Towards a Seamful Design of Networked Knowledge: Practical Pedagogies in Collaborative Teams

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Abstract

Collaboration is an ethically charged relationship that challenges traditional modes of authorship attribution, institutional norms, and expectations of teaching and learning. A careful reflection on the needs and expectations of project participants demands an exposure of the seams and social dynamics inherent in research-driven relationships. In this paper, we ask: How does integrating digital scholarship into undergraduate pedagogy challenge systems of evaluation and credit and affect collaboration in research environments tuned to promotion and tenure? Emerging from our participation in the Scholarly Communication Institute (2015) in the Research Triangle of North Carolina, this article presents the findings of a team tasked with evaluating best practices and better understanding how authorship and contributorship models emerge in heterogeneous teams of students, faculty, staff, #alt-ac roles, librarians, programmers, and community partners.[1]

Digital scholarship is often a deeply collaborative and networked enterprise, one which involves multiple practitioners from a variety of academic, #altac, and non-academic contexts. This kind of socially oriented knowledge creation emerges from a community of practice that moves fluidly between curricular experiences and co-curricular research experiences, often hosted in DH labs, libraries, and centers.[1] Neither formalised evaluative structures nor socio-cultural understandings of value and credit have kept pace with disciplinary and technological change in the humanities. In this context, scholarly work involves a mesh of potentially uneven relationships between many knowledge stakeholders and researchers with a range of technical capabilities. For example, student labor is paired awkwardly with faculty promotion and tenure, which is driven by faculty members' ability to manage and mobilize large heterogeneous teams of researchers at all levels within the academic community. Credit, promotion, funding, and credentialing are more complex topics than ever, yet many individuals and institutions rely on often outdated structures to assess the value and insights made by these networked teams.

Collaborative digital humanities projects present ethically charged relationships among non-tenure line and tenure line faculty, graduate and undergraduate students, staff, and community stakeholders. Spencer D. C. Keralis's blog post "Milking the Deficit Internship" describes the power dynamic in this way: "Student labor in the classroom is never not coerced" [Keralis 2016]. A range of knowledge stakeholders are now able to rethink the hierarchies imposed by academic rank and hollow notions of prestige by forming systems that emerge from new tools and methods. We believe this moment will allow humanities scholars to shape a collaborative practice by balancing pedagogy and labor through increased data collection within teams.

We have determined that collaboration should be locally-determined, *seamfully* designed, and mutually productive, regardless of standing within or without academic institutions; there must be an intentional ethics that is both

transparent and adaptive to the needs of the team. We wish to expose the seams that knit technological infrastructure and academic assessment for both faculty and students working on DH projects. In doing so, we borrow language from Matt Ratto's article "Ethics of Seamless Infrastructures" to think critically about our use of technology in humanities scholarship and our institutionalization of mentorship and credit allocation [Ratto 2007]. In an effort to best describe these relationships, we present a project-based pedagogy that realigns academic hierarchies of prestige and oversight and reflects the realities of scholarly labor: we suggest that, in the formation of collaborative teams, digital humanists must recognize and explicitly foreground the constraints, priorities, and shapes of our professional and institutional positions in order to affect a purposeful pedagogy aligned with research. We will present several case studies that cross between undergraduate and graduate pedagogies, public engagement, business partnerships, scholarly community formation, and #alt-ac roles toward a heterogeneous field of contributorship. We present, in other words, a species of networked knowledge in practice. Our objective is to link discussions of what we have come to call "social knowledge creation" with undergraduate education to produce new ways of measuring, evaluating, and validating digital scholarship.[2]

Students Rethought

Undergraduate digital scholarship in its current form can be a collaborative and networked enterprise that involves multiple practitioners from a variety of academic contexts. However, no great revolution in pedagogical practice is needed; the tools and methods are before us. Socially oriented projects and platforms within DH are evidence of this shift: Day of DH, Digital Humanities Now, HASTAC, CenterNet, NINES, and DHSI are just a small sampling of community minded approaches in DH. Efforts like these have sought to value social knowledge creation by working to set the conditions for new discoveries in an online social space.

