africa’s resources, transnational information and communication industries are racing to control the minerals and land needed for their aggressive expansion and growth—an echo of earlier colonial pursuits by European nations looking to open new markets for cotton and revitalize depressed Western economies. Neocolonial processes remain intact, particularly in places like the Democratic Republic of Congo. That nation’s history of Western plunder began a century and a half earlier, under the rule of King Leopold II of Belgium, when its rubber and ivory resources were extracted for the manufacture of tires and condoms destined for the sprawling automobile and leisure culture of the United States.

Efforts to reclaim autonomy over the Congo and its natural-resource riches were led in part by the pan-Africanist Patrice Lumumba, whose opposition to Belgian and US control of the Congo resulted in his assassination in 1961. This was but one of many efforts to subdue and effectively put down Black liberation movements on the continent of Africa. The foreclosing of African anti-colonial movements by Western state powers was mirrored in the US government’s simultaneously enacted Counter Intelligence Program (COINTELPRO), which systematically assassinated and jailed Black feminist and Black Power liberation and civil rights movement activists in the US from the 1960s to the 1980s. Many of these same strategies are being re-enacted in this historical moment under the USA Patriot Act. The North American activists targeted by COINTELPRO were seeking liberation from interlocking oppressions, and developed relationships of solidarity and mutual aid with many pan-Africanist movements. Since the 1940s, pan-Africanists had been actively engaging in conferences and knowledge production designed to unify the interests of oppressed peoples directly affected by imperialist projects around the globe. This is an important intellectual lineage from which intersectional feminist critiques and activism emerged, their origins evident in the statement issued in 1945 from the Fifth Pan-African Conference:

> We condemn the monopoly of capital and the rule of private wealth and industry for profit alone. We welcome economic democracy as the only real democracy. Therefore we shall complain, appeal and we will make the world listen to the facts of our condition. We will fight every way we can for freedom, democracy and social betterment.

These intellectual linkages of critique and resistance demonstrate the connection between colonial projects of the past to the neocolonial, transnational, and neoliberal projects of the contemporary moment. Indeed, the neocolonial projects that fuel extraction industries (and their concomitant environmental and human catastrophes) in places like the Congo today persist in a historical trajectory of global capital’s thirst for
expansion at the expense of Black life. Pádraig Carmody details the colonial quest for rubber and ivory in the Congo that led to the slaughter of more than ten million people; Carmody estimates that another three to five million were killed from 1983 to 2003 in wars over minerals and the control of coltan. Coltan, short for columbite-tantalite, is a mineral, more potent than steel which is needed for computers and electronics to release electrical charges in small capacitors. Contemporary global communications infrastructure, including the internet and the billions of devices, appliances, electronics, and “things” connected to it, could not exist without cheap access to coltan. Nevertheless, the bloody “conflict mineral” wars over its control—the rape, violence, and loss of human life involved—are largely invisible byproducts to digital tech users in the West.

In the networked economy of resources needed for global communications infrastructure, Black lives are engaged in some of the most treacherous labor essential to the growth and proliferation of the internet. Capital’s organization in multi-tiered global supply chains obfuscates the direct relationships between Black labor, child labor, civil war, rape, and a smartphone, laptop, or iPad. Electronics companies such as Google, Apple, Dell, Intel, Sony, Nokia, and Ericsson are heavily invested in the computer and electronics hardware manufacturing industries and need raw minerals such as coltan to produce components such as tantalum capacitors for microprocessor chips. But this labor is outsourced, and thus conveniently out of sight and out of mind, going to low-bidders who provide the cheapest labor under favorable neoliberal economic policies. These practices are consistent with other forms of racialized and outsourced internet labor, such as commercial content moderation for large internet companies.

In a transnational and neoliberal context, such practices are not limited to sites located geographically outside the West. David Pellow and Lisa Sun-Hee Park have written a comprehensive study of the underside of Silicon Valley—touted as a panacea of innovation, wealth, and opportunity, when this is the reality only for a choice few. Just as in other areas of the globe, the technology and communications industries headquartered in Silicon Valley achieve their capital accumulation at the expense of overuse and abuse of the environment, gross poverty, and health degradation as they rely on an invisible labor force of immigrants and others living in the transnational, racialized margins:

Power, privilege and wealth are relational, which often means that one person’s riches and leisure time are derived from another’s impoverishment and hard labor; one’s socioeconomic or racial/ethnic group’s access to safe, high-salary jobs and clean neighborhoods is frequently linked to another group’s relegation to dangerous, low-wage occupations and environmentally contaminated communities. This is the essence of environmental racism and environmental injustice: ecological policies and practices are characterized by unfair treatment, discrimination, and oppression.
Intersectional analysis makes these relational elements visible and allows us to trace the connections forged by inequities of wealth and power that bind local communities to others around the globe. Taking an intersectional approach to the internet and its infrastructure bridges the African diaspora, to help us see where and how oppressions are operationalized in similar ways and in the service of shared agents or shared motivations. The internet and its infrastructure are implicated in cases such as the recent public health crisis in Flint, Michigan, where state and corporate abuses, in the interest of multinational companies heavily invested in the technology sector, resulted in poisoned water supplies. The web is functioning as a site of online hyper-surveillance and trolling of Black activists engaged in the #BlackLivesMatter movement in the US and beyond. It is fundamental to Wall Street, where, through the mortgage crisis and Great Recession of 2008, information technology and the gamification of financial markets led to the largest decimation of Black wealth in the history of the United States. It is central to the oppressive working conditions facing Congolese laborers engaged in mineral extraction, in mineral wars, and in creating the greatest site of sexual violence in the world, according to the United Nations. It is evident in the toxic waste sites on the west coast of Africa, in Ghana, where e-waste is shipped in from the West and dumped, poisoning land, water, people, and environments.

These connections need to be made in order to understand the tradeoffs and true costs that come with the overemphasis, financially and in policy, on digital technologies and internet infrastructures. Communications scholar Robert Mejia has critiqued the multiple ways in which electronics and communications devices and infrastructures have material consequences with potent environmental impacts. He notes:

> it is imperative that media and cultural studies scholars offer an account of how the 3.7 million gallons of water used per day by Intel in Hillsboro, Oregon, and the millions more used elsewhere, contribute to an ecology hospitable to infectious disease and its natural reservoirs...
> Knowing that an estimated 632,000 pounds of mercury were disposed of in United States’ landfills between 1997 and 2007, from just discarded personal computers alone, and that about 130 million cellphones are thrown away each year.[29]

The consequences of these ecological disasters are not equitably applied to everyone. The study of the materiality of the internet includes thinking through the specific contexts of who is affected by the social, environmental, economic, and policy arrangements of the digital.[30]

Intellectual investments in thinking of the internet and the digital as disembodied and ephemeral—as if they have no materiality—come at a great cost of erasure and denial. Jean-François Blanchette has written one of the most detailed critical accounts of the development of computing—including the ways in which information is processed, networks are developed and managed, and fiber infrastructure is built and maintained—in order to dislodge the idea that the internet and computing are immaterial or abstract.[31] An intersectional examination of the global information infrastructure underscores that it is predicated upon a complex, globalized, and fundamentally material economy of resource extraction and human labor, from Congolese
labor to extract minerals, to Chinese labor working for poverty wages at Foxconn to make Apple's iPhones, to the exclusion of African American labor from high-wage IT jobs in the United States, to Ghanaians sifting through electronic trash and toxic waste.

**A Future for Intersectional Black Feminist Technology Studies**

Technologies such as the internet and digitally enabled devices are never neutral and certainly never without consequence. A truer reckoning of how capital is organized in the interests of those who wield transnational power at the expense of Black life in the diaspora is an essential intervention and outcome of an intersectional approach to the study of the internet. Such an approach affords scholars a way of understanding and intervening upon the conditions of oppression by making global and historical linkages visible. Yet information and communication studies have been slow to apply an intersectional lens; for this reason, Black studies scholarship is particularly important and could serve as instructive to researchers in their pursuit of a more complete and accurate analysis. Where social construction of technology theorists explicitly name the political, social and economic dimensions of technologies as never value-free, they fail to identify how these practices are co-constituted in racialized and gendered ways that involve power and often foster and maintain systematic discrimination and oppression.

We need theoretical models that help us better understand the ways that technological practices are intersectionally racialized and gendered. We need to shed light on what is happening with our digital media and the internet, and denaturalize the idea that these “tools” are apolitical or without consequence. An intersectional approach can explicitly engage with the always-already concurrent existence of racism and sexism, rendering them visible as part of the social structures and economies fundamental to experiences in digital cultures, platforms, economies, and infrastructures. Taking up intersectionality affirms and is a response to Christian Fuchs's call for a critical media and information studies that allows us to engage with digital technologies, social media, platforms, and global media as they intersect with capital, state policy, and global social formations, many of which are based in intersecting historical and contemporary patterns and practices of oppression. As Fuchs argues, we must have the tools to engage with and analyze various information and media as they affect, and are affected by, global capital and its attendant crises facilitated by the internet. Intersectionality is a critical analytical framework that brings more nuance to the racialized and gendered dimensions of the political economy of the internet.

Here I invoke the work of Jemima Pierre, in her pan-Africanist analysis of the historical liberal separation of African Americans from the African diasporic politic that was previously concerned with “a reconceptualization of understandings of race from its global interconnected structural dimensions to more local concerns with the national integration.” Pierre’s work on postcolonial Ghana is a wake-up call and powerful ethnography that traces the political economy of global Blackness. Her work is part of the through line that connects the interests of Black/African Americans to Africa, and I contend that these are the frameworks from Black studies that must be integrated with information and communications scholarship.
What we need is to keep sufficient feminist pressure on the development of technologies, in the context of material consequences that diminish any liberatory possibility. An intersectional approach to the internet and to digital studies widens the scope of analysis to include the inequity of global development and the financialization and circulation of global capital that the internet both engenders and is supported by. It provides a point of entry to globalization, surveillance, control, and the power relations that are embedded within digital information and communication systems and infrastructures.

Rather than maintaining collective intellectual investments in the liberatory possibilities of the internet that ignore a broader accounting of the true cost of investment, an intersectional analysis, harkening to the Combahee River Collective, allows the bridging of historical, economic, and political agendas to the contemporary material realities of marginalized and oppressed peoples across the globe, and offers up a site of critique and the development of counternarratives to those in power. In this sense, intersectional critique provides liberatory potential for those who seek to understand power structures that control the lives of so many, among them, Black people across the diaspora.

Footnotes

1. Combahee River Collective statement. [Return to text]
2. “A Herstory of the #BlackLivesMatter Movement” by Alicia Garza, October 7, 2014. [Return to text]
8. Brock, “Beyond the Pale,” 1088. [Return to text]
12. Hull, Bell Scott, and Smith, But Some of Us Are Brave. [Return to text]
16. Statistics provided by the Center for American Progress in their 2013 “Fact Sheet: The State of African American Women in the United States.” [Return to text]
17. Daniels, “Race and Racism.” [Return to text]


28. Ibid., 3. [Return to text]


THE COMPUTATIONAL TURN: THINKING ABOUT THE DIGITAL HUMANITIES

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Introduction

Few dispute that digital technology is fundamentally changing the way in which we engage in the research process. Indeed, it is becoming more and more evident that research is increasingly being mediated through digital technology. Many argue that this mediation is slowly beginning to change what it means to undertake research, affecting both the epistemologies and ontologies that underlie a research programme. Of course, this development is variable depending on disciplines and research agendas, with some more reliant on digital technology than others, but it is rare to find an academic today who has had no access to digital technology as part of their research activity. Library catalogues are now probably the minimum way in which an academic can access books and research articles without the use of a computer, but, with card indexes dying a slow and certain death (Baker, 1996, 2001), there remain few outputs for the non-digital scholar to undertake research in the modern university. Email, Google searches and bibliographic databases are become increasingly crucial, as more of the world libraries are scanned and placed online. Whilst some decry the loss of the skills and techniques of older research traditions, others have warmly embraced what has come to be called the digital humanities (Schreibman et al., 2008; Schnapp & Presner, 2009; Presner, 2010; Hayles, 2011).

The digital humanities try to take account of the plasticity of digital forms and the way in which they point toward a new way of working with representation and mediation, what might be called the digital ‘folding’ of reality, whereby one is able to approach culture in a radically new way. To mediate an object, a digital or computational device requires that this object be translated into the digital code that it can understand. This minimal transformation is effected
through the input mechanism of a socio-technical device within which a model or image is stabilised and attended to. It is then internally transformed, depending on a number of interventions, processes or filters, and eventually displayed as a final calculation, usually in a visual form. This results in real-world situations where computation is event-driven and divided into discrete processes to undertake a particular user task. The key point is that without the possibility of discrete encoding there is no object for the computational device to process. However, in cutting up the world in this manner, information about the world necessarily has to be discarded in order to store a representation within the computer. In other words, a computer requires that everything is transformed from the continuous flow of our everyday reality into a grid of numbers that can be stored as a representation of reality which can then be manipulated using algorithms. These subtractive methods of understanding reality (episteme) produce new knowledges and methods for the control of reality (techne). They do so through a digital mediation, which the digital humanities are starting to take seriously as their problematic.

The digital humanities themselves have had a rather interesting history. Starting out as ‘computing in the humanities’, or ‘humanities computing’, in the early days they were often seen as a technical support to the work of the ‘real’ humanities scholars, who would drive the projects. This involved the application of the computer to the disciplines of the humanities, something that has been described as treating the ‘machine’s efficiency as a servant’ rather than ‘its participant enabling of criticism’ (McCarty, 2009). As Hayles explains, changing to the term “Digital Humanities” was meant to signal that the field had emerged from the low-prestige status of a support service into a genuinely intellectual endeavour with its own professional practices, rigorous standards, and exciting theoretical explorations’ (Hayles, 2011). Ironically, as the projects became bigger and more complex, and as it developed computational techniques as an intrinsic part of the research process, technically proficient researchers increasingly saw the computational as part and parcel of what it meant to do research in the humanities itself. That is, computational technology has become the very condition of possibility required in order to think about many of the questions raised in the humanities today. For example, as Schnapp and Presner explain in the Digital Humanities Manifesto 2.0,

The first wave of digital humanities work was quantitative, mobilizing the search and retrieval
powers of the database, automating corpus linguistics, stacking hypercards into critical arrays. The second wave is qualitative, interpretive, experiential, emotive, generative in character. It harnesses digital toolkits in the service of the Humanities’ core methodological strengths: attention to complexity, medium specificity, historical context, analytical depth, critique and interpretation. (2009, original emphasis)

Presner argues further that

the first wave of Digital Humanities scholarship in the late 1990s and early 2000s tended to focus on large-scale digitization projects and the establishment of technological infrastructure, [while] the current second wave of Digital Humanities -- what can be called ‘Digital Humanities 2.0’ -- is deeply generative, creating the environments and tools for producing, curating, and interacting with knowledge that is ‘born digital’ and lives in various digital contexts. While the first wave of Digital Humanities concentrated, perhaps somewhat narrowly, on text analysis (such as classification systems, mark-up, text encoding, and scholarly editing) within established disciplines, Digital Humanities 2.0 introduces entirely new disciplinary paradigms, convergent fields, hybrid methodologies, and even new publication models that are often not derived from or limited to print culture. (2010: 6)

The question of quite how the digital humanities undertake their research, and whether the notions of first and second wave digital humanities captures the current state of different working practices and methods in the digital humanities, remains contested. Yet these can be useful analytical concepts for thinking through the changes in the digital humanities. We might, however, observe the following: first-wave digital humanities involved the building of infrastructure in the studying of humanities texts through digital repositories, text markup, etc., whereas second-wave digital humanities expands the notional limits of the archive to include digital works, and so bring to bear the humanities’ own methodological toolkits to look at ‘born-
digital’ materials, such as electronic literature (e-lit), interactive fiction (IF), web-based artefacts, and so forth.