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Community formation lies at the base of our model, and successful scholarly communities grow best when fostered by effective mentorship and collaboration. Beyond Marc Prensky's much popularized but widely discredited description of students as "digital natives," faculty must be ready to link interpretative priorities with employability and an enduring value of education through transferable, durable, and authentic skills [Prensky 2001].[3] The canon and critical thinking skills once served this language of extensibility in education. Students must be ready to work alongside faculty and staff; in so doing, they undoubtedly benefit from discipline-specific expertise and embrace methods and skills that may not be validated by the very institution that grants their degrees. Therefore, the connection between technology and content must not be missed. There must be an integral and functional connection between the technology, teaching, and team integration. In "Digital Pedagogy Unplugged", Paul Fyfe recounts his surprise upon learning that "Jerome McGann does not especially like computers" [Fyfe 2011, 1]. The affordances of a multimedia hypertext were simply required to build the Rossetti Archive; the ability to set text and image in a discoverable interface was made possible by the internet. There is an emerging tension between research-specific computing needs and, as Fyfe puts it, "opening those projects to questions he had yet to imagine" through computing [Fyfe 2011, 1]. The symbiotic relationship between intellectual curiosity and skills-based training in the humanities requires a community of concerns bound by an evolving culture of exploration and experimentation through method. This is a dialogue that should occur between faculty, staff, and students in an ongoing basis during the development and dissemination of in-process scholarly work. In a curricular context, this interdependent relationship between student and instructor means that curricular models aimed at including DH methods may not keep perfect pace with the development of consumer products, technical standards, or open source projects. Providing access to long lasting technical standards and active communities supporting open source technologies that will remain after graduation must be the goal of our training.[4]

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Therefore, unlike a more global technical standard, we find that collaborative models must be locally determined and agreed upon by local partners, often in an ad hoc way. Bethany Nowviskie has described the "human factors" of our "scholarly machine" and how, even as we conceive of research in the humanities as operating at a great scale, the collaborations themselves unfold on a closer, human scale: "Despite all the focus on cyberinfrastructure and scholarly workflows, we're fashioning ever closer, more intimate and personalized systems of production" [Nowviskie 2012]. The argument for a greater appreciation of the human scale of research and teaching is the basis for an ethics of collaboration and validating digital scholarship. In this context, Nowviskie's reminder of human scale of research and

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teaching also highlights a fundamental inconsistency within university structures, for both faculty and students, that are often more interested in statistical metrics of success.

For example, large archival and digitization projects across a range of disciplines have outstripped the constraints of traditional tenure and promotion timelines. Two notable examples of this disjunction between project development and university standards could include The Map of Early Modern London (http://mapoflondon.uvic.ca/), which has been in development for over 10 years, and The Orlando Project (http://www.artsrn.ualberta.ca/orlando/), which has been in development for over 20 years. In "Assessing the Future Landscape of Scholarly Communication", a report by The Center for Studies in Higher Education, the authors seek to describe the pressures facing faculty in collaborative digitally oriented teams and "to understand the needs and practices of faculty for in-progress scholarly communication" [Harley et al. 2010, 2]. Due to the increased time and collaboration required to create large scale digital projects and the likelihood that these efforts may grow without being "finished," scholarly communication that occurs in-progress is indeed becoming more prominent and bucks the traditional view that knowledge is created when a monograph is printed and bound.[5] The report surveys a handful of disciplines–archaeology, astrophysics, biology, economics, history, music, and political science–with a view to understanding the role of technology in collaborative research and in-progress scholarly communication. The core concern for the historians interviewed concerned the "crisis in monographic publication," which stems from both "cutting back the number of books" published by high quality presses and the "glut of books" produced by low market publishers in an attempt to satiate the "number of books required for advancement at competitive universities" [Harley et al. 2010, 436]. In all of this, the report recognizes that university libraries, facing squeezed budgets, are incapable of purchasing these monographs, which further deflates demand. In *Open Access*, Peter Suber has even claimed that the rapid inflation of science based journal subscriptions has caused a knock-on effect in humanities based monograph publishing because university libraries are forced to maintain access to online subscriptions while eroding the physical collection of books housed on campus [Suber 2012, 32]. The answer offered by the authors of the report is in the successful collaborations revolving around "online databases of archival materials or data sets built collaboratively by scholars" [Harley et al. 2010, 471]. The crisis in scholarly publishing has been well documented in other venues,[6] but the response to these pressures has generated, by necessity, informal collaborations that have placed pressure on students, staff, community partners, and other knowledge stakeholders.