I would like to explore here a tentative path for a third wave of the digital humanities, concentrated around the underlying computationality of the forms held within a computational medium. That is, I propose to look at the digital component of the digital humanities in the light of its medium specificity, as a way of thinking about how medial changes produce epistemic changes. This approach draws from recent work in software studies and critical code studies, but it also thinks about the questions raised by platform studies, namely the specifics of general computability made available by specific platforms (Fuller, 2008; Manovich, 2008; Montfort & Bogost, 2009; Berry, 2011). I also want to suggest that neither first nor second-wave digital humanities really problematized what Lakatos (1980) would have called the ‘hard-core’ of the humanities, the unspoken assumptions and ontological foundations which support the ‘normal’ research that humanities scholars undertake on an everyday basis. Indeed, we could say that third-wave digital humanities points the way in which digital technology highlights the anomalies generated in a humanities research project and which leads to the questioning of the assumptions implicit in such research, e.g. close reading, canon formation, periodization, liberal humanism, etc. We are, as Presner argues, ‘at the beginning of a shift in standards governing permissible problems, concepts, and explanations, and also in the midst of a transformation of the institutional and conceptual conditions of possibility for the generation, transmission, accessibility, and preservation of knowledge’ (2010: 10).

To look into this issue, I want to start with an examination of the complex field of understanding culture through digital technology. Indeed, I argue that to understand the contemporary born-digital culture and the everyday practices that populate it – the focus of a digital humanities second wave – we need a corresponding focus on the computer code that is entangled with all aspects of our lives, including reflexivity about how much code is infiltrating the academy itself. As Mathew Fuller argues, ‘in a sense, all intellectual work is now “software study”, in that software provides its media and its context... [yet] there are very few places where the specific nature, the materiality, of software is studied except as a matter of engineering’ (2006). We also need to bring to the fore the ‘structure of feeling’ that computer code facilitates and the way in which people use software in their research thinking and everyday...
practices. This includes the increase in the acceptance and use of software in the production, consumption and critique of culture.

Thus, there is an undeniable cultural dimension to computation and the medial affordances of software. This connection again points to the importance of engaging with and understanding code: indeed, computer code can serve as an index of digital culture (imagine digital humanities mapping different programming languages to the cultural possibilities and practices that it affords, e.g. HTML to cyberculture, AJAX to social media). This means that we can ask the question: what is culture after it has been ‘softwarized’? (Manovich, 2008:41). Understanding digital humanities is in some sense then understanding code, and this can be a resourceful way of understanding cultural production more generally: for example, just as digital typesetting transformed the print newspaper industry, eBook and eInk technologies are likely to do so again. We thus need to take computation as the key issue that is underlying these changes across mediums, industries and economies.

**Knowing knowledge**

In trying to understand the digital humanities our first step might be to problematize computationality, so that we are able to think critically about how knowledge in the 21st century is transformed into information through computational techniques, particularly within software. It is interesting that at a time when the idea of the university is itself under serious rethinking and renegotiation, digital technologies are transforming our ability to use and understand information outside of these traditional knowledge structures. This is connected to wider challenges to the traditional narratives that served as unifying ideas for the university and, with their decline, has led to difficulty in justifying and legitimating the postmodern university vis-à-vis government funding.

Historically, the role of the university has been closely associated with the production of knowledge. For example, in 1798 Immanuel Kant outlined an argument for the nature of the university titled *The Conflict of the Faculties*. He argued that all of the university’s activities should be organised by a single regulatory idea, that of the concept of reason. As Bill Readings (1996) stated:

> Reason on the one hand, provide[d] the *ratio* for all the disciplines; it [was] their organizing
principle. On the other hand, reason [had] its own faculty, which Kant names[d] ‘philosophy’ but which we would now be more likely to call the ‘humanities’. (Readings, 1996: 15)

Kant argued that reason and the state, knowledge and power, could be unified in the university by the production of individuals who would capable of rational thought and republican politics – students trained for the civil service and society. Kant was concerned with the question of regulative public reason, that is, with how to ensure stable, governed and governable regimes which can rule free people, in contrast to tradition represented by monarchy, the Church or a Leviathan. This required universities, as regulated knowledge-producing organisations, to be guided and overseen by the faculty of philosophy, which could ensure that the university remained rational. This was part of a response to the rise of print culture, growing literacy and the kinds of destabilising effects that this brought. Thus, without resorting to dogmatic doctrinal force or violence, one could have a form of perpetual peace by the application of one’s reason.2

This was followed by the development of the modern university in the 19th century, instituted by the German Idealists, such as Schiller and Humboldt, who argued that there should be a more explicitly political role to the structure given by Kant. They argued for the replacement of reason with culture, as they believed that culture could serve as a ‘unifying function for the university’ (Readings, 1996: 15). For the German Idealists like Humboldt, culture was the sum of all knowledge that is studied, as well as the cultivation and development of one’s character as a result of that study. Indeed, Humboldt proposed the founding of a new university, the University of Berlin, as a mediator between national culture and the nation-state. Under the project of ‘culture’, the university would be required to undertake both research and teaching, i.e., the production and dissemination of knowledge respectively. The modern idea of a university therefore allowed it to become the preeminent institution that unified ethnic tradition and statist rationality by the production of an educated cultured individual. The German Idealists proposed

that the way to reintegrate the multiplicity of known facts into a unified cultural science is through Bildung, the ennoblement of character… The university produces not servants but subjects.
That is the point of the pedagogy of Bildung, which teaches knowledge acquisition as a process rather than the acquisition of knowledge as a product. (Reading, 1996: 65-67)

This notion was given a literary turn by the English, in particular John Henry Newman and Mathew Arnold, who argued that literature, not culture or philosophy, should be the central discipline in the university, and also in national culture more generally. Literature therefore became institutionalised within the university ‘in explicitly national terms and [through] an organic vision of the possibility of a unified national culture’ (Readings, 1996: 16). This became regulated through the notion of a literary canon, which was taught to students to produce literary subjects as national subjects.

Readings argues that in the postmodern university we now see the breakdown of these ideals, associated particularly with the rise of the notion of the ‘university of excellence’ -- which for him is a concept of the university that has no content, no referent. What I would like to suggest is that today, we are beginning to see instead the cultural importance of the digital as the unifying idea of the university. Initially this has tended to be associated with notions such as information literacy and digital literacy, betraying their debt to the previous literary conception of the university, albeit understood through vocational training and employment. However, I want to propose that, rather than learning a practice for the digital, which tends to be conceptualised in terms of ICT skills and competences (see for example the European Computer Driving License), we should be thinking about what reading and writing actually should mean in a computational age. This is to argue for critical understanding of the literature of the digital, and through that develop a shared digital culture through a form of digital Bildung. Here I am not calling for a return to the humanities of the past, to use a phrase of Fuller (2010), ‘for some humans’, but rather to a liberal arts that is ‘for all humans’. To use the distinction introduced by Hofstadter (1963), this is to call for the development of a digital intellect -- as opposed to a digital intelligence. Hofstadter writes:

Intellect… is the critical, creative, and contemplative side of mind. Whereas intelligence seeks to grasp, manipulate, re-order, adjust, intellect examines, ponders, wonders, theorizes, criticizes, imagines. Intelligence will seize the immediate meaning in a situation and evaluate it.
Intellect evaluates evaluations, and looks for the meanings of situations as a whole... Intellect [is] a unique manifestation of human dignity. (Hofstadter, 1963: 25)

The digital assemblages that are now being built not only promise great change at the level of the individual human actor. They provide destabilising amounts of knowledge and information that lack the regulating force of philosophy -- which, Kant argued, ensures that institutions remain rational. Technology enables access to the databanks of human knowledge from anywhere, disregarding and bypassing the traditional gatekeepers of knowledge in the state, the universities and the market. There no longer seems to be the professor who tells you what you should be looking up and the 'three arguments in favour of it' and the 'three arguments against it'. This introduces not only a moment of societal disorientation, with individuals and institutions flooded with information, but also offers a computational solution to this state of events in the form of computational rationalities--something that Turing (1950) described as super-critical modes of thought. Both of these forces are underpinned at a deep structural level by the conditions of possibility suggested by computer code.

As mentioned previously, computer code enables new communicative processes, and with the increasing social dimension of networked media the possibility of new and exciting forms of collaborative thinking arises. This is not the collective intelligence discussed by Levy (1999); rather, it is the promise of a collective intellect. The situation is reminiscent of the medieval notion of the universitatis, but recast in a digital form, as a society or association of actors who can think critically together, mediated through technology. It further raises the question of what new modes of collective knowledge software can enable or constitute. Can software and code take us beyond the individualising trends of blogs, comments, twitter feeds, and so forth, and make possible something truly collaborative -- something like the super-critical thinking that is generative of ideas, modes of thought, theories and new practices? There is certainly something interesting about real-time stream forms of digital memory in that they are not afforded towards the past, as history, but neither are they directed towards a form of futurity. Instead we might say they seem to now-mediate? new-mediate? life-mediate? Jetztzeit-mediate (Benjamin, 1992: 252-3)? In other words, they gather together the newness of a particular group of streams, a kind of collective writing, that has the potential
to be immensely creative. These are possible rich areas for research for a third-wave digital humanities that seeks to understand these potentially new forms of literature and the medium that supports them.

For the research and teaching disciplines within the university, the digital shift could represent the beginnings of a moment of ‘revolutionary science’, in the Kuhnian sense of a shift in the ontology of the positive sciences and the emergence of a constellation of new ‘normal science’ (Kuhn 1996). This would mean that the disciplines would, ontologically, have a very similar Lakatosian computational ‘hard core’ (Lakatos, 1980). This has much wider consequences for the notion of the unification of knowledge and the idea of the university (Readings, 1996). Computer science could play a foundational role with respect to the other sciences, supporting and directing their development, even issuing ‘lucid directives for their inquiry’. Perhaps we are beginning to see reading and writing computer code as part of the pedagogy required to create a new subject produced by the university, a computational or data-centric subject. This is, of course, not to advocate that the existing methods and practices of computer science become hegemonic, rather that a humanistic understanding of technology could be developed, which also involves an urgent inquiry into what is human about the computational humanities or social sciences. In a related manner, Fuller (Fuller, S., 2006) has called for a ‘new sociological imagination’, pointing to the historical project of the social sciences that have been committed to ‘all and only humans’, because they ‘take all human beings to be of equal epistemic interest and moral concern’ (Fuller, 2010: 242). By drawing attention to ‘humanity’s ontological precariousness’ (244), Fuller rightly identifies that the project of humanity requires urgent thought, and, we might add, even more so in relation to the challenge of a computationality that threatens our understanding of what is required to be identified as human at all.

If software and code become the condition of possibility for unifying the multiple knowledges now produced in the university, then the ability to think oneself, taught by rote learning of methods, calculation, equations, readings, canons, processes, etc., might become less important. Although there might be less need for an individual ability to perform these mental feats or, perhaps, even recall the entire canon ourselves due to its size and scope, using technical devices, in conjunction with collaborative methods of working and studying, would enable a cognitively supported method
instead. The internalisation of particular practices that have been instilled for hundreds of years in children and students would need to be rethought, and in doing so the commonality of thinking qua thinking produced by this pedagogy would also change. Instead, reasoning could shift to a more conceptual or communicative method of reasoning, for example, by bringing together comparative and communicative analysis from different disciplinary perspectives, and by knowing how to use technology to achieve a usable result – a rolling process of reflexive thinking and collaborative rethinking.

Relying on technology in a more radically decentred way, depending on technical devices to fill in the blanks in our minds and to connect knowledge in new ways, would change our understanding of knowledge, wisdom and intelligence itself. It would be a radical decentring in some ways, as the Humboldtian subject filled with culture and a certain notion of rationality would no longer exist; rather, the computational subject would know where to recall culture as and when it was needed in conjunction with computationally available others, a just-in-time cultural subject, perhaps, to feed into a certain form of connected computationally supported thinking through and visualised presentation. Rather than a method of thinking with eyes and hand, we would have a method of thinking with eyes and screen.8

This doesn’t have to be dehumanising. Latour and others have rightly identified the domestication of the human mind that took place with pen and paper (Latour, 1986). This is because computers, like pen and paper, help to stabilise meaning by cascading and visualising encoded knowledge that allows it to be continually ‘drawn, written, [and] recoded’ (Latour, 1986: 16). Computational techniques could give us greater powers of thinking, larger reach for our imaginations, and, possibly, allow us to reconnect to political notions of equality and redistribution based on the potential of computation to give to each according to their need and to each according to their ability. This is the point made forcefully by Fuller (2010: 262), who argues that we should look critically at the potential for inequality which is created when new technologies are introduced into society. This is not merely a problem of a ‘digital divide’, but a more fundamental one of how we classify those that are more ‘human’ than others, when access to computation and information increasingly has to pass through the market.
Towards a digital humanities?

The importance of understanding computational approaches is increasingly reflected across a number of disciplines, including the arts, humanities and social sciences, which use technologies to shift the critical ground of their concepts and theories – something that can be termed a computational turn. This is shown in the increasing interest in the digital humanities (Schreibman et al., 2008) and computational social science (Lazer et al., 2009), as evidenced, for example, by the growth in journals, conferences, books and research funding. In the digital humanities ‘critical inquiry involves the application of algorithmically facilitated search, retrieval, and critical process that… originat[es] in humanities-based work’; therefore ‘exemplary tasks traditionally associated with humanities computing hold the digital representation of archival materials on a par with analysis or critical inquiry, as well as theories of analysis or critical inquiry originating in the study of those materials’ (Schreibman et al., 2008: xxv). In social sciences, Lazer et al. argue that ‘computational social science is emerging that leverages the capacity to collect and analyze data with an unprecedented breadth and depth and scale’ (2009).

Latour speculates that there is a trend in these informational cascades, which is certainly reflected in the ongoing digitalisation of arts, humanities and social science projects that tends towards ‘the direction of the greater merging of figures, numbers and letters, merging greatly facilitated by their homogenous treatment as binary units in and by computers’ (Latour, 1986: 16). The financial considerations are also new with these computational disciplines, as they require more money and organisation than the old individual scholar of lore did. Not only are the start-up costs correspondingly greater, usually needed to pay for the researchers, computer programmers, computer technology, software, digitisation costs, etc., but there are real questions about sustainability of digital projects, such as: ‘Who will pay to maintain the digital resources?’ ‘Will the user forums, and user contributions, continue to be monitored and moderated if we can’t afford a staff member to do so? Will the wiki get locked down at the close of funding or will we leave it to its own devices, becoming an online-free-for all?’ (Terras, 2010). It also raises a lot of new ethical questions for social scientists and humanists to grapple with. As argued in Nature,

For a certain sort of social scientist, the traffic patterns of millions of e-mails look like manna
from heaven. Such data sets allow them to map formal and informal networks and pecking orders, to see how interactions affect an organization’s function, and to watch these elements evolve over time. They are emblematic of the vast amounts of structured information opening up new ways to study communities and societies. Such research could provide much-needed insight into some of the most pressing issues of our day, from the functioning of religious fundamentalism to the way behaviour influences epidemics... But for such research to flourish, it must engender that which it seeks to describe... Any data on human subjects inevitably raise privacy issues, and the real risks of abuse of such data are difficult to quantify, (Nature, 2007)

For Latour, ‘sociology has been obsessed by the goal of becoming a quantitative science. Yet it has never been able to reach this goal because of what it has defined as being quantifiable within the social domain…’. Thus, he adds, ‘[i]t is indeed striking that at this very moment, the fast expanding fields of “data visualisation”, “computational social science” or “biological networks” are tracing, before our eyes, just the sort of data’ that sociologists such as Gabriel Tarde, at the turn of the 20th century, could merely speculate about (Latour, 2010: 116).