By describing some of the pressures facing researchers, we have begun with a very pragmatic, perhaps pessimistic, view of what David Berry called the "computational turn" across disciplines, wherein "technologies [have shifted] the critical ground of their concepts and theories" [Berry 2011, 11]. Berry acknowledges that "... with card indexes dying a slow and certain death… there remain few outputs for the non-digital scholar to undertake research in the modern university," but he extends the consequences of this reality to the need to reimagine pedagogy and the social function of a humanities education. No longer are the humanities tasked with training students for civil participation through a national canon: students, he suggests, "would need to be rethought" [Berry 2011, 6]. Berry imagines a radical, deeply collaborative recentering that "... would change our understanding of knowledge, wisdom and intelligence itself," a shift to "... a method of thinking with eyes and screen" [Berry 2011, 10].

In keeping with Berry's vision of a "collective intellect" spurred by "... a society or association of actors who can think critically together, mediated through technology," the academy must rethink both undergraduate and graduate students through the lens of a technologically literate, socially participatory community. By validating digital scholarship throughout the university, all research participants by better conceptualize how pedagogy, labor, and contributorship overlap. Likewise, students must reimagine their relationships and expectations for training, professionalization, and future employment. The social aspect of DH becomes the basis for a community of practice that respects the realities of international, networked, and hybrid identities and cultures. Akin to the communities of practitioners that gather online to support open source projects, DH has the potential to become a community of lifelong learning for our students as participation in the workforce will require near perpetual retraining. We are proposing a third space within the university that is both beyond and between the experiences of teaching and research. Understanding the cultural and social realities of online community formation is a relatively new social function of the humanities, and our collaborative work must similarly engage with these realities that face our students, their employers, and the university itself.

Students require expertise that is adaptable, durable, and authentic. Non-curricular experiences must thereby promote experimentation and open ended play with technology. Skills acquisition should be part of a student's outlook toward any technical or cultural problem. Humanities students who embrace this sensibility will, however, face an additional set of problems. The heterogeneous nature of collaborative groups in the humanities means that competing values, concerns, and responsibilities can result in tensions and misunderstandings between Primary Investigators and funders, collaborating faculty and staff, graduate and undergraduate students, and knowledge stakeholders and community partners. Sheila Cavanagh observes in her recent article, "Living in a Digital World: Rethinking Peer Review, Collaboration, and Open Access", that "collaborative work has a different history in the humanities than in the sciences and conventional reward structures in humanistic disciplines do not always easily accommodate mutual efforts" [Cavanagh 2012]. Similarly, Amy E. Earhart cautions us against "[romanticizing] the lab. Science labs emphasize collaboration, but hierarchies may be apparent" [Earhart 2015, 393]. Social knowledge creation may include geographically disparate contributors or clusters coming together through social collaboration platforms.[7] The recent work by the digital humanities program at UCLA to standardize student collaborator rights has helped to clarify the ethical imperative for faculty who may be forced by the pressures of tenure and promotion to emphasize scholarly output at the expense of sound pedagogy. Their "Student Collaborators' Bill of Rights" maintains that "[c]ollaborations between students and more experienced digital humanities practitioners should benefit everyone" [Di Pressi et al.]. Similarly, the efforts of the Modern Language Association (MLA) gesture toward a bridge between the concerns of faculty with those of students working in a research context. The MLA's Guidelines for Evaluating Work in Digital Humanities and Digital Media (2012) recognises, for example, that digital scholarly practitioners "engage in collaborative work" far more often than their non-digital counterpart but stops short of recommending specific frameworks of evaluation and peer review. Compounding the difficulties inherent in formally evaluating digital research is the collaborative involvement of teaching faculty, students, graduate researchers, cultural heritage professionals, etc. The difficulties evaluators face is not limited to media type or form–archives, blog posts, databases, and code bases are all up for consideration here–but also encompasses disciplinary norms and shared authorship practices. Through the lens of media and collaboration, we work to discuss and share guidelines that address credit, mentorship frameworks, and scholarly merit for digital work in a responsible way.

Non-mechanical Contributors

Ethically-framed interventions have long been part and parcel of theorized pedagogies. We position bell hooks' Teaching to Transgress as a model for classroom based community formation that negotiates class, race, and gender in an inclusive and productive way [hooks 1994]. Our goal is to extend this kind of "liberated classroom," as hooks describes it, into the research space and into the public space. Social relationships forged beyond the classroom have guided pedagogies that carry the structural oppressions from society into the classroom and, in our current concerns, collaborative teams. As Brett Hirsch puts it in the introduction to *Digital Humanities Pedagogy*, "bracketing" teaching away from research is particularly dangerous [Hirsch 2012, 5]. Whether we are thinking about tenure and promotion, course design, research activities, or the critical discussion of pedagogy or experimental design, we risk marginalizing digital humanities by not fully integrating our research practice within our teaching. Perhaps more subtly, we risk transferring the hierarchy between student and instructor by artificially partitioning teaching from research. Paulo Freire remains instructive on this point:

> The pedagogy of the oppressed, as a humanist and libertarian pedagogy, has two distinct stages. In the first, the oppressed unveil the world of oppression and through the praxis commit themselves to its transformation. In the second stage, in which the reality of oppression has already been transformed, this pedagogy ceases to belong to the oppressed and becomes a pedagogy of all people in the process of permanent liberation. [Freire 2005, 55]

We argue that theoretically informed interventions remain the source of digital humanities work, but digital humanities must structure collaborative work to reflect that ethics in a broader pedagogy. The slippage and breadth of collective pronouns is a symptom of this broader problem of credit allocation. As faculty, we must respect and include their behaviors, their view of the world, and their own ethics. As students, we must work to liberate our education from

antiquated economic and institutional structures; we must liberate our instructors from paper-based assessment that attempts to fix academic output as a single assignment rather than a dynamic development process; by embracing a collaborative, project based pedagogy, we must reject the simplistic "'banking' concept of education" that presumes education is deposited in the heads of students from a teacher [Freire 2005, 72]; we must liberate ourselves from traditional and conservative models of education that are predicated on rarified access to resources and information. The banking concept of education is invalidated by the Open Access model that makes content free. When paired with similar Open Source and Open Data movements, access to open standards and data allows non-traditional scholars to participate like never before. As Freire reminds us, true liberation comes when the oppressors as well as the oppressed are liberated from the structural inequalities that propagate and reward hierarchies of control and dominance. Teaching our students to build digital projects will validate digital scholarship for faculty and staff as well. Crossing between these spaces should not carry with it the hierarchies of the university's own evaluative procedures.