Further, it is not merely the quantification of research which was traditionally qualitative that is offered with these approaches. Rather, as Unsworth argues, we should think of these computational ‘tools as offering provocations, surfacing evidence, suggesting patterns and structures, or adumbrating trends’ (Unsworth, quoted in Clement et al., 2008). For example, the methods of ‘cultural analytics’ make it possible, through the use of quantitative computational techniques, to understand and follow large-scale cultural, social and political processes for research projects – that is, it offers massive amounts of literary or visual data analysis (see Manovich and Douglas, 2009). This is a distinction that Moretti (2007) referred to as distant versus close readings of texts. As he points out, the traditional humanities focuses on a ‘minimal fraction of the literary field’,

A canon of two hundred novels, for instance, sounds very large for nineteenth-century Britain
(and is much larger than the current one), but is still less than one per cent of the novels that were actually published: twenty thousand, thirty, more, no one really knows -- and close reading won’t help here, a novel a day every day of the year would take a century or so... And it’s not even a matter of time, but of method: a field this large cannot be understood by stitching together separate bits of knowledge about individual cases, because it isn’t a sum of individual cases: it’s a collective system, that should be grasped as such, as a whole, (Moretti, 2007: 3-4)

It is difficult for the traditional arts, humanities and social sciences to completely ignore the large-scale digitalisation effort going on around them, particularly when large quantities of research money are available to create archives, tools and methods in the digital humanities and computational social sciences. However, less understood is the way in which the digital archives being created are deeply computational in structure and content, because the computational logic is entangled with the digital representations of physical objects, texts and ‘born digital’ artefacts. Computational techniques are not merely an instrument wielded by traditional methods; rather they have profound effects on all aspects of the disciplines. Not only do they introduce new methods, which tend to focus on the identification of novel patterns in the data as against the principle of narrative and understanding, they also allow the modularisation and recombination of disciplines within the university itself.

Computational approaches facilitate disciplinary hybridity that leads to a post-disciplinary university -- which can be deeply unsettling to traditional academic knowledge. Software allows for new ways of reading and writing. For example, this is what Tanya Clement says on the distant reading of Gertrude Stein’s The Making of Americans,

*The Making of Americans* was criticized by [those] like Malcolm Cowley who said Stein’s ‘experiments in grammar’ made this novel ‘one of the hardest books to read from beginning to end that has ever been published’…. The highly repetitive nature of the text, comprising almost 900 pages and 3174 paragraphs with only approximately 5,000 unique words, makes
keeping tracks of lists of repetitive elements unmanageable and ultimately incomprehensible... [However] text mining allowed me to use statistical methods to chart repetition across thousands of paragraphs... facilitated my ability to read the results by allowing me to sort those results in different ways and view them within the context of the text. As a result, by visualizing clustered patterns across the text’s 900 pages of repetitions... [th]is discovery provides a new key for reading the text as a circular text with two corresponding halves, which substantiates and extends the critical perspective that Making is neither inchoate nor chaotic, but a highly systematic and controlled text. This perspective will change how scholars read and teach The Making of Americans. (Clement, quoted in Clement, Steger, Unsworth, and Uszkalo, 2008)

I wouldn’t want to overplay the distinction between pattern and narrative as differing modes of analysis. Indeed, patterns implicitly require narrative in order to be understood, and it can be argued that code itself consists of a narrative form that allows databases, collections and archives to function at all. Nonetheless, pattern and narrative are useful analytic terms that enable us to see the way in which the computational turn is changing the nature of knowledge in the university and, with it, the kind of computational subject that the university is beginning to produce. As Bruce Sterling argues,

‘Humanistic heavy iron’: it’s taken a long time for the humanities to get into super computing, and into massive database management. They are really starting to get there now. You are going to get into a situation where even English professors are able to study every word ever written about, or for, or because of, Charles Dickens or Elizabeth Barrett Browning. That’s just a different way to approach the literary corpus. I think there is a lot of potential there. (Sterling, 2010)

Indeed, there is a cultural dimension to this process and, as we become more used to computational visualisations, we will expect to see them and use them with confidence and fluency. The computational subject is a key requirement for a data-centric age,
certainly when we begin to look at case studies that demonstrate how important a computational comportment can be in order to perform certain forms of public and private activities in a world that is increasingly pervaded by computational devices. In short, Bildung is still a key idea in the digital university, not as a subject trained in a vocational fashion to perform instrumental labour, nor as a subject skilled in a national literary culture, but rather as a subject which can unify the information that society is now producing at increasing rates, and which understands new methods and practices of critical reading (code, data visualisation, patterns, narrative) and is open to new methods of pedagogy to facilitate it. Indeed, Presner (2010) argues that the digital humanities

must be engaged with the broad horizon of possibilities for building upon excellence in the humanities while also transforming our research culture, our curriculum, our departmental and disciplinary structures, our tenure and promotion standards, and, most of all, the media and format of our scholarly publications. (Presner, 2010: 6)

This is a subject that is highly computationally communicative, and that is also able to access, process and visualise information and results quickly and effectively. At all levels of society, people will increasingly have to turn data and information into usable computational forms in order to understand it at all. For example, one could imagine a form of computational journalism that enables the public sphere function of the media to make sense of the large amount of data which governments, amongst others, are generating, perhaps through increasing use of ‘charticles’, or journalistic articles that combine text, image, video, computational applications and interactivity (Stickney, 2008). This is a form of ‘networked’ journalism that ‘becomes a non-linear, multi-dimensional process’ (Beckett, 2008: 65). Additionally, for people in everyday life who need the skills that enable them to negotiate an increasingly computational field – one need only think of the amount of data in regard to managing personal money, music, film, text, news, email, pensions, etc. – there will be calls for new skills of financial and technical literacy, or, more generally, a computational literacy or computational pedagogy that the digital humanities could contribute to.
Humanity and the humanities

As the advantages of the computational approach to research (and teaching) become persuasive to the positive sciences, whether history, biology, literature or any other discipline, the ontological notion of the entities they study begins to be transformed. These disciplines thus become focused on the \textit{computationality} of the entities in their work.\footnote{11} Here, following Heidegger, I want to argue that there remains a location for the possibility of philosophy to explicitly question the ontological understanding of what the computational is in regard to these positive sciences. Computationality might then be understood as an ontotheology, creating a new ontological ‘epoch’ as a new historical constellation of intelligibility. The digital humanists could therefore orient themselves to questions raised when computationality is itself problematized in this way (see Liu 2011).

With the notion of ontotheology, Heidegger is following Kant’s argument that intelligibility is a process of filtering and organising a complex overwhelming world by the use of ‘categories’, Kant’s ‘discursivity thesis’. Heidegger historicizes Kant’s cognitive categories by arguing that there is ‘succession of changing historical ontotheologies that make up the “core” of the metaphysical tradition. These ontotheologies establish “the truth concerning entities as such and as a whole”, in other words, they tell us both what and how entities are – establishing both their essence and their existence’ (Thomson, 2009: 149-150). Metaphysics, grasped ontotheologically, ‘temporarily secures the intelligible order’ by understanding it ‘ontologically’, from the inside out, and ‘theologically’, from the outside in, which allows the formation of an epoch, a ‘historical constellation of intelligibility which is unified around its ontotheological understanding of the being of entities’ (Thomson, 2009: 150). As Thomson argues:

\begin{quote}
The positive sciences all study classes of entities... Heidegger... [therefore] refers to the positive sciences as ‘ontic sciences’. Philosophy, on the other hand, studies the being of those classes of entities, making philosophy an ‘ontological science’ or, more grandly, a ‘science of being’ (Thomson 2003: 529).
\end{quote}

Philosophy as a field of inquiry, one might argue, should have its ‘eye on the whole’, and it is this focus on ‘the landscape as a whole’ which
distinguishes the philosophical enterprise and which can be extremely useful in trying to understand these ontotheological developments (Sellars, 1962: 36). If code and software are to become objects of research for the humanities and social sciences, including philosophy, we will need to grasp both the ontic and ontological dimensions of computer code. Broadly speaking, then, this paper suggests that we take a philosophical approach to the subject of computer code, paying attention to the wider aspects of code and software, and connecting them to the materiality of this growing digital world. With this in mind, the question of code becomes central to understanding in the digital humanities, and serves as a condition of possibility for the many computational forms that mediate out experience of contemporary culture and society.

**Endotes**

1 HTML is the HyperText Markup Language used to encode webpages. AJAX is shorthand for Asynchronous JavaScript and XML, which is a collection of client side technologies that enable an interactive and audio-visual dynamic web.

2 I am indebted to Alan Finlayson for his comments on this section.

3 For example in *The Idea of a University* (Newman, 1996) and *Culture and Anarchy* (Arnold, 2009).


5 What Heidegger calls ‘the Danger’ (*die Gefahr*) is the idea that a particular ontotheology should become permanent, particularly the ontotheology associated with technology and enframing (see Heidegger 1993).

6 See Thomson (2003: 531) for a discussion of how Heidegger understood this to be the role of philosophy.

7 Kirschenbaum argues:

> I believe such trends will eventually affect the minutiae of academic policy. The English
department where I teach, like most which offer the doctorate, requires students to demonstrate proficiency in at least one foreign language. Should a graduate student be allowed to substitute demonstrated proficiency in a computer-programming language instead? Such questions have recently arisen in my department and elsewhere; in my own case, almost a decade ago, I was granted permission to use the computer language Perl in lieu of proficiency in the second of two languages that my department required for the Ph.D. I successfully made the case that given my interest in the digital humanities, this was far more practical than revisiting my high-school Spanish. (Kirschenbaum 2009, emphasis added)

8 This does not preclude other more revolutionary human-computer interfaces that are under development, including haptic interfaces, eye control interfaces, or even brain-wave controlled software interfaces.

9 See http://www.thecomputationalturn.com/

10 See the open digital humanities translation of Plato’s Protagoras for a good example of a wiki-based project, http://openprotagoras.wikidot.com/

11 Here I don’t have the space to explore the possibilities of a transformation of the distinction between research and teaching by digital technologies, themselves a result of the Humboldtian notion of the university. We might consider that a new hybridized form of research-teaching or teaching-research might emerge, driven, in part, by the possibility of new knowledges being created and discovered within the teaching process itself. This would mean that the old distinctions of research as creative, and teaching as dissemination would have to change too.

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Code of Best Practices in Fair Use for the Visual Arts

COLLEGE ART ASSOCIATION

Funded by the Andrew W. Mellon Foundation
Additional support provided by the Samuel H. Kress Foundation
MESSAGE FROM THE CAA PRESIDENT

The mission of the College Art Association (CAA) is to promote the visual arts and their understanding through advocacy, intellectual engagement, and a commitment to the diversity of practices and practitioners. CAA contributes to the visual arts profession as a whole through scholarly publications, advocacy, exchange of research and new work, and the development of standards and guidelines that reflect the best practices of the field.

The Code of Best Practices in Fair Use for the Visual Arts is based on a consensus of professionals in the visual arts who use copyrighted images, texts, and other materials in their creative and scholarly work and who, through discussion groups, identified best practices for using such materials. They included art and architectural historians, artists, designers, curators, museum directors, educators, rights and reproduction officers, and editors at scholarly publishers and journals.

CAA is grateful to Lead Principal Investigators Patricia Aufderheide and Peter Jaszi of American University for their oversight and execution of this project, including their surveying nearly 12,000 CAA members on their use of copyrighted materials, conducting 100 interviews to identify key issues, facilitating discussions with another 120 visual arts professionals to understand and identify points of consensus concerning best practices in use of such materials and, finally, articulating that consensus in the Code of Best Practices.

CAA expresses its deep appreciation to the many visual arts professionals who gave their time and expertise to this project. Special thanks are due to the other principal investigators—Linda Downs, Anne Collins Goodyear, under whose CAA presidency the project began, and Jeffrey Cunard—as well as to Gretchen Wagner, who, with Jeffrey, cochaired CAA’s Task Force on Fair Use. CAA also thanks the project advisors, the Legal Advisory Committee, the Task Force on Fair Use, its Committee on Intellectual Property, and its Professional Practices Committee for expert assistance, and Janet Landay, project manager, for orchestrating all logistics. A full list of participants is set out in the credits that follow the Code.

Finally, CAA acknowledges the generous support of the Andrew W. Mellon Foundation and the Samuel H. Kress Foundation, without which this project would not have been possible.

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President, CAA, and Professor, Art and Art History Department, Colgate University
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Introduction

The Code of Best Practices in Fair Use was created with and for the visual arts community. Copyright protects artworks of all kinds, audiovisual materials, photographs, and texts (among other things) against unauthorized use by others, but it is subject to a number of exceptions designed to assure space for future creativity. Of these, fair use is the most important and the most flexible. (Appendix A is an essay by Peter Jaszi presenting a perspective on fair use.) The Code describes common situations in which there is a consensus within the visual arts community about practices to which this copyright doctrine should apply and provides a practical and reliable way of applying it.

Assessing fair use in light of shared professional understandings is a respected practice. Invoking professional practices provides members of a community with a clear framework in which to apply fair use with confidence, knowing the shared norms of their field. Having a code of best practices allows them to share their common understandings with others—including publishing entities, distributors, insurers, and lawyers—who may make decisions on which they depend. In addition to serving as a useful tool for individuals, a code can assist institutions and their counsel in applying the doctrine and developing policies that reflect their particular concerns. Further, a code provides guidance to rights holders as to when it may not make sense for them to claim infringement in light of an appropriate invocation of fair use. Finally, although a code cannot control the judicial interpretation of fair use, it helps courts to become familiar with best practices in a professional community when called upon to rule on fair use.

The right to make fair use of copyrighted materials is a key tool for the visual arts community, although its members may not always choose to take advantage of it. They may still seek copyright permissions, for instance, to maintain relationships, to reward someone deemed deserving, or to obtain access to material needed for their purposes. But, in certain other cases, including those described in the Code, they may choose instead to employ fair use of copyrighted material in order to accomplish their professional goals.

Many members of the visual arts community employ fair use in their professional practices and many do so regularly. For instance, scholars and their editors employ fair use in the context of analytic writing (for example, in using reproductions of copyrighted artworks and quotations). Teachers rely on it—along with other copyright exceptions—to show images of works being discussed during class sessions, and, even more heavily, to provide relevant images for student use outside class. In the museum context, fair use may be employed in exhibitions and publications, and in a range of digital and educational projects. Artists may employ fair use to build on preexisting works, engage with contemporary culture, or provide artistic, political, or social commentary. And the entire visual arts community benefits
from fair use when it enables enhanced access to archival materials. These are only some of the most common ways in which fair use is central to visual arts practice.

**WHY THE CODE?**

Artists, scholars, teachers, museum professionals, and others represented in the College Art Association membership are significant producers of copyrighted works and they value their own rights. CAA recognized the value of promoting greater certainty among its members about the appropriate exercise of fair use. The risk posed by widespread uncertainty on this point was underscored by the common default expectation that users of copyrighted material should routinely seek permission to eliminate potential legal liability for unauthorized uses. CAA members were aware that such a culture of permissions could limit the work of the visual arts community and, as a result, deprive the public, especially in a digital era. CAA therefore engaged Patricia Aufderheide and Peter Jaszi, professors at American University and leading experts in copyright and fair use, to assess the current state of the community’s practices with respect to the use of third-party copyrighted materials. In 2014, thanks to generous preliminary funding from the Samuel H. Kress Foundation and a major grant from the Andrew W. Mellon Foundation, CAA asked Aufderheide and Jaszi to prepare “Copyright, Permissions, and Fair Use among Visual Artists and the Academic and Museum Visual Arts Communities: An Issues Report.”

The Issues Report, which was based on their interviews with 100 visual arts professionals and a survey of CAA members, reported that the practices of many professionals in the visual arts are constrained due to the pervasive perception that permissions to use third-party materials are required even where a confident exercise of fair use would be appropriate. Most commonly the decision not to rely on fair use is made by visual arts professionals themselves. Although members of the community may rely on fair use in some instances, they may self-censor in others, due to confusion, doubt, and misinformation about fair use, leading them to over-rely on permissions. (This is in contrast to self-censorship due to specific, non-copyright-related circumstances, such as a personal relationship with an artist.) Doing so jeopardizes their ability to realize their own full potential, as well as that of the visual arts community as a whole.

Aware of the success of other communities in developing codes of best practices in fair use, and of the opportunity that best practices present to help shape the application of fair use law, CAA decided to create such a code for the visual arts community. The methodology is described in Appendix B.

**WHEN THE CODE DOES AND DOES NOT APPLY**

Fair use is part of US copyright law, and the Code applies to the activities of members of the visual arts community who use copyrighted works in the US in furtherance of their professional goals. The Code applies to any copyrighted work used in the United States regardless of whether the work originated outside the United States. The Code does not apply to reproductions, distributions,
The Code is not applicable to—and is not needed for—uses of material for which permissions already have been granted to the broader public, such as through Creative Commons licenses, which provide advance permission for a range of uses. Anyone may use such works in ways authorized by the applicable license but may also invoke fair use for other kinds of uses, where appropriate.

Similarly, the Code is not a guide to—and, again, is not needed for—the use of material that is in the public domain. By definition, public domain material is not protected by copyright and may be used without regard to copyright. According to the reasoning of the decision in Bridgeman Art Library v. Corel Corp., 36 F. Supp. 2d 191 (S.D.N.Y. 1999), moreover, copyright-free material also includes faithful photographic reproductions of two-dimensional artworks, which are distinct from the artworks they depict. Bridgeman, however, does not on its face apply to still photographs of three-dimensional works, such as sculpture, architecture, and performance art. Nevertheless, such photographs might be used pursuant to fair use in light of the principles and limitations set forth in the Code.

In practice, fair use can be applied only to works for which users can obtain access, including, for example, in the case of visual art, to reproductions, such as analog slides or digital images. Sometimes, however, permission must be sought simply because a “sole source” controls an art object or reproductions thereof—even where the work itself is in the public domain. Because demands for permission fees in this context are not based on copyright, fair use cannot be invoked to avoid paying such fees.

Fair use and, therefore, the Code, also do not apply to the extent that a license agreement or other contract controls reproduction or other use. Thus, for example, archives must abide by restrictions imposed by donors, and museums must comply with provisions for rights clearance in distribution contracts that supersede fair use. Sometimes such terms may be found in the “fine print” of agreements that may otherwise be noncontroversial.

**APPLYING THE CODE**

Fair use can be applied consistently based on logical principles grounded in factual contexts. The Code describes an approach to reasoning about the application of fair use to issues both familiar and emergent. It does not provide rules of thumb, bright-line rules, or other decision-making shortcuts. For instance, it does not prescribe a uniform size or resolution for digital images that might be appropriate for all online uses. Rather, it calls on a user to consider context in deciding what image size should be employed for any new use, in light of the user’s professional goals and other considerations.

Likewise, the Code refers users to generally applicable professional standards, which, in turn, may evolve over time. This is the case, for example, where it invokes the concept of “appropriate metadata” (which might include information
about the title, artist, date, medium, provenance, current location, ownership, and other characteristics of a work), the meaning of which may differ according to context.

Finally, it is important to emphasize that decisions about whether to utilize the principles of the Code are not affected or limited by the possibility that others may make further uses of the copyrighted material in question. As the law has been interpreted, such “downstream” uses (scanning a book illustration and placing the image on consumer goods, for example) do not give rise to legal liability on the part of visual arts professionals who themselves have relied appropriately on fair use in making the material available and are not actively aware of widespread misuse of it by others.

The Code that follows states five consensus principles that reflect best practices by members of the visual arts community in applying fair use. Each of the principles is given shape by its associated limitations, which are integral to application of the principle. The Code includes only principles and limitations about which there was near-universal consensus among the discussion groups’ participants. As a result, they are not necessarily exhaustive.

More specifically, the Code does not describe all the situations in which fair use might be available to members of the visual arts community. Rather, it addresses only the most common situations that members of the community encounter. By the same token, the Code’s principles and limitations are, of course, subject to interpretation.
The Code of Best Practices: Situations, Principles, and Limitations

ONE: ANALYTIC WRITING

DESCRIPTION

Analytic writing focuses attention on artists, artworks, and movements; it includes analyses of art within larger cultural, political, and theoretical contexts. Such writing routinely includes reproductions, in full or in part, of relevant artworks in all media, texts, historical images, digital phenomena, and other visual culture. This material—much of it copyrighted—may be drawn from a variety of sources, including the collections of libraries and archives (generally referred to here as “memory institutions”), notes and photographs taken by the writer, and documentary reproductions created or published by others; some works start out in analog formats and others are born digital. Sometimes the visual or textual works reproduced in connection with analytic writing are the specific subjects of analysis. Sometimes they are used to illustrate larger points about artistic trends and tendencies, or to document a particular point or conclusion. Such writing is published both within traditional academic venues and in ever-expanding venues beyond them. It may be published in a variety of formats, including print and electronic books and journals, exhibition catalogues, collection catalogues, blog and social media posts, and contributions to collaborative digital projects, such as wikis (which projects often reside in institutional repositories), or it may be delivered at academic meetings or on similar occasions. The effectiveness of analytic writing about art is improved by the reproduction of the materials that it references. In many instances, particularly for works of visual art, writers may conclude that reproduction of an entire work may be the most appropriate way to make their points.

PRINCIPLE

In their analytic writing about art, scholars and other writers (and, by extension, their publishers) may invoke fair use to quote, excerpt, or reproduce copyrighted works, subject to certain limitations:

Limitations

- The writer’s use of the work, whether in part or in whole, should be justified by the analytic objective, and the user should be prepared to articulate that justification.
- The writer’s analytic objective should predominate over that of merely representing the work or works used.
- The amount and kind of material used and (where images are concerned) the size and resolution of the published reproduction should not exceed that appropriate to the analytic objective.
- Justifications for use and the amount used should be considered especially carefully in connection with digital-format reproductions of born-digital works,
where there is a heightened risk that reproductions may function as substitutes for the originals.

- Reproductions of works should represent the original works as accurately as can be achieved under the circumstances.
- The writing should provide attribution of the original work as is customary in the field, to the extent possible.

TWO: TEACHING ABOUT ART

DESCRIPTION Teaching about art in studio and classroom settings, whether in academia or elsewhere, has historically been achieved using reproductions of artwork as illustrations. Today, technology has extended the classroom beyond four walls: teachers may show digital slides or video in classrooms, while also making such works that are related to their courses available to students online by means, for example, of course management platforms. Some institutions also offer their students art courses conducted entirely online. Although specific copyright exceptions are available for some teaching activities, teachers’ fulfillment of their mission often is frustrated by the narrow scope of those exceptions. Even where these exceptions may be adequate to cover face-to-face teaching or distance education in real time, they fail to cover many forms of pre- and post-class support that teachers wish to provide to students. In support of their teaching activities, teachers in the visual arts long have maintained collections of exemplary documentation for their own use and that of their students. Sometimes these are maintained in their personal files and sometimes in departmental or other institutional reference collections. Those who maintain such files generally agree that they would prefer to share them more broadly, with peers or related institutions, to create more powerful teaching resources.

PRINCIPLE Teachers in the visual arts may invoke fair use in using copyrighted works of various kinds to support formal instruction in a range of settings, as well as for uses that extend such teaching and for reference collections that support it, subject to certain limitations:

Limitations
- The works selected should further the teacher’s substantive pedagogical objectives.
- The teacher’s pedagogical objective should predominate over that of merely representing the work or works used.
- Student access to course management sites where such works are made available should be restricted to those enrolled in the course or otherwise designated by the teacher.
- Images made available to students should, to the extent possible, accurately represent the works they depict.
- If providing downloadable images online is justified by the teacher’s objectives, those images should be suitable in size for satisfactory full-screen projection or display on a personal computer or mobile device, but generally not larger.
When displayed, images should be accompanied by attribution of the original work as is customary in the field, to the extent possible.

Images and other items in a reference collection should be augmented with appropriate and reasonably available metadata.

Access to an institutional reference collection should be limited to persons affiliated with the institution and its partner institutions, such as students, faculty, and authorized researchers, subject to a requirement that items in the collection should be used only for legitimate purposes.

THREE: MAKING ART

DESCRIPTION For centuries, artists have incorporated the work of others as part of their creative practice. Today, many artists occasionally or routinely reference and incorporate artworks and other cultural productions in their own creations. Such quotation is part of the construction of new culture, which necessarily builds on existing culture. It often provides a new interpretation of existing works, and may (or may not) be deliberately confrontational. Increasingly, artists employ digital tools to incorporate existing (including digital) works into their own, making uses that range from pastiche and collage (remix), to the creation of new soundscapes and lightscapes. Sometimes this copying is of a kind that might infringe copyright, and sometimes not. But whatever the technique, and whatever may be used (from motifs or themes to specific images, text, or sounds), new art can be generated.

PRINCIPLE Artists may invoke fair use to incorporate copyrighted material into new artworks in any medium, subject to certain limitations:

Limitations

Artists should avoid uses of existing copyrighted material that do not generate new artistic meaning, being aware that a change of medium, without more, may not meet this standard.

The use of a preexisting work, whether in part or in whole, should be justified by the artistic objective, and artists who deliberately repurpose copyrighted works should be prepared to explain their rationales both for doing so and for the extent of their uses.

Artists should avoid suggesting that incorporated elements are original to them, unless that suggestion is integral to the meaning of the new work.

When copying another’s work, an artist should cite the source, whether in the new work or elsewhere (by means such as labeling or embedding), unless there is an articulable aesthetic basis for not doing so.

FOUR: MUSEUM USES

DESCRIPTION Museums regularly curate and organize temporary or permanent (i.e., long-term) exhibitions, which include works from their own, other institutional, and private collections. Exhibitions can generate new artistic and scholarly insights and attract and enhance the experience of museum visitors. Frequently, exhibitions
may enhance or confirm the reputations of the artists whose work is included. Museums also routinely prepare print and graphic materials associated with exhibitions, including wall panels that display text and reproductions of related images; make available brochures and educational guides; publish catalogues; and offer related lectures and other public programs. Many museums also offer various kinds of guides (including publicly accessible databases) that reproduce images for many or all of the works in their permanent collections. Increasingly, they are doing all these things using digital and other new technologies. For example, visitors may access electronic information about exhibitions and collections with their own or a museum-supplied portable device, which may be networked. Teachers and students may access exhibition- and collection-related educational or curricular materials (text, mixed media, and video) on the museum’s website and social media channels, or through third parties, including for-profit and nonprofit publishers. Physical exhibitions may be complemented by virtual counterparts or online enhancements so that remote visitors can virtually “walk through” the galleries, appreciate the curatorial narrative, and, if desired, focus their attention on particular works. Similarly, online documentation of collections (including collection catalogues and databases of images and metadata) can help to place individual artworks in a larger institutional or cultural context and provides some of the benefits of a physical visit to the museum, as well as providing access to material not currently on display. Such documentation also may prepare the members of the public to interact more fully with art when they visit the museum in person.

PRINCIPLE Museums and their staffs may invoke fair use in using copyrighted works, including images and text as well as time-based and born-digital material, in furtherance of their core missions, subject to certain limitations:

Limitations

■ When copyrighted works are used in connection with physical or virtual exhibitions, the use should be justified by the curatorial objective, and the user should be prepared to articulate that justification.

■ The amount of a work used in museum publications, the size and resolution of published reproductions, and the level of fidelity of those reproductions should be appropriate to the analytic or educational purpose.

■ Downloadable images made available online should be suitable in size for full-screen projection or display on a personal computer or mobile device, but generally not larger.

■ When image details and support for “close looking” are offered online through large or high-resolution images, downloading should not be facilitated unless a special justification is present.

■ Images provided to the public should be accompanied by attribution of the original work as is customary in the field, to the extent possible.

■ Images and other documentation of museum collections should be associated with all appropriate and reasonably available metadata.
Images and documentation of museum collections should honor institutional policies designed to protect noncopyright interests of third parties, including the privacy of individuals and the cultural sensitivities of communities.

**FIVE: ONLINE ACCESS TO RELATED COLLECTIONS IN MEMORY INSTITUTIONS**

**DESCRIPTION** Many institutions, including academic libraries, art schools, museums, archives, and study centers, maintain collections of art-related documentation, including the sketches and studies, manuscripts, financial records, personal photographs, and book collections of artists, collectors, dealers, and others. Unless subject to use restrictions, including those imposed by donation agreements, these memory institutions typically make such documentation available for study and personal copying by scholars and members of the public. Much of this valuable and often unique study material—some unpublished and some difficult to trace to rights holders—may be under copyright. Online access resulting from digitization of these collections greatly expands their utility for scholars, students, artists, and the public; it also contributes to the protection of the information they contain against theft, disaster, and decay.

**PRINCIPLE** Memory institutions and their staffs may invoke fair use to create digital preservation copies and to enable digital access to copyrighted materials in their collections and to make those collections available online, with appropriate search tools, subject to the following limitations:

**Limitations**

- Material made available online should be redacted to protect the privacy and other noncopyright interests of third parties, in accordance with prevailing professional standards.
- Visitors to the site should be informed that the materials they access are provided for their personal and/or scholarly use, and that they are responsible for obtaining any copyright permissions that may be required for their own further uses of that material.
- Institutions should prominently offer such users a point of contact for further information and correspondence and they should respond promptly to user complaints, corrections, and questions.
- When provided, downloadable images provided online should be suitable in size and resolution for full-screen projection or display on a personal computer or mobile device, but generally not larger.
- Materials made available should be accompanied by attribution as is customary in the field, to the extent possible.
- Items should be augmented with all appropriate and reasonably available metadata.
Appendix A: Fair Use Today*

Some background information about the fair use doctrine, seen in the context of copyright law and its objectives, may be helpful in thinking about how to use the Code. The goal of US copyright law is to promote the progress of knowledge and culture. Its best-known feature is protection of owners’ rights. But copying, quoting, recontextualizing, and reusing existing cultural material can be critically important to creating and spreading knowledge and culture.

That is why there is a social bargain at the heart of copyright law. That bargain is: Our society offers creators some exclusive rights in copyrighted works, to encourage them to produce culture. The compensation that creators receive from exploiting their copyrights is important as an incentive to this ultimate end; it is not an end in itself. Society also limits copyright in important ways, so that the primary intended beneficiary of copyright law—the public—can benefit from those works. Most basically, copyright lasts for a limited time, and then works enter the public domain, where they are free for use by all. Other limitations allow the use of works protected by copyright without permission or payment to the copyright owner. Without those uses, creative and scholarly activities would suffer, and the public would lose out on important new work that builds on the past.

As Section 107 of the Copyright Act of 1976 provides, “fair use of a copyright work... is not an infringement of copyright.”† Fair use is the most important limit on copyright monopoly rights. It has been part of US copyright law for more than 170 years. Where it applies, fair use is a right and not a mere privilege. Because copyright law describes fair use in general terms, the fair use doctrine can adjust to evolving circumstances, and the fact that it is asserted procedurally as an affirmative defense should not affect this characterization.

* Peter Jaszi wrote this section and is solely responsible for it.
† § 107. Limitations on exclusive rights: Fair use

Notwithstanding the provisions of sections 106 and 106A, the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright. In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include—
1. the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes;
2. the nature of the copyrighted work;
3. the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
4. the effect of the use upon the potential market for or value of the copyrighted work.

The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors.
As a comparison, for example, freedom of expression is a right that is also asserted as a defense in defamation cases. Rather than following a formula, lawyers and judges assess whether a particular use of copyrighted material is “fair” according to an “equitable rule of reason.” This means taking into account all facts and circumstances to decide if an unlicensed use of copyrighted material generates social or cultural benefits greater than the cost imposed on the copyright owner.

Judicial decisions on fair use can give practitioners strong positive guidance about how to apply the doctrine. In 1976, Congress inscribed the venerable judge-made rule into Section 107, codifying the familiar “four factors.” It also included a preamble, listing examples of uses that were eligible to be treated (as fair use. Notably, some of these (like “criticism, comment, . . . teaching, scholarship, [and] research”) are core activities of many visual arts professionals. There then ensued a decade of generally cautious and even conservative court opinions, calling into question the real utility of the doctrine for those who make and comment on culture.

Since the early 1990s, however, the case law has taken a dramatic turn. By 2002, when the US Supreme Court affirmed the strong connection between fair use and First Amendment freedom of expression in Eldred v. Ashcroft, 537 U.S. 186 (2003), the doctrinal landscape already had changed dramatically. In the intervening time, the courts had indicated that a generally critical consideration in evaluating the fair use factors is whether the use can be considered “transformative”—whether it “adds something new, with a further purpose or different character,” as the Supreme Court put it in Campbell v. Acuff-Rose Music, 510 U.S. 569 (1994).

Since then, cases have reinforced the notion that for a use to be considered “transformative,” it need not—as, in fact, it usually does not—entail a literal modification or revision of the original material. Instead, it is crucial that it has put that material in a new context where it performs a new function. Thus, the reproduction of an image to illustrate the argument of a scholarly article could qualify, just as could the use of copyrighted material in new art.