Our ethics is split along the same discursive lines that divides the very term digital humanities. Between the computational tools and the human understanding of culture, there lies a split between the mechanical and the human that animates our collaborative relationships. The UCLA "Student Collaborators' Bill of Rights" defines the necessity to pay students for their work, arguing that an unpaid internship model should not merely exchange experience or education for labor.[8] Work and education cannot enter into an economics of exchange or gift because the value exchanged is simply too ephemeral, prone to abuse, and reliant on hierarchies of authority between faculty, students, and staff that are symptomatic of the old academy. The UCLA Bill of Rights explains this division with a pragmatic sensibility: "If students have made substantive (i.e., non-mechanical) contributions to the project, their names should appear on the project as collaborators, and they should be acknowledged in subsequent publications that stem from the project" [Di Pressi et al.]. Student labor and education should not become merely an extension of the computational tools researchers are taking up. Large scale XML/TEI projects may well be the most susceptible research method because of the labor required. The extensibility of the language may become extended uncomfortably into our pedagogy; the structural demands of encoding text re-encodes personal relationships and builds a human ethics through the demands of the machine. Jaron Lanier's *You are Not a Gadget* does well to describe how "the most important thing about technology is how it changes people" [Lanier 2010, 4]. While his argument is dystopian in tone and scope, Lanier rightly argues that people sacrifice some portion of their intellect and their very humanity to serve the limitations of computing. Teachers, as well as students, are susceptible to the extensibility of this ethic. Digital humanities runs the risks of translating the structural logic of the machine onto the human experience of our students. People become the mere workings of the machines now used for analysis and knowledge generation. For this reason, we suggest that contributorship must be modeled on conditions and ethics that are inherited from the humanities.

Narrative / History / Taxonomy

We must be ready to radically rethink authorship attribution through a more narrative style of contributorship. Models of attribution from other disciplines, in which tacit rules governing order of authorship may privilege the Primary Investigator as the originator of insight, signal the contributions of graduate students or lab directors, or present a simple alphabetized list, do not translate well into digital humanities. Insights offered by constituent partners–who may include undergraduates, graduate research assistants, #altac staff, librarians, computer IT professionals–are essential for the functioning of digital projects for both faculty and institutions. Ideas in a multimedia environment are dependent on layers of software, mentorship, and methodology. The next great insight may come from a unique moment of discovery couched in mentorship, direction, and dialogue. Heterogeneous collaborations within academic contexts help to define the value of publishing digital projects and communicating them to the public.

Scholarly communication is bound up in several competing issues when done collaboratively in a multimedia and multidisciplinary context. Authorship occupies potentially-competing modes of credit and accountability. In recognition of this tension, collaboration allows project contributors with diverse expertise to define their roles and to apportion mutually-beneficial responsibility. There are several models to document and attribute diverse contributions made in a heterogeneous team. TaDiRAH and CrediT are two of the most commonly discussed currently in digital humanities and scholarly communication,[9] though it is unclear just how often these taxonomies are employed (Brand). TaDiRAH cites

the Digital Research Infrastructure for Arts and Humanities (DARIAH) and The Digital Research Tools project (DiRT) as employing the framework. Collaboration disrupts existing models of authorship and attribution. Greater transparency is possible with these taxonomies; however, collaborative teams evolve as expertise increases and roles shift as students or faculty come in and out of the project. Activity definitions, like those used by TaDiRAH represent just one side of the story that includes contributor narrative statements and historical perspectives of the evolution of roles as the overlap and shift over time. The humanities-specific logic of history and narrative come to define our model.

As we discussed at the opening, our perspective emerged during our participation in the Mellon-funded Scholarly Communication Institute (SCI) hosted by the Research Triangle of North Carolina from the 11th to the 15th of October, 2015. Our discussions during this week centered on digital humanities work as a community of practice, wherein the community is formed by the very methods and techniques employed. TaDIRAH includes "community_building" and "teaching_and_learning" in the taxonomy of activities, but these roles do not map easily to student participation and define what constitutes these acts. During the week at SCI, we were engaged on multiple levels of community building and teaching and learning, but these activities were difficult to capture in the current taxonomies. We turned to building a timeline with Timeline.js to show how our thought evolved. We built a project site to capture our collaboratively written white paper, which used Google Docs to shape our team's discussions. We strove to have our project site reflect the fluidity of born digital content, which evinces different issues related to credit, to valuing varied contributions, and the articulation of participation in our thinking. The romantic ideal of the solitary genius and the writer in his garret was transparent to us as we worked in a multimedia environment, rapidly picking up tasks, and sharing information. The taxonomies of contributorship faded as we grappled with collecting our conversation. The timeline of our thinking includes tweets from group members and digital photographs of our activity, many of which were taken by Eric Dye. We argue for a radical inclusiveness that recognises the very real labor of contributors that may manifest in a variety of ways. This is a model of digital scholarship that is interested in the big picture of academia intersecting with the public and of pedagogy existing as research. Knowledge is a networked thing, and conceiving of scholarship as an inherently collaborative venture enriches the people and the products of any given field. Having begun in-depth discussion of theoretical issues, we realised that our key insights to discussions of how to evaluate digital work emerged from extensive practical knowledge. To expand on those insights, we developed a number of project-based case studies that highlighted the collaboration behind them. These case studies might serve as models for further study to gain information on more widespread practices in digital scholarship.