Where a use is transformative, the first statutory factor (looking to “purpose and character”) will weigh strongly in favor of fair use even if the new use is “commercial” in character. The second factor (which implicates the nature of the work used) tends to favor transformative uses as well. This factor functions to provide certain imaginative works extra protection from unfair exploitation; however, this concern loses much of its force when they are used for new purposes. Moreover, where the third factor is concerned, courts will measure the appropriateness of the amount of copyrighted material used against the transformative purpose of

Note that although the factors are often viewed as representing the four corners of fair use analysis, the list is made explicitly nonexclusive; thus, courts can and (from time to time) do take other considerations into account, including the “public interest,” in allowing the use under consideration to go forward. This may be of particular relevance to educational users and those associated with memory institutions, who can marshal strong arguments about the social utility of their activities.
that use; where visual imagery is concerned, use of an entire work often will qualify, as in \textit{Nunez v. Caribbean Int'l News Corp.}, 235 F.3d 18 (1st Cir. 2000).

And crucially, a transformative use is likely to weigh in favor of fair use under the fourth factor (directed toward the market harm suffered by the copyright holder), because (as increasing numbers of courts have recognized) copyright owners are not entitled to control the “transformative markets” for their works, as exemplified by \textit{Bill Graham Archives v. Dorling Kindersley Ltd.}, 448 F.3d 605 (2d Cir. 2006), which involved graphic art reproduced to illustrate a historical narrative. The unlicensed use of reference images (so-called “thumbnails”) in internet search engines has been found to be fair on this basis, an example being \textit{Perfect 10, Inc. v. Amazon.com, Inc.}, 508 F.3d 1146 (9th Cir. 2007). But, conversely, the transformativeness test also safeguards rights holders from the invasion of commercially significant markets or potential markets that they are entitled to exploit. When a use merely substitutes for an authorized use in a copyright owner’s core market, for example, the photographic image of a statue chosen and used for its visual appeal on a postage stamp in \textit{Gaylord v. United States}, 595 F.3d 1364 (Fed. Cir. 2010), it is less likely to be considered fair.

Where a use is deemed nontransformative, the market-harm test of factor four is likely to play a more important role in the analysis. Thus, for example, a textbook author’s failure to license summaries of various artists’ careers adopted from a proprietary website could weigh against a fair use finding. Alternatively, the reproduction of an “orphan” work that is not being actively exploited might be deemed fair on the same grounds.

As might be expected, these developments in the case law have been questioned by some, who have criticized the transformativeness test as too subjective in its application, too harsh (where the interests of copyright owners are concerned) in effect, and somehow inconsistent with the fact that copyright owners are granted an “exclusive right” to “prepare derivative works” under Section 106(2) of the Copyright Act. Only time may tell how well justified some of these objections are. But, as to the last, it is worth noting that all the exclusive rights granted in Section 106 are qualified. It is not clear why the derivative work right should be any less subject to fair use than, for example, the rights of “reproduction,” “distribution,” or “performance.”

Certainly, controversy remains about how fair use should apply to so-called appropriation art, the case law concerning which was discussed at some length in the Issues Report that helped frame the issues addressed in this Code. The particular application of the transformativeness test in \textit{Cariou v. Prince}, 714 F.3d 694 (2d Cir. 2013), involving new works created by defendant’s overpainting of photographs taken from plaintiff’s book, continues to attract critics as well as defenders. This Code offers a balanced approach to invoking fair use in this area of visual arts practice, as in others.

In general, there has never been as strong a general judicial consensus about the nature of the fair use doctrine as the one that exists today. In making fair use decisions about issues such as those that confront the visual arts community, judges
today generally focus, in effect, on two key analytic questions:

- Did the use “transform” the copyrighted material by using it for a purpose significantly different from that of the original, or did it do no more than provide consumers with a “substitute” for the original?
- Was the material taken appropriate in kind and amount, considering the nature of both the copyrighted work and the use?

These two questions effectively collapse the four factors. The first question contains the first two factors—the purpose of the use and nature of the work used. Thus, for example, the unpublished nature of a work could weigh against fair use if a deceased artist’s copyrighted private letters were being used for gratuitous and sensational effect, but it should have little bearing if the use were for an academic (and thus transformative) purpose. The second question rephrases the third factor, which looks to the quantity and quality of the material used. Both of the key questions touch on the fourth factor, focusing on economic harm the use will cause to the owner’s relevant market. This is because courts have made it clear that substitutional harm is what matters in applying factor four. Thus, if Artist B’s “parodies” of Artist A’s works actually supplant purchases of Artist A’s works, that might result in such harm, but if Artist A’s work, as a result, loses popularity or marketability, that would not.

In other words, if the answer to these two questions is clearly in the affirmative, a court is likely to find a use fair, even if the work is used in its entirety. Where that is the case, a rights holder also might conclude that it ought not to challenge the use.

Court decisions also show that it can be helpful to the fair use argument for the user to explain the new function, purpose, or context of the use. The case law further suggests that the more coherent an account the user can give of how and why it was appropriate to employ the copyrighted work, the easier it is for judges to understand if and whether and why the use would be considered transformative.

The flexibility of fair use can lead users to wish for clearer rules or brighter lines. But the flexibility of fair use is its strength. Courts have emphasized that fair use analysis is fact- and situation-specific. In most cases, however, it is also quite predictable. Moreover, it can be made more so. Even without case law specifically addressing a use, judges and lawyers consider expectations and practice—whether the user acted reasonably and in good faith in light of standards of accepted practice in a particular field. One way of creating better understanding of what fair use permits is, therefore, to document the considered attitudes and best practices of a professional community.

Finally, it is worth noting that legal experts disagree on how much a user’s show of good faith adds to a claim of fair use—although, of course, it cannot hurt. Nevertheless, the members of the visual arts community who met to devise the consensus reflected in the Code believed in its importance. Thus, the Code reflects some widely and strongly held community values not tied to language of the Copyright Act, in particular the importance of attribution, and of safeguarding noncopyright interests such as privacy and cultural sensitivities (including those of indigenous communities).
Appendix B: How The Code Was Created

In five cities—New York, Washington, DC, Dallas, Chicago, and Los Angeles—two groups, each of ten to fourteen visual arts professionals, met with facilitators Aufderheide and Jaszi for four-hour, closed, deliberative discussions. Each group brought together practitioners from across the spectrum of the visual arts, including artists, scholars, museum professionals, editors, and others. They were asked to speak as individuals rather than as representatives of particular organizations. To encourage open discussion, participants’ anonymity and the confidentiality of their individual views were guaranteed.

In each session, participants considered issues drawn from the situations described in the Issues Report. Participants discussed their reasons for using third-party materials in such situations and, in light of their missions, they explored the limits of those rationales. Each group considered areas of consensus identified in previous groups’ discussions as well as points that had not been clarified fully in those earlier discussions.

The facilitators summarized, in a draft code, the areas of consensus identified in the discussion groups. The other principal investigators, the project advisors, CAA’s Task Force on Fair Use, its Committee on Intellectual Property, and its Professional Practices Committee reviewed and provided comments on that draft. After a further revision by the facilitators, the draft Code was presented to a Legal Advisory Committee of five experts in copyright law and fair use. That committee was charged with ensuring that the Code’s articulation of principles and limitations fell within the bounds of reason and was generally consonant with fair use doctrine. The Code was then revised in light of the committee’s comments. With the exception of Appendix A, no part of this document represents the individual views of any contributor. The final version of this document, including the Code, was presented to the Board of Directors of the College Art Association, which approved it on January 12, 2015.
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Note to Readers: This *Code of Best Practices* is available online at the College Art Association website: www.collegeart.org/fair-use. In conjunction with the publication, CAA’s website also includes Frequently Asked Questions and other materials that facilitate the use of the Code. The Code and related materials are also available online on the websites of American University’s Center for Media and Social Impact (www.cmsimpact.org/fair-use) and the Washington College of Law’s Program on Information Justice and Intellectual Property (www.wcl.american.edu/pijip/go/fair-use).

Funded by the Andrew W. Mellon Foundation. Additional support provided by the Samuel H. Kress Foundation.
Storyboarding research: How to proactively plan projects, reports and articles from the outset.

A storyboard is just a comprehensive set of rough sketches on paper to help keep a project ticking along to completion. Patrick Dunleavy is a firm supporter of this approach for research projects. The storyboard is what you build as soon as you know you have the grant award or the contract is in the bag, and the precise resources that entails. Prototyping in this way creates on an easy-to-make simulacrum of a final product at a very early stage in its production. Anyone handling long-term, expensive or complex research projects can gain a lot from using a storyboarding approach.

Almost everyone doing research makes a plan before getting started – because we all know that research is time consuming, often expensive and hard to predict. Nowadays too this is often accompanied by some simple project management stuff—usually a Gant chart with tasks sketched in. If it’s a one person project this just parcels our blocks of weeks to topics; but in a group project it allocates both time blocks and people or sub-teams to different tasks. Critical deadlines for deliverables are included here.

These plans always include some unrealistically short time for ‘writing up’ after ‘doing the research’ is complete. But what that actually means in terms of how a report or article will be organized is often sketched out only in very formal or conventional terms. (You know, the kind of completely useless ‘structure’ that goes: Introduction, then Definitions, Literature Review, Methods, Data, Data Problems, Analysis, Conclusion). The key thing here is that you read the plan and are no wiser at all about what the report or article will actually say. In group or team projects there’s often a lot of rather abstract negotiation(sometimes fierce argument) about the plan and project schedule, plus the allocation of tasks. The amount of final text space to be given to each person’s aspect of the work is especially tussled over.

Then the researcher (or everyone in the team) gets to work … and the plan usually crumbles on first contact with research realities. What was envisaged proves more difficult or time-consuming, or yields only ‘obvious’ results, or things apparently dis-confirming the main initial hypotheses. Previous literature supposed to be there proves elusive or useless. Experiments misfire and have to be redesigned. Archives are hard to reach and take more time to understand than planned. Interviewees don’t respond to requests to talk, and survey forms are unreturned. Statistics or data prove much resistant to analysis than expected.

Meanwhile the plan is not revised, but instead just atrophies. At meetings in team projects the leaders struggle to keep some progress going and everyone busy and committed, but some team members get overloaded and others are under-occupied. Usually the plan is too fixed and high-level to be easily redone, except with ad hoc fixes in periodic meetings. In teams each member or sub-group often focuses down on what they’re doing, losing the bigger picture and trying to just deliver what they promised, with meetings just hurdles to weather not a pooling of minds or information. In individual projects the overall picture of the report or article or chapter gets fuzzed, with the researcher plugging on, now with much less of a plot. Through it all the project burns time and money, but gets less defined until…

…the end of the year, or some other fixed deadline looms, or the client for paid projects demands an update prior to the final deliverables. Cue a mad rush to get ‘writing up’ done. The formal headings of six months or a year ago are dug out, and some harsh realities are faced with hand deletions of sections that now are not viable. Chunks of text that could have been written months ago (but were n’t) are finally committed to screen or paper. The researcher or the team now burns the midnight oil in a frenzy, rush-producing results and findings, hustling statistics and Stata
outputs (correct to 7 decimal points) into giant, disorganized tables. Much that should be better done is not. Individual authors just don’t have the time to improve the writing. And in teams, members are mostly too exhausted or time-poor to comment on (let alone fight over) other folks’ weak sections—unless some control freak (willing to work all hours) seizes the moment to re-architect the text in a more coherent way despite the arguments that this generates.

I hope this picture is familiar, not because I wish bad things for you, but because I don’t want my own multiple experiences of my own and other people’s weak and fragile project planning to be too exceptional. And because storyboarding research can help.

**What is storyboarding and why does it work?**

‘A film storyboard’, according to [Wikipedia](https://en.wikipedia.org), ‘is essentially a large comic of the film or some section of the film produced beforehand to help film directors, cinematographers and television commercial advertising clients visualize the scenes and find potential problems before they occur. Besides this storyboards also help estimate the cost of the overall production and saves time. Often storyboards include arrows or instructions that indicate movement’.

![Storyboard images](https://via.placeholder.com/150)

**Image credit: Rodrigo Ferrusca (Wikimedia, Creative Commons Attribution-Share Alike 3.0)**

If you’re planning a video, a TV commercial, a film, or even a theatre production, you know will be a long or costly project. And it will inherently entail a concentrated creative effort, during which initial plans are likely to chop and change, a lot. So a storyboard is usefully because it is literally just a comprehensive set of rough sketches on paper. It takes us—scene by scene, or even shot by shot – through what this version of the plan (of multiple versions) says will happen. Often storyboards include key image ideas, scenery or landscape concepts, or set design ideas, as well as bits of dialogue for critical ‘turning points’ in the plot, or partial dialogue cores for scenes. These then get fleshed out, perhaps leading through a stage where there are dozens of plot index cards, as shown in the header photo for this article. (This shows Oscar-winning screen writer Dustin Lance Black, hard at work on a movie screenplay, being built up from many index cards. He brilliantly explains his practice here).

Storyboarding works because

(i) It helps envision, or picture in miniature, and long in advance, a finished product, allowing all those in a project
involved to begin mentally run, rerun and debug each scene or angle.

(ii) Storyboarding is a kind of low-cost prototyping, a way of making more concrete what will happen. It seeks to generate key reactions and ideas to a very expensive product before a mass of scarce resources and money are expended on building the vision at full scale.

(iii) Because concepts are fleshed out and made concrete in an accessible way, a storyboard can help generate resources and commitment from external sources. In movies raising finance from investors, or in advertising securing agreement from clients, are key stages before the full project can go ahead.

(iv) Looking ahead in this way can also help a lot in realistically costing what it will take to implement ideas in time and money terms.

(v) A storyboard helps creatively develop difficult materials, in enterprises where fine details and the exact form of implementation of ideas are key. In some contexts (like adverts or music videos) the storyboard may be the only ‘shooting script’ that exists before production. In longer films it often metamorphoses into a contingent screenplay, that is itself often revised.

(v) The storyboard (and later the screenplay) generate a detailed, common vision that can be shared early on by many different actors in complex production teams—writers, directors, actors, camera people, multiple designers and technicians. From an early stage a storyboards gets everyone on the same page, in a ‘blow by blow’ way that is easily updated and reformulated. So long as it expands and adapts, it can also help keep them there as the project constantly evolves.

Why storyboarding also helps in doing research

Completing a research project, or doing a PhD, may seem a long way away from creative film- or video-making? So why should a method from such a remote line of activity be useful to scholars, scientists and academics?

In fact prototyping research is just as valuable in research contexts, as it is in a wide range of business and science contexts. ‘Prototyping’ is building any kind of cheap and easy-to-make simulacrum of a final product at a very early stage in its production, especially the stage of deciding what to try to produce. Protoyping can extend to building something a bit fancier, a ‘minimum viable product’ in business-speak, that can do some of the key functions of the intended final product. Prototyping saves time and money being spent on things that won’t work; or that won’t be acceptable in the form envisaged; or that have flaw or problems that only become manifest when we try to make them even a bit more concrete. Prototypes often fail, but mostly in a particular kind of way, one where ideas are ‘pivoted’—significantly modified or re-orientated in what the product is trying to do, rather than abandoned altogether.

Scientific and academic researchers often neglect to create prototypes. The ethos of ‘research’ tends to assume that we don’t know what the answers are at the start, and so should avoid preconceptions. The feeling often in that (in some obscure way) it would be biasing to try and look forward to possible answers or outcomes from research before it gets done. The temptation then is to get your head down, get on with assembling materials to ‘test’ the research ‘hypotheses’ and see what happens—not ‘waste time speculating’ about what the ‘findings’ may turn out to be.

This “Don’t look ahead” stance is perhaps especially common amongst new researchers (PhDers especially, because they have a fixed task to complete in a fixed three or four years). But it also occurs amongst experienced researchers working alone, who are perhaps least likely to articulate in advance what they hope to find. One reason why academics who co-author with other people have more citations may well be that having to talk about the research and allocate tasks produces more looking ahead and prototyping. Not doing prototypes, and just getting stuck into a research grind, can also be a syndrome in teams with a very well-known or protracted timetable to complete a research grant or a consultancy brief for a client.
Visualizing your final product is also invaluable in research contexts, and again storyboarding directly helps here. The benefits for scientists and academics include:

- **Triggering a cumulation of ideas** early enough to help shape the research process, rather than these being just unanswered questions left dangling in the ‘writing up’. One paragraph tends to suggest another, perhaps a possible counter-argument, and that in turn may suggest a rebuttal argument. None of this is obvious before the first paragraph gets written. Similarly, looking hard at a completed chart or table almost always reveals patterns (or possible interpretations) highlighting a need for another chart or table.