Layered Dependencies: DH Case Studies

With a desire to identify universal bridges between disciplines, we turned to narrative case studies about four projects that involved our team members in a range of capacities, including as facilitator, project manager, principal investigator, and student collaborator. These case studies work from the understanding that a granular approach to contribution, as would be captured in a metric that simply counted GitHub commits, would not appreciate the contributions of individuals who may have provided a critical insight or discovery that shaped the evolution of our projects. We found that historical accounting of activities helped lay bare the methodological decisions of each group as they evolved. Our realization in our heterogeneous group was that there are layers of dependences between technology and expertise that foregrounds students, staff, and faculty roles in a highly variable way. We found that a mentorship model that flattened hierarchies between participants allowed for a fuller sense of participation and a holistic representation of the insights offered by any one individual.

12th Street Project

The 12th Street Project is a collaborative effort of the students and faculty at Penn State Behrend. 12th Street emerges from three needs arising from the students and faculty at the college. Hosted by the Penn State Digital Humanities Lab, 12th Street collects the history, culture, and contemporary voices of those living in Erie, PA. The project takes its name from an industrial corridor in Erie that has been lined with factories and businesses throughout the region's history. We take 12th Street as a microcosm of the social, cultural, and economic forces that have shaped the region since the mid-19th century. Together we are charting the history of the region in an effort to imagine its potential futures. Developed on Omeka and the Neatline add-on, 12th Street is a local geographical history of the region that appeals to a global

audience. The campus has recently developed an undergraduate major program in Digital Media, Arts, and Technology, otherwise known as DIGIT. The program positions undergraduate research opportunities at the core of the curriculum and necessitates open and dynamic collaboration. The major is organized around four media specific concentrations that include text analysis, sound design and film production, data visualization, and modeling and simulation. 12th Street is capable of accommodating a wide range of multimedia contributions and maintain coherence through its dedication to explaining the relationship between space and place as well as culture and economy. The project is intended to grow organically with the interests of participating faculty and students. An emphasis on creative works may emerge with the contributions of participating creative writing faculty, or an emphasis on visual history may develop over time with the contributions of our arts and humanities faculty and students.

For example, Eric Dye's contributed a review and analysis of the history of the locomotive industry in Erie through a juxtaposition of images from the past and present. Local public library archives, as well as community and company materials, have become resources to help frame the cultural impacts of the 1853 Erie Gauge War or more recent attempts to move the engine manufacturing industry to tax and labor friendly jurisdictions. This contribution also includes interviews, newspapers, maps, and economic census data. By contrast, "The Masonic Temple as a Microcosm of Erie History" is another multimedia submission that Bridget Jenkins has developed. It encompasses a visual and textual report that detailed how the Erie Masonic Temple's survival and development represents a template for the evolution of the city and the region. Jenkins encountered difficulties in finding a relevant original documentation, so she began networking outside of the library system. Eventually, she connected with an individual within one of the Temple's Masonic bodies that had collected documents throughout the years in an aim to have the Temple listed as a historic site. This documentation, combined with the other minimal information she had scrounged from the libraries and online, provided her with the foundation for her project. She then contributed photographs and a personal narrative of what the building looks like today. Joining the historical documents with the present conditions enabled her to explain a narrative of the broader social and cultural importance of the building. Because Eric came to his contributions with a pre-existing expertise in photography, his methodological focus embraced photography. Jenkins came to her research with a robust background in journalism and public scholarship. She was able to locate unique resources by directly engaging with knowledge stakeholders and current users of the space. While Dye and Jenkins worked on their own component of the project, they were able to chart each other's progress on Yammer and celebrate each other's milestones. In this way, the faculty lead, Aaron Mauro, describes himself as laying out the canvas that will become the big-tent of DH at the undergraduate level. Students are responsible for completing projects in a fluid and additive way. They each pull up poles to support the larger structure. Through their individual efforts, they build a community of practice that shifts and evolves with the interests of the student contributors and the skills offered by faculty teaching at Behrend.