- **Facing up to inconsistencies.** We all have a strong natural capability to maintain contradictory ideas or arguments in our private thinking, or even in oral expositions and conversations. Writing out arguments, or otherwise visualizing outputs or deliverables in concrete ways, helps counteract maintaining inconsistent commitments and arguments. Committing ideas to screen or to paper forces you to face up to weaknesses, refine arguments to avoid problems, or fashion counter-responses or potential solutions for things that seem to clash.

- **Avoiding procrastination** by encouraging researchers to complete known requirements as soon as they feasibly can. If you can foresee that it will take two paragraphs to explain Concept A; or a sub-section must explain Method X; or that a data table will be needed on aspect G—well, why not get that written/done now, instead of in a mad rush at the end, or up against a deadline?

- **Focusing on a research narrative,** early on. Although a storyboard must includes critical, substantive details, it also focuses on getting across overall messages in an accessible way. For a research project, article or PhD chapter a storyboard directs your attention relentlessly to the value-added of the research, the key findings and conclusions, the ‘bottom line’ argument.

- **Filling the otherwise large gap between initial plans and producing a first draft of the report, article or chapter.** Storyboarding is about envisioning research. It asks: ‘If everything went as well as it could (given initial expectations), what would I find out or end up arguing?’ Or: ‘What if things went “badly”- in the sense of diverging a lot from initial expectations? or showing that I do not really understand what was going on? or that things are just more complex than I thought? What then would the argument be?’ ‘Are there any intermediate outputs, findings or results that I can bank for sure? Or anything that can offer me some “insurance” benefit, something to “lay off” against the largest risks of things going awry?’

**How storyboarding tackles the mid-stages of text production**

Between the plan and the first draft falls the storyboard. Plans are gnomic and often vague, no more than a set of skeletal stages to be filled in only later. A storyboard by contrast focuses on fulfillment, on anticipating and ‘getting on the board’ now all that can already be anticipated. It follows the (Theodore) Roosevelt doctrine of ‘Do what you can, where you are with what you have’. A plan is what you promise when you’re applying for a grant or bidding for a research contract. The storyboard is what you build as soon as you know you have the grant award or the contract is in the bag, and the precise resources that entails.

A plan is also a static thing, mechanical, inorganic and hence tending to go out of date. Sometimes teams believe that simply articulating the plan in great detail, defining a complex architecture – with formal heading pyramided using organizer software, especially with multiply numbered sections (like 2.1.1.a)—will be enough to keep a plan relevant. But such plans just fall sooner and in multiple detailed ways. Click on any element in a plan and there is normally nothing behind it. By contrast a storyboard is organic and dynamic. As soon as a component can be sketched in, it is included. And as and when the sketch can be filled out, then an image or summary of the completed component sits in its place in the evolving overall structure. Click on any element in a storyboard and there will be something lying behind it, depending on the stage of development of that component of the report or article.

There are two key levels of storyboarding—early and full. An *early research storyboard* is the equivalent of the initial
cartoon version of a TV advert or video. It is very short, but still narrative- or sequence-orientated; still aiming to envision the finished research project in concrete, substantive message terms. Gradually it should fill out and transform towards the second stage.

A full research storyboard expands to hold an image or some mini version of all the components of the final text. What this especially means is that the storyboard shows

- all of the headings and sub-headings that will structure the analysis, given in full;
- at least quick verbal sketches of every main text section
- or perhaps later on, summaries of every main paragraph or groups of paragraphs;
- images of all long quotations; and
- versions of every Figure, chart, table or case study boxes planned. At the beginning these might just be made up sketch graphs instead of charts, or simple pictures of a planned diagram, or a set of empty boxes that is the same size as a planned table. With time these components get fleshed-out (e.g. using interim data in tables, or just quickly drawn charts). Late on they will be clickable images of the now finished exhibits.

All these elements need to be organized into the same sequence that they will be in in the finished text. And they must be easily moveable, so that authors can experiment and see what would happen if the sequence was rearranged, or if an element or two were just left out or marginalized to an Annex.

Add these two stages into normal academic and scientific procedures and you get a six stage, active planning process that does not have the major implementation gaps of conventional approaches:

Stage 1 Research Plan. This includes the tendering phase in a consultancy research project or the writing and submission stage in a research grant application.

Stage 2 Early storyboard. With the feasible timelines and available resources now well-defined, how exactly can the promises of the plan be delivered? What substantively will be done and what messages given in each part of the main text deliverable – the research report, or an article or chapter? What is not yet known, must be anticipated or guessed at or visualized as far as feasible. In cases of uncertainty consider possible scenarios.

Stage 3: Full storyboard. This is a long-lasting phase, operating throughout the main research process. The structure is actively reviewed in the light of interim findings and results so far. Any components that can be realized immediately are put in place in miniature, as clickable images (so that the storyboard remains readable), but in advanced, even final form so that details can be easily reviewed.

Stage 4: Rapid first draft. This is a joined up write-up of the expanded storyboard, done quickly in ‘blitzkrieg’ (go around any obstacles) mode. The aim is to get the core arguments down, without worrying too much about their coherence, let alone missing references or tables and charts that are not there yet. Include the right amount of space for any missing component, and its indicative storyboard image, but the go round it in developing the overall argument. Generally this version of the text will be kept private, because it still has necessary components missing and gaps being filled in. But it can be shown to supervisors (with PhDs or dissertations), and in consultancy it might be shared with clients too (following a ‘no surprises’ policy). Getting such core feedback as early as possible makes a really rapid first draft useful, because you still have time to react, to pivot the argument a bit, and to do infill research areas where gaps are spotted.

Stage 5: Full text draft. Here all the gaps are gone and readers get a view of the report or article without annoying glitches and omissions. All the ‘i’s are dotted, the ‘t’s are crossed, the text references and bibliography match, and all the exhibits and arguments are present in final or very-near-final form. Above all this is the moment when the researcher or the research team finally gets to see the report or article as a whole. This text can be sent for wider commenting and reactions. And the authors can stand back from the text, and try to get enough critical distance to
spot flaws and weak points—never easy when you are close to a just-written text. Hopefully, with storyboarding, you can reach this stage a lot earlier and less stressfully.

Stage 6: *Edit and revise to get a final text.* Most writing is improved by making a 10 per cent cut. And both ‘paragraph re-planning’ and less drastic forms of editing (like the ‘build, blur, corrode’ test) can add a lot of value—especially if they are not being done in a rush, and most key issues have been solved already.

**Storyboarding on PC or paper**

How you do storyboarding, what system or mechanism you use, could vary a good deal. In general, storyboarding should be

- visual, letting you overview argument structures and sequences quickly
- easy to add new components to
- flexible so you can move stuff around and try out different sequences
- expandable, so that you can add in paragraphs, charts, tables, text boxes, photos, and whatever else you need
- operating at two levels, one the overview mode with miniaturized elements that are still viewable; and the other the full slide mode that lets you click through to inspect any element in detail.
- ideally the system should not entail any extra entry of headings, text or exhibits. You should be able to easily copy across what you need from the system you use for drafting full text.

Because I do most of my writing on PC (bar the earliest ideas-planning stage and the final text edit) the system I use a lot, and recommend to others because it is so widely available is Powerpoint. Whatever its drawbacks as a presentation system, the slide sorter view in Powerpoint is just great for storyboarding. Every component—headings, text paragraphs, charts, tables—goes onto a slide of its own. It’s often best to copy stuff onto slides in picture formats that can be easily re-sized – certainly always put in images of charts, tables and diagrams this way. You can control the size of the slide miniatures in the slide sort mode, balancing the number of components in view at once, against how much of that component is readable. Moving things around is easy to do and very visual in the slide sorter, and it’s easy to keep an eye on the narrative thrust. As you go from a slim early storyboard to a fuller version it may help to print out the slide sort view, and spread out large printouts on a big dining table or pinboard to see the picture as a whole.

For research teams, using Powerpoint also makes ‘version control’ easier—because almost everyone already has the software, or a close Apple or Google substitute. And storyboarding on PC means that files are easily shareable via Dropbox or Google Drive. Everyone making changes or additions needs to initial and renumber the title so as to save a uniquely named version. For team meetings book a committee room with a big TV display or a PC projector. Then the whole team can gather round each screen, perhaps using the giant Post It notes (the kind that stick on any nearby wall) to scribble down changes or new ideas that can also be kept visible to everyone.

Of course, re-purposing Powerpoint in this way has some limitations, chiefly the relentless linearity of its approach. This is the feature that other presentation systems (like Prezzie) make such a big thing of avoiding. Yet remember that in the end most reports, articles and chapters will have to be read and reviewed linearly. So Powerpoint’s linear approach may actually be better for this than Prezzie’s recursive meanderings. There are also specialist PC programs dedicated to the idea-generating, ideas organizing and storyboarding task, and some seem well liked by their users. For instance, the simplified, author-orientated wordprocessor Scrivenor has a ‘corkboard’ mode that tries to help you through the planning-to-drafting stage by replicating many features of a physical corkboard. Perhaps anyone better informed than me could email me with suggestions and reviews of alternative systems.

The big alternative to storyboarding is using paper and physical systems. You need corkboards (like TV detectives
use) or magnetic boards on the walls here; or a big table to spread out and rearrange components on. And you can write ideas out in different ways. Post-It notes now come in different sizes and shapes, and some are arrowed to help convey direction easily. Or you can just pin sheets of paper up or use magnetic markers to hold them in place on whiteboards. The main alternative is to arrange index cards. This approach is perhaps the most expandable version, especially if you have many repeating or similar elements, and a standard format for covering key aspects.

Standing up to look at elements on walls or tables, and physically move them around, is probably good for your health. (It combats what Neal Stephenson calls the ‘arsenestos’ threat that plagues deskbound writers, academics and scientists). It may also help create the distance from your ideas that you need to think through potential criticisms or alternative approaches. Standing up in teams might also help energize thinking.

Who should use storyboarding most of all?

Anyone handling long-term, expensive or complex research projects can gain a lot from using a storyboarding approach. Especially if you’ve experienced past problems of ‘writing up’ getting too end-loaded, too rushed and compressed up close-to-deadlines, why not give this approach a try? Everyone will need to evolve their own practice, that fits the kinds of writing and research they do, the types of materials they handle, and the things that are already going well or poorly.

Three types of researchers can benefit disproportionately from adopting the two-stage (early and full) storyboarding approach set out here:

- **Large research teams.** In academic life that’s any three or more people working on the same project, but it could mean teams of ten to twenty at the upper limit. Just as with feature films, a live storyboard that is never allowed to go out of date, greatly helps keep everyone on the same page. Its presence always shortens meetings, since team members can review progress in other sections for themselves – and thus ask better questions and sustain more interactive discussions, rather than listening to a whole set of ‘briefings’ for most of meetings. A storyboard also helps pool ideas, letting someone working on topic A see possible synergies or connections with what colleagues are doing or finding in another area G. A storyboard also helps head off the ‘hiding’ of non-working results, or people ‘shirking’ in an easily reserchable areas while colleagues facing harder going feel more and more stressed.

- **PhDers and other students doing graduate dissertations** can also get more out of storyboarding. It gets them more easily into the developmental rhythms needed for sustained academic work. Storyboarding creates more materials to share with supervisors. And it helps overcome the naive (‘first do the research, then just “write up” in three months’) attitude that PhDers often have. By forcing people to write up more as they go along, storyboarding builds greater realism about the writing and creative process. And it gets people practicing writing (or finishing tables and charts) much earlier on. It can also link easily to the regular annual reporting of progress that PhDers and dissertation writers are normally required to do. It gives supervisors both a continuously up-to-date overview of the dissertation macro-structure, and a context within which to set the chunks of work being submitted to show annual progress.
Graduate students doing group projects can particularly gain from the approach. Compulsory projects are increasingly common requirement in business and public policy schools, especially in elite universities and post-experience courses like MBAs and MPAs. Here group working over long time periods (e.g. 5 months for the MPA’s ‘capstone’ project at LSE) is a core element of the degree. If you are supervising any similar groups, or taking part in one, storyboarding helps a lot in keeping efforts directed to a common goal. Such student groups don’t have any formal hierarchic leadership, and hence are vulnerable to twin threats of some degree of free-riding by some members and over-committment/over-dominance by others. At the same time these projects are normally being completed for real-life clients, for whom a storyboard is a useful way of being updated. Initially the student group should evolve a very rudimentary storyboard to take forward the TOR (Terms of Reference) document with the client in an initial meeting. In the middle of the project a full storyboard using interim results and conclusions can be a key document for a productive ‘course correction’ meeting. It lets one or two client personnel react to emerging findings and lines of argument, and give feedback on whether or not it meets their needs. This usually firms up how the final drafting takes place, and suggests ways of proceeding to the final presentation and report to a full client audience.

I sincerely thank Esther Bunny for her really helpful responses to an earlier Twitter request for people to tell me how they use storyboarding. I’d be very grateful if anyone else with relevant or experiences or suggestions to share could email me, especially from research fields I may know little about. To follow up related writing ideas in more detail see my book: Patrick Dunleavy, ‘Authoring a PhD’ (Palgrave, 2003) or the Kindle edition, where Chapter 5 covers ‘Writing clearly’ and Chapter 6 ‘Developing as a Writer’.

This piece originally appeared on the Writing for Research blog and is reposted with permission.

Note: This article gives the views of the authors, and not the position of the Impact of Social Science blog, nor of the London School of Economics. Please review our Comments Policy if you have any concerns on posting a comment below.

About the Author

Patrick Dunleavy is Professor of Political Science at the LSE and is Chair of the LSE Public Policy Group. He is well known for his book Authoring a PhD: How to plan, draft, write and finish a doctoral dissertation or thesis (Palgrave Macmillan, 2003).

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Sustainability Implementation Toolkit
Developing an Institutional Strategy for Supporting Digital Humanities Resources

Published June 18, 2014
Nancy L. Maron, Sarah Pickle

What do the digital humanities look like on your campus? What types of projects are your faculty undertaking? Which will require longer-term support, and where will that support come from? What roles do your service units, centers, and digital labs play in the various life-cycle stages, and is this clear to faculty? This toolkit will help administrators create a coherent institutional strategy for supporting digital humanities activities and the valuable outputs that they generate.

To get started, click on the three steps below. Step 1 will help you evaluate who on your campus is creating digital projects, the problems they are facing, and where they are finding help now. Step 2 offers a framework to analyze where there are overlaps and gaps in the services offered by various units on campus, for all stages of the digital project lifecycle. Step 3 provides tools to facilitate meetings with key stakeholders to develop plans to support faculty and their digital research projects in a way that is in line with campus mission and priorities.

The toolkit will help you:
- Understand all of the stages in the digital lifecycle of a project, from project planning to preservation and outreach.
- Assess the range of project types and complexity, so that your solution can include both scale solutions and customized support where it is needed.
- Clearly communicate the paths of support to campus faculty.
- Articulate institutional expectations for project leaders.
- Obtain the commitment of key stakeholders.

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The Humanist in the Computer:
Digital Humanities and Social Justice
Short Description:
What can digital technologies do to our words? What can they do for our words, as activism? In this course, we will use computers to create, share, and analyze different kinds of digital texts in order to discover together—through, reading, writing, and entry-level programming—how our use of these technologies changes our relationship to language and politics. Desires to think, experiment, and collaborate are required; programming experience is not.

Introduction and Course Rationale

Since the 1940s, humanists have been studying the advantages and constraints of using computing technologies for communication. Roberto Busa, one of the first people to undertake this kind of work, writes, “humanities computing is precisely the automation of every possible analysis of human expression (therefore, it is exquisitely a ‘humanistic’ activity), in the widest sense of the word, from music to the theater, from design and painting to phonetics, but whose nucleus remains the discourse of written texts.”[1] In this course, we will use computers to create, share, and analyze different kinds of digital texts in order to discover how these technologies alter our understanding of language and literature.