Digital Scudéry

Digital Scudéry is an interdisciplinary, interdivisional collaboration at the College of Wooster that will result in digitally transcribed textual surrogates for five of Madelaine de Scudéry's late seventeenth- and early eighteenth-century books. The end result of the project is not conceived as a digital edition per se, but as a version of de Scudéry's *Conversations* that students can (1) read more easily than they can images of the printed books and (2) encode with research-based XML tags using Text Encoding Initiative (TEI) standards. The project began with a pedagogical challenge: both the seventeenth-century French and the unfamiliar typography offered challenges to Laura Burch's students, the latter of which was a distraction from the pedagogical efficacy of the former. By bringing this pedagogical question to Jacob Heil, then The Ohio Five's Digital Scholar, working under the auspices of an Andrew W. Mellon Foundation Grant to help faculty with digital pedagogical projects, Prof. Burch kicked off a process that would come to involve multiple faculty, staff, and student partners.

The first phase of the project involved four students' transcriptions of the first book of de Scudéry's *Conversations*, comprised of two volumes, approximately 400 pages apiece. In attempts to mitigate the tedium of transcription Burch designed revolving student pairings so that they might practice their acquisition of French while cross-checking their transcriptions by reading aloud to their partners over Google Hangouts. The team of students–Shelby Stone (Wooster '15), Marie Schroder ('17), Jennifer Filak ('16), and Grace Gamble ('17)–also worked in Basecamp so that they might raise questions about transcription publicly; Burch, Heil, and Stephen Flynn (at the time, Wooster's Emerging

Technologies LIbrarian) found in these questions opportunities to discuss editorial practice, the idiosyncrasies of books made during the handpress period of printing, and about structured markup. Regarding the latter of these, Flynn designed a "pre-TEI" workflow so that students would have a gentle introduction to angle brackets without getting in the way of the transcription itself. The students were exposed to light markup that Flynn then transformed into valid TEI via scripts and ported it into an interface like TEI Boilerplate. Finally, a senior computer science student was hired for a few weeks simply to explore TEI Boilerplate: Douglas Code was tasked only with exploring creative, project-specific hacks to the Boilerplate code and in his brief time on the project was able to create a table of contents to facilitate ease of reading.

At its outset, then, Digital Scudéry was a partnership between student editors transcribing the text, a librarian creating a technical framework, a student coder/hacker, a faculty member, and the Five Colleges' Digital Scholar. To this point, Heil had been framing the project at the topmost level by suggesting tools and frameworks like TEI and Basecamp, and by guiding overall project timelines based on planning meetings, expressed goals, and local resources. For his part the project was an experiment designed to help us walk through the role of TEI in our transcription projects on the Liberal Arts campus. Additionally, however, Heil was also attempting to find partners in computer science who might save the project from manual transcription by tailoring the optical character recognition (OCR) workflows designed as a part of the Early Modern OCR Project (eMOP) at Texas A&M University. Professor Sofia Visa introduced an optional assignment in her machine learning class and recruited Will Rial, a rising senior at Wooster who worked over the summer tailor these workflows. (Rial has presented talks and posters and has a forthcoming publication on his design.) Next steps for the project will include close collaboration between Rial and a French Language and Literature student to further refine the OCR outputs so that the final four books in de Scudéry's oeuvre can be OCR'd effectively. The result of the project is not just machine- and human-readable texts, but it will also contribute to the digital humanities world's knowledge base on the OCR technologies and processes that are essentially to freeing the millions of pages of human cultural artifacts from the digital images on which they are *preserved.*