Scholars have dubbed this new field of inquiry the Digital Humanities (DH), and it comprises a growing and changing set of theories of and practices for teaching, learning, and performing humanities work with digital tools and resources. Conversely, DH also encompasses analysis of the use of technologies to do humanist work—that is, the work of understanding what it means to be human. This course will provide an introduction to many aspects of DH work. We will investigate what computers enable us to do differently, and sometimes better, with text when we read, write, analyze, visualize, play, edit, create, experiment with, archive, annotate, publish, perform, and share our machine-readable work. For example, we will discover what new kinds of questions we can answer when a computer turns pages of novels or poetry into data. We will experience how we write differently when we create and publish our own texts and podcasts online according to best practices for digital publishing and archiving. We will also consider the digital and literary properties of new kinds of texts and stories that computing has given rise to, such as video games and interactive fiction. And, on the flip side, we will think about what traditional modes of humanist inquiry teach us about our use of technologies—both digital and analog.
But that’s not all, and it’s also not enough. This course is organized as a survey of different methodological approaches to the Digital Humanities as a way to analyze texts. What will make these methods especially meaningful (and not just a group of methods) is that we will interrogate how they can be used to promote equality and social justice. Digital technologies, when paired with humanist enquiry, can help citizens organize, work together, produce works of cultural critique, reach new audiences, and effect social change. They have the potential to disrupt traditional modes of knowledge acquisition and distribution that favor privileged majorities. At the same time, digital technologies also offer platforms for those in power to control media outlets that reach large audiences.

In the course title, I emphasize the “humanist in the computer” in order to critique technological determinism, or, the idea that technologies shape the social. Rather, we will insist that people craft hardware, software, and virtual networks—with varying degrees of success—and it is human employment of digital tools that makes things happen with computing. In each class, and for each topic, we will study examples of digital activism that accord with the DH methodology we are studying. Search the preliminary course schedule for “digital activism” for examples.

Are you ready to collaborate? We will lean on one another in order to answer questions, solve problems, and make things happen. This is one of the things I love most about DH as a field and as a practice. This discipline turns the image of the solitary genius typing alone into a networked lab or workshop—sometimes even an intellectual party. With every new tool or program, we will learn how to use it together and share these skills with our classmates. We will also generate a lot of error messages together, fail to make things work properly, and help each other troubleshoot. Each topic we cover will feature an invited guest speaker to model the practice of gathering knowledge from our wider community of experts. Similarly, our coursework will ask you to gather and share knowledge with your classmates. While some of our assignments will be completed individually for a grade, others will be collaborative. It follows that participation online and in the classroom constitutes a significant percentage of your final course grade.

Required Texts: All readings will be provided electronically on our course website or Canvas.

Required Skills: No programming knowledge/experience required. Willingness to experiment, laugh, learn how to troubleshoot, and work together to solve problems is mandatory.

Learning Objectives:

- Understand, employ, and analyze basic concepts, methodologies, and tools of the Digital Humanities
- To explore and evaluate a diverse corpus of DH projects that address social justice issues
- Participate in, with guidance, and reflect critically on public DH scholarship related to social justice

Assignments/Grading

Practicums: 25%
Midterm Essay: 20%
Final Project: 25%
Participation – in class: 15%
Participation – on-line: 15%
Total: 100%

Major Assignments

1. **Daily Blogs**: Each person in our class will join HASTAC (hastac.org, Humanities, Arts, Sciences, and Technology Alliance and Collaboratory) as part of our class group that I administer. HASTAC is a community of over 14,000 individuals and institutions dedicated to advancing digital scholarship and learning. Our blog posts will respond to the texts, projects, or videos assigned to prepare for each class, due by midnight the night before class. Each blog post will have an optional prompt to help you get started writing. Posts should be at least 300 words long, include at least one link, and include one embedded image, video, or sound byte.

2. **Practicums**: There will be a Practicum due each Tuesday by classtime. I borrowed this idea from Alan Liu’s assignments in his course “Hacking Literary Interpretation” (http://english197s2015.pbworks.com/w/page/93936365/Assignments). They are “hands-on, small-scale exercises that ask students to learn at a beginner’s level about the concepts, methods, and tools of the digital humanities” and each practicum needs to be “turned in” by writing about it on your blog. (Daily blog posts and practicums are separate assignments, though they both “report” in the medium of the blog.)

3. **Midterm Essay** (length: 5 pages in Word, but published on your blog): Find the text of at least two speeches on social justice/social engagement issues that you would like to analyze in Voyant. Identify three questions that you hope your analysis can answer about those texts. In a blog post, discuss how you decided which texts to use, how you prepared the text files for analysis in Voyant, what your questions are and how you came up with them, and what you learned from your analysis. Be sure to include screen shots to illustrate your blog post. Your midterm essay will report on the findings of your analysis and will walk your reader through your analysis, as you see the sample post do here http://hermeneuti.ca/now-analyze-that.

4. **Final Project and Presentation**: You will design and complete a final project that is in some way collaborative and that addresses the theme of social justice in DH. For example, you can take one of the modules or skills learned in our practicums and turn that into a larger project, or you can propose a different project. Final projects will be collaborative.

**COURSE CALENDAR**

Read this schedule as a list of due dates of readings and assignments. All readings will be provided for you. You do not have to purchase any texts. Assignments will always have more detailed instructions presented in class and on our course website. This schedule will change and grow as the term progresses, and I will announce these changes clearly in class and online. Our course material has two parts:
Meeting times: We will meet every Tuesday and Thursday from 10:10am-12:00pm. Our weekly X-hour period is each Wednesday from 3:30-4:20pm. I have kept the x-hour time slots open on our course schedule, and we will use them regularly for practicum workshops, midterm essay workshops, or final project workshops. I will always be available to assist you during X-hour even if we do not meet as a class.

Part I: DH Infrastructure and Digital Data Creation & Display

Thurs 1/5: Course introduction, syllabus review

- Don’t worry, there’s nothing due for class today! We will get to know one another, and I will introduce the syllabus. In our remaining time, we will read and discuss selections from Amanda Visconti’s “Digital Humanities: What? Why? How?” (https://www.hastac.org/blogs/amanda-visconti/2016/07/25/digital-humanities-what-why-how-dlf-eresearch-network-talk); Tara McPherson’s “Why Are the Digital Humanities So White? or Thinking the Histories of Race and Computation” (http://dhdebates.gc.cuny.edu/debates/text/29); and/or watch Elijah Meek’s “What is Digital Humanities?” (https://www.youtube.com/watch?v=AvZToQSX244)” video (10 min).
- Digital Activism for Day 1: Alex Gil, Around DH in 80 Days (http://www.arounddh.org/journey/) (you will find a very large sampling of DH projects from different parts of the world)

Tues 1/10: Hardware, Software, Internet, People

- Reading: “Between Bits and Atoms” (ANC, PDF provided); “Embodiment, Entanglement, and Immersion” (ANC, PDF provided); Can Digital Humanities Mean Transformative Critique? (http://journals.dartmouth.edu/cgi-bin/WebObjects/Journals.woa/1/xmlpage/4/article/425) (Alexis Lothian and Amanda Philips); Optional: For more on DH methods and making: browse Miriam Posner’s “How did they make that?” (http://miriamposner.com/blog/how-did-they-make-that/)”
- Digital Activism: hastac.org (http://hastac.org) (be sure to explore some blog posts)
- Practicum, in class: blogging troubleshooting practicum, together, on hastac.org. You do not have to do this ahead of time.

Thurs 1/12: Texts, from Page to Screen, Interfaces

Reading Group, “In the Beginning was the Word: A Visualization of the Page as Interface”
(http://transliteracies.english.ucsb.edu/images/flash_projects/john-morph.html) (Flash animation)

- Digital Activism: American Prison Writing Archive (http://apw.dhinitiative.org/)
- Guest expert: Michelle Warren

**Tues 1/17: From Page to Screen, cont.: HTML, CSS**

- Reading/doing/viewing: Mozilla Developer Network “Introduction to HTML (https://developer.mozilla.org/en-US/docs/Web/Guide/HTML/Introduction)” ; Mozilla Developer Network “Introduction to CSS (https://developer.mozilla.org/en-US/Learn/CSS/Introduction_to_CSS/How_CSS_works).” Or, if you prefer, watch this video series: Travis Neilson, of Dev Tips for Designers, has put together a series of friendly video tutorials on HTML and CSS. Check them out here: HTML 5 Basics (http://www.youtube.com/watch?v=NzzGt7EmXVw&list=SPqGj3iMvMa4KJln1pMYPVV3eYzxJlWcON) and CSS Basics (http://www.youtube.com/watch?v=s7ONvIgOWdM&feature=c4-overview-vl&list=PLqGj3iMvMa4IOmy04kDxh_hqQDMq0eeCy).
- Practicum due: American Prison Writing Project transcription
- Desired guest speakers: from the DALI Lab

**Thurs 1/19: Structured Data on the Web, part 2: Markup and Digital Editions (XML, TEI)**

- Explore Module 1 (“Common Structure and Elements” (http://teibyexample.org/modules/TBED01v00.htm)) of the TEI By Example Tutorial
- Digital Activism: The Orlando Project (http://orlando.cambridge.org/) (Orlando: Women’s Writing in the British Isles from the Beginnings to the Present)
- Desired guest speaker: Shannon Rose Smith on TEI encoding literature

**Tues 1/24: Databases**

- Digital Activism: Emory University, The Trans-Atlantic Slave Trade Database: The Voyages Database (http://www.slavevoyages.org/voyage/)
- Desired guest speaker: TBD

Thurs 1/26: From Database to Digital Archive

- Desired guest speaker: Caitlin Birch, Dartmouth Vietnam Project (http://www.dartmouth.edu/~dvp/) Digital Archivist

Tues 1/31: Collaboration and Crowdsourcing

- Practicum due: TEI Encoding
- Desired guest speakers: TBD

Thurs 2/2: Social Media

Part II: DH Projects & Analysis

Tues 2/7: Text Analysis 1 (TAPoR (http://www.tapor.ca/), Ant-Conc (http://www.laurenceanthony.net/software/antconc/), Voyant (http://voyant-tools.org/)

- Digital Activism: Voyant analysis comparing how Barack Obama and Jeremiah Wright address race: http://hermeneuti.ca/now-analyze-that. We will play with Voyant in class.
- Practicum Due: Wikipedia editing
- Desired guest expert: Emily Klancher Merchant

Thurs 2/9: Text Analysis 2: Algorithms and Topic Modelling

- Digital Activism: Lisa Marie Rhody “Why I Dig: Feminist Approaches to Text Analysis (http://dhdebates.gc.cuny.edu/debates/text/97)"

Tues 2/14: Text Analysis 3: Exploring Error (Happy Valentine’s Day!)

- Reading: Liz Losh et al. “Putting the Human Back into the Digital Humanities: Feminism, Generosity, and Mess (http://dhdebates.gc.cuny.edu/debates/text/61)”; “Messy Data and Faulty Tools (http://dhdebates.gc.cuny.edu/debates/text/100)” and “The Syuzhet Blog Posts (https://annieswafford.wordpress.com/syuzhet-blog-posts/)” (Joanna Swafford, Matt Jockers) [Note: these blog posts contain technical jargon that I do not expect you to fully understand. But I do expect you to read for the gist of this important debate between two scholars. It may help to annotate as you read.]
- Digital Activism: FemTechNet (http://femtechnet.org/) Collective
Practicum due: Text analysis with Voyant
Desired guest speaker: Annie Swafford

Thurs 2/16: Mapping
- Reading: Franco Moretti “Maps” in *Graphs, Maps, and Trees* (PDF provided); Ian Gregory et al. “Crossing Boundaries: Using GIS in Literary Studies, History and Beyond (http://inha.revues.org/4931)”
- Desired guest speaker: James Adams, Dartmouth’s Visualization Librarian

Tues 2/21: Network Analysis
- Digital Activism: Kindred Britain (http://kindred.stanford.edu/) (Is this activist? Why/why not?)
- Practicum due: Create a timemap of your last term (real or fictional) with 10 different dates on it and 10 distinct geo-coordinates using http://timemapper.okfnlabs.org/ (http://timemapper.okfnlabs.org/)
- Desired guest speaker: TBD

Thurs 2/23: 2D and 3D, Performance Studies
- Digital Activism: Performing Archive: Curtis + “The Vanishing Race” (http://scalar.usc.edu/works/performingarchive/intro?path=index); Act.Feminism: A Performing Archive (http://www.reactfeminism.org/about.php); Apartheid Heritages/Projects/Soweto ’76 3D (http://apartheidheritages.org/projects/shgis/)
- Desired guest expert: James Dietrich, on 3D modeling

Tues 2/28: Sound Studies and Podcasts

Digital Activism: The Body Modification Podcast (https://thebodymodificationpodcast.com/) – listen to 1 episode (or more!)

Practicum due: Network analysis with pre-made data set in either Gephi or Cytoscape (refer to 2/21 readings for step-by-step instructions)

Desired guest speakers: Kes and Memory, hosts/creators/editors of The Body Modification Podcast

Thurs 3/2: Games

Reading: Mary Flanagan, Chapter 1, Values at Play in Digital Games; Liz Losh, “#GamerGate 101 (http://www.virtualpolitik.blogspot.com/),” Virtualpolitik (blog) (17 Oct 2014).

Digital Activism & Play: Tiltfactor.org; Elizabeth LaPensée http://www.elizabethlapensee.com/#/games/ (http://www.elizabethlapensee.com/#/games/)

Desired guest expert: Mary Flanagan, Tiltfactor

Tues 3/7: Electronic Literature


Digital Activism/Poetry: Judd Morrissey, and Lori Talley, “The Jew’s Daughter (http://collection.eliterature.org/1/works/morrissey__the_jews_daughter.html); Mary Flanagan [theHouse] (http://collection.eliterature.org/1/works/flanagan__thehouse.html); Any 2 additional poems of your choice tagged “Activist” in EL3 (http://collection.eliterature.org/3/keyword.html); Optional: Roderick Coover, Canyonlands: Edward Abbey in the Great American Desert (http://directory.eliterature.org/individual-work/327)

Desired guest speaker: Leonardo Flores (via Skype), on I © E-Poetry

Practicum due: Game or story creation in Twine (http://twinery.org/) or Inkle (http://www.inklestudios.com/inklewriter/)

Wednesday 3/8: X-hour (Wed. 3:30pm)


Final reflections, discussion, and debate
March 11-14 Final Exams

We will have a final project presentation and party; peer evaluations of final projects will also be due. (These will not count toward their grade, but they will count toward your final project grade.)


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November 29, 2016 January 11, 2017 Categories: Uncategorized

The Innovator’s DNA
by Jeffrey H. Dyer, Hal Gregersen, and Clayton M. Christensen
FROM THE DECEMBER 2009 ISSUE
“How do I find innovative people for my organization? And how can I become more innovative myself?”
These are questions that stump senior executives, who understand that the ability to innovate is the “secret sauce” of business success. Unfortunately, most of us know very little about what makes one person more creative than another. Perhaps for this reason, we stand in awe of visionary entrepreneurs like Apple’s Steve Jobs, Amazon’s Jeff Bezos, eBay’s Pierre Omidyar, and P&G’s A.G. Lafley. How do these people come up with groundbreaking new ideas? If it were possible to discover the inner workings of the masters’ minds, what could the rest of us learn about how innovation really happens?

In searching for answers, we undertook a six-year study to uncover the origins of creative—and often disruptive—business strategies in particularly innovative companies. Our goal was to put innovative entrepreneurs under the microscope, examining when and how they came up with the ideas on which their businesses were built. We especially wanted to examine how they differ from other executives and entrepreneurs: Someone who buys a McDonald’s franchise may be an entrepreneur, but building an Amazon requires different skills altogether. We studied the habits of 25 innovative entrepreneurs and surveyed more than 3,000 executives and 500 individuals who had started innovative companies or invented new products.

We were intrigued to learn that at most companies, top executives do not feel personally responsible for coming up with strategic innovations. Rather, they feel responsible for facilitating the innovation process. In stark contrast, senior executives of the most innovative companies—a mere 15% in our study—don’t delegate creative work. They do it themselves.

But how do they do it? Our research led us to identify five “discovery skills” that distinguish the most creative executives: associating, questioning, observing, experimenting, and networking. We found that innovative entrepreneurs (who are also CEOs) spend 50% more time on these discovery activities than do CEOs with no track record for innovation. Together, these skills make up what we call the innovator’s DNA. And the good news is, if you’re not born with it, you can cultivate it.

**What Makes Innovators Different?**
Innovative entrepreneurs have something called creative intelligence, which enables discovery yet differs from other types of intelligence (as suggested by Howard Gardner’s theory of multiple intelligences). It is more than the cognitive skill of being right-brained. Innovators engage both sides of the brain as they leverage the five discovery skills to create new ideas.

In thinking about how these skills work together, we’ve found it useful to apply the metaphor of DNA. Associating is like the backbone structure of DNA’s double helix; four patterns of action (questioning, observing, experimenting, and networking) wind around this backbone, helping to cultivate new insights. And just as each person’s physical DNA is unique, each individual we studied had a unique innovator’s DNA for generating breakthrough business ideas.

Imagine that you have an identical twin, endowed with the same brains and natural talents that you have. You’re both given one week to come up with a creative new business-venture idea. During that week, you come up with ideas alone in your room. In contrast, your twin (1) talks with 10 people—including an engineer, a musician, a stay-at-home dad, and a designer—about the venture, (2) visits three innovative start-ups to observe what they do, (3) samples five “new to the market” products, (4) shows a prototype he’s built to five people, and (5) asks the questions “What if I tried this?” and “Why do you do that?” at least 10 times each day during these networking, observing, and experimenting activities. Who do you bet will come up with the more innovative (and doable) idea?

Studies of identical twins separated at birth indicate that our ability to think creatively comes one-third from genetics; but two-thirds of the innovation skill set comes through learning—first understanding a given skill, then practicing it, experimenting, and ultimately gaining confidence in one’s capacity to create. Innovative entrepreneurs in our study acquired and honed their innovation skills precisely this way.

Let’s look at the skills in detail.

**Discovery Skill 1: Associating**
Associating, or the ability to successfully connect seemingly unrelated questions, problems, or ideas from different fields, is central to the innovator’s DNA. Entrepreneur Frans Johansson described this phenomenon as the “Medici effect,” referring to the creative explosion in Florence when the Medici family brought together people from a wide range of disciplines—sculptors, scientists, poets, philosophers, painters, and architects. As these individuals connected, new ideas blossomed at the intersections of their respective fields, thereby spawning the Renaissance, one of the most inventive eras in history.

To grasp how associating works, it is important to understand how the brain operates. The brain doesn’t store information like a dictionary, where you can find the word “theater” under the letter “T.” Instead, it associates the word “theater” with any number of experiences from our lives. Some of these are logical (“West End” or “intermission”), while others may be less obvious (perhaps “anxiety,” from a botched performance in high school). The more diverse our experience and knowledge, the more connections the brain can make. Fresh inputs trigger new associations; for some, these lead to novel ideas. As Steve Jobs has frequently observed, “Creativity is connecting things.”

The world’s most innovative companies prosper by capitalizing on the divergent associations of their founders, executives, and employees. For example, Pierre Omidyar launched eBay in 1996 after linking three unconnected dots: (1) a fascination with creating more-efficient markets, after having been shut out from a hot internet company’s IPO in the mid-1990s; (2) his fiancée’s desire to locate hard-to-find collectible Pez dispensers; and (3) the ineffectiveness of local classified ads in locating such items. Likewise, Steve Jobs is able to generate idea after idea because he has spent a lifetime exploring new and unrelated things—the art of calligraphy, meditation practices in an Indian ashram, the fine details of a Mercedes-Benz.

Associating is like a mental muscle that can grow stronger by using the other discovery skills. As innovators engage in those behaviors, they build their ability to generate ideas that can be recombined in new ways. The more frequently people in our study attempted to understand, categorize, and store new knowledge, the more easily their brains could naturally and consistently make, store, and recombine associations.
Discovery Skill 2: Questioning

More than 50 years ago, Peter Drucker described the power of provocative questions. “The important and difficult job is never to find the right answers, it is to find the right question,” he wrote. Innovators constantly ask questions that challenge common wisdom or, as Tata Group chairman Ratan Tata puts it, “question the unquestionable.” Meg Whitman, former CEO of eBay, has worked directly with a number of innovative entrepreneurs, including the founders of eBay, PayPal, and Skype. “They get a kick out of screwing up the status quo,” she told us. “They can’t bear it. So they spend a tremendous amount of time thinking about how to change the world. And as they brainstorm, they like to ask: ‘If we did this, what would happen?’”

Most of the innovative entrepreneurs we interviewed could remember the specific questions they were asking at the time they had the inspiration for a new venture. Michael Dell, for instance, told us that his idea for founding Dell Computer sprang from his asking why a computer cost five times as much as the sum of its parts. “I would take computers apart…and would observe that $600 worth of parts were sold for $3,000.” In chewing over the question, he hit on his revolutionary business model.

To question effectively, innovative entrepreneurs do the following:

Ask “Why?” and “Why not?” and “What if?”

Most managers focus on understanding how to make existing processes—the status quo—work a little better (“How can we improve widget sales in Taiwan?”). Innovative entrepreneurs, on the other hand, are much more likely to challenge assumptions (“If we cut the size or weight of the widget in half, how would that change the value proposition it offers?”). Marc Benioff, the founder of the online sales software provider Salesforce.com, was full of questions after witnessing the emergence of Amazon and

Sample of Innovative Entrepreneurs from our Study

Sam Allen: ScanCafe.com
Marc Benioff: Salesforce.com
Jeff Bezos: Amazon.com
Mike Collins: Big Idea Group
Scott Cook: Intuit
Michael Dell: Dell Computer
Aaron Garrity: XanGo
Diane Green: VMWare
Eliot Jacobsen: RocketFuel
Josh James: Omniture
Chris Johnson: Terra Nova
Jeff Jones: NxLight; Campus Pipeline
Herb Kelleher: Southwest Airlines
Mike Lazaridis: Research In Motion
Spencer Moffat: Fast Arch of Utah
David Neeleman: JetBlue; Morris Air
Pierre Omidyar: eBay
John Pestana: Omniture
Peter Thiel: PayPal
Mark Wattles: Hollywood Video
Corey Wride: Movie Mouth
Niklas Zennström: Skype

eBay, two companies built on services delivered via the internet. “Why are we still loading and upgrading software the way we’ve been doing all this time when we can now do it over the internet?” he wondered. This fundamental question was the genesis of Salesforce.com.

**Imagine opposites.**

In his book *The Opposable Mind*, Roger Martin writes that innovative thinkers have “the capacity to hold two diametrically opposing ideas in their heads.” He explains, “Without panicking or simply settling for one alternative or the other, they’re able to produce a synthesis that is superior to either opposing idea.”

Innovative entrepreneurs like to play devil’s advocate. “My learning process has always been about disagreeing with what I’m being told and taking the opposite position, and pushing others to really justify themselves,” Pierre Omidyar told us. “I remember it was very frustrating for the other kids when I would do this.”

Asking oneself, or others, to imagine a completely different alternative can lead to truly original insights.

**Embrace constraints.**

Most of us impose constraints on our thinking only when forced to deal with real-world limitations, such as resource allocations or technology restrictions. Ironically, great questions actively impose constraints on our thinking and serve as a catalyst for out-of-the-box insights. (In fact, one of Google’s nine innovation principles is “Creativity loves constraint.”) To initiate a creative discussion about growth opportunities, one innovative executive in our study asked this question: “What if we were legally prohibited from
selling to our current customers? How would we make money next year?” This led to an insightful exploration of ways the company could find and serve new customers. Another innovative CEO prods his managers to examine sunk-cost constraints by asking, “What if you had not already hired this person, installed this equipment, implemented this process, bought this business, or pursued this strategy? Would you do the same thing you are doing today?”

**Discovery Skill 3: Observing**

Discovery-driven executives produce uncommon business ideas by scrutinizing common phenomena, particularly the behavior of potential customers. In observing others, they act like anthropologists and social scientists.

Intuit founder Scott Cook hit on the idea for Quicken financial software after two key observations. First he watched his wife’s frustration as she struggled to keep track of their finances. “Often the surprises that lead to new business ideas come from watching other people work and live their normal lives,” Cook explained. “You see something and ask, ‘Why do they do that? That doesn’t make sense.’” Then a buddy got him a sneak peek at the Apple Lisa before it launched. Immediately after leaving Apple headquarters, Cook drove to the nearest restaurant to write down everything he had noticed about the Lisa. His observations prompted insights such as building the graphical user interface to look just like its real-world counterpart (a checkbook, for example), making it easy for people to use it. So Cook set about solving his wife’s problem and grabbed 50% of the market for financial software in the first year.

Innovators carefully, intentionally, and consistently look out for small behavioral details—in the activities of customers, suppliers, and other companies—in order to gain insights about new ways of doing things. Ratan Tata got the inspiration that led to the world’s cheapest car by observing the plight of a family of four packed onto a single motorized scooter. After years of product development, Tata Group launched in 2009 the $2,500 Nano using a modular production method that may disrupt the entire automobile distribution system in India. Observers try all sorts of techniques to see the world in a different light. Akio Toyoda regularly practices Toyota’s philosophy of *genchi genbutsu*—“going to the spot and seeing for yourself.” Frequent direct observation is baked into the Toyota culture.
**Discovery Skill 4: Experimenting**

When we think of experiments, we think of scientists in white coats or of great inventors like Thomas Edison. Like scientists, innovative entrepreneurs actively try out new ideas by creating prototypes and launching pilots. (As Edison said, “I haven’t failed. I’ve simply found 10,000 ways that do not work.”) The world is their laboratory. Unlike observers, who intensely watch the world, experimenters construct interactive experiences and try to provoke unorthodox responses to see what insights emerge.

The innovative entrepreneurs we interviewed all engaged in some form of active experimentation, whether it was intellectual exploration (Michael Lazaridis mulling over the theory of relativity in high school), physical tinkering (Jeff Bezos taking apart his crib as a toddler or Steve Jobs disassembling a Sony Walkman), or engagement in new surroundings (Starbucks founder Howard Shultz roaming Italy visiting coffee bars). As executives of innovative enterprises, they make experimentation central to everything they do. Bezos's online bookstore didn’t stay where it was after its initial success; it morphed into an online discount retailer, selling a full line of products from toys to TVs to home appliances. The electronic reader Kindle is an experiment that is now transforming Amazon from an online retailer to an innovative electronics manufacturer. Bezos sees experimentation as so critical to innovation that he has institutionalized it at Amazon. “I encourage our employees to go down blind alleys and experiment,” Bezos says. “If we can get processes decentralized so that we can do a lot of experiments without it being very costly, we’ll get a lot more innovation.”

Scott Cook, too, stresses the importance of creating a culture that fosters experimentation. “Our culture opens us to allowing lots of failures while harvesting the learning,” he told us. “It’s what separates an innovation culture from a normal corporate culture.”

One of the most powerful experiments innovators can engage in is living and working overseas. Our research revealed that the more countries a person has lived in, the more likely he or she is to leverage that experience to deliver innovative products,
Rankings are based on a survey of more than 3,000 executives and entrepreneurs.

Discovery Skill 5: Networking

Devoting time and energy to finding and testing ideas through a network of diverse individuals gives innovators a radically different perspective. Unlike most executives—who network to access resources, to sell themselves or their companies, or to boost their careers—innovative entrepreneurs go out of their way to meet people with different kinds of ideas and perspectives to extend their own knowledge domains. To this end, they make a conscious effort to visit other countries and meet people from other walks of life.

They also attend idea conferences such as Technology, Entertainment, and Design (TED), Davos, and the Aspen Ideas Festival. Such conferences draw together artists, entrepreneurs, academics, politicians, adventurers, scientists, and thinkers from all over the world, who come to present their newest ideas, passions, and projects. Michael Lazaridis, the founder of Research In Motion, notes that the inspiration for the original BlackBerry occurred at a conference in 1987. A speaker was describing a wireless data system that had been designed for Coke; it allowed vending machines to send a signal when they needed refilling. “That’s when it hit me,”
Put a Ding in the Universe

Why do innovators question, observe, experiment, and network more than typical executives? As we examined what motivates them, we discovered two common themes: (1) They actively desire to change the status quo, and (2) they regularly take risks to make that change happen. Throughout our research, we were struck by the consistency of language that innovators use to describe their motives. Jeff Bezos wants to “make history,” Steve Jobs to “put a ding in the universe,” Skype cofounder Niklas Zennström to “be disruptive, but in the cause of making the world a better place.” These innovators steer entirely clear of a common cognitive bias called the status quo bias—the tendency to prefer an existing state of affairs to alternative ones.

Practice, Practice, Practice

As innovators actively engage in the discovery skills, they become defined by them. They grow increasingly confident of their creative abilities. For A.G. Lafley, innovation is the central job of every leader, regardless of the place he or she occupies on the organizational chart. But what if you—like most executives—don’t see yourself or those on your team as particularly innovative?

Though innovative thinking may be innate to some, it can also be developed and strengthened through practice. We cannot emphasize enough the importance of rehearsing over and over the behaviors described above, to the point that they become automatic. This requires putting aside time for you and your team...
Embracing a mission for change makes it much easier to take risks and make mistakes. For most of the innovative entrepreneurs we studied, mistakes are nothing to be ashamed of; in fact, they are expected as a cost of doing business. “If the people running Amazon.com don’t make some significant mistakes,” explained Bezos, “then we won’t be doing a good job for our shareholders because we won’t be swinging for the fences.” In short, innovators rely on their “courage to innovate”—an active bias against the status quo and an unflinching willingness to take risks—to transform ideas into powerful impact.

The most important skill to practice is questioning. Asking “Why” and “Why not” can help turbocharge the other discovery skills. Ask questions that both impose and eliminate constraints; this will help you see a problem or opportunity from a different angle. Try spending 15 to 30 minutes each day writing down 10 new questions that challenge the status quo in your company or industry. “If I had a favorite question to ask, everyone would anticipate it,” Michael Dell told us. “Instead I like to ask things people don’t think I’m going to ask. This is a little cruel, but I kind of delight in coming up with questions that nobody has the answer to quite yet.”

To sharpen your own observational skills, watch how certain customers experience a product or service in their natural environment. Spend an entire day carefully observing the “jobs” that customers are trying to get done. Try not to make judgments about what you see: Simply pretend you’re a fly on the wall, and observe as neutrally as possible. Scott Cook advises Intuit’s observers to ask, “What’s different than you expected?” Follow Richard Branson’s example and get in the habit of note taking wherever you go. Or follow Jeff Bezos’s: “I take pictures of really bad innovations,” he told us, “of which there are a number.”

To strengthen experimentation, at both the individual and organizational levels, consciously approach work and life with a hypothesis-testing mind-set. Attend seminars or executive education courses on topics outside your area of expertise; take apart a product or process that interests you; read books that purport to identify emerging trends. When you travel, don’t squander the opportunity to learn about different lifestyles and local behavior. Develop new hypotheses from the knowledge you’ve acquired and test them in the search for new products or processes. Find ways to institutionalize frequent, small experiments at all levels of the organization. Openly acknowledging that learning through failure is valuable goes a long way toward building an innovative culture.
Try spending 15 to 30 minutes each day writing down questions that challenge the status quo in your company.

To improve your networking skills, contact the five most creative people you know and ask them to share what they do to stimulate creative thinking. You might also ask if they’d be willing to act as your creative mentors. We suggest holding regular idea lunches at which you meet a few new people from diverse functions, companies, industries, or countries. Get them to tell you about their innovative ideas and ask for feedback on yours.

Innovative entrepreneurship is not a genetic predisposition, it is an active endeavor. Apple’s slogan “Think Different” is inspiring but incomplete. We found that innovators must consistently act different to think different. By understanding, reinforcing, and modeling the innovator’s DNA, companies can find ways to more successfully develop the creative spark in everyone.

A version of this article appeared in the December 2009 issue of Harvard Business Review.

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