While *Digital Scudéry* will result in digital, pedagogically useful texts for Professor Burch to use in her courses–her initial goal–it additionally demonstrates an ethically motivated and no less expedient series of collaborations. In the aforementioned partnership between libraries, students, faculty members, and an #altac facilitator, each party brought their expertise to the table and, importantly, informed the project's processes in meaningful ways. Additionally, Heil sought an opportunity for a "coincidental collaboration" in which Visa and Rial could use data from Burch et al. to inform their project, the result of which would benefit Burch's original pedagogical goal without rendering this goal dependent upon the results of the computer science intervention. That is to say that two viable digital, pedagogical projects worked along parallel paths, along which each stakeholder contributed her or his creative and specialized solution to the research questions at hand. Along the way, Digital Scudéry will have deliverables: preservation-quality TEI documents, the potential for a digital edition of Scudéry's work, machine-readable text that can be utilized in the classroom for pedagogical experiments in text mining, introductory TEI workflows for encoding projects, OCR processes for printed seventeenth-century French books, and post-processing scripts to clean the OCR output. The project also exemplifies ethical interdisciplinary, interdivisional collaborations at two different scales while it introduces more possibilities for collaboration in the near term: Heil hopes to fold the lessons learned into processes that can result in whole-campus collaborations that formally knit together faculty teaching, student research, and library and educational technologies' technical acumen. It is a version of interdisciplinary collaboration that is facilitated at the level of an academic superstructure–here, the Ohio Five, the library, the Ed Tech division–rather than at the level of individual faculty researcher(s).

ReKN

The Renaissance Knowledge Network (ReKN) is a major scholarly initiative designed to augment digital scholarship in early modern studies by developing an integrated research, analysis, and production environment. It is based at the Electronic Textual Cultures Lab (University of Victoria) and has been developed in partnership with Iter (University of Toronto Scarborough); ReKN also works closely with the Implementing New Knowledge Environments Project (Social Sciences and Humanities Research Council Major Collaborative Research Initiative) and the Advanced Research Consortium (Texas A&M University). Led jointly by Dr Raymond G. Siemens (Canada Research Chair in Humanities

Computing and Distinguished Professor of English and Computer Science at the University of Victoria) and Dr William R. Bowen (Director of Iter: Gateway to the Middle Ages and Renaissance and Chair of the Department of Arts, Culture and Media at the University of Toronto Scarborough), it is a network of researchers, projects, and resources dedicated to sharing and disseminating digital resources related to early modern studies.

ReKN, as both a potential scholarly platform and, more importantly, an intellectual community, is devoted to understanding, critiquing, and building digital projects for the study of the Renaissance. These aims ensure that the scope and significance of individual and institutional contributions are maximised across the scholarly community of interest. ReKN directly addresses the growing challenge of diverse, isolated, and siloed digital resources by building a scholarly environment explicitly tailored to the needs of humanities scholars studying the Renaissance. ReKN seeks to bring existing scholarly resources and methods into conversation by integrating research, discovery, exploration, analysis, and visualisation. ReKN will take shape at the intersection of the initiatives, projects, and trends outlined above, providing a single point of entry into an entire galaxy of scholarly activity, specialised for and oriented to scholars of the Renaissance. It is a resource for searching and discovering, for analysing and exploring, and for publishing and writing. And in all of these diverse activities we are cognisant of the many ways the community is formed, collaboration occurs, and research is shared and debated. ReKN is being developed from its inception to encompass the ways that not only researchers interact with each other, but the many ways in which digital resources and tools benefit from interoperability and cross communication. ReKN is at once a unique technological resource, a focal point for diverse digital resources, and a community–of individuals, of practice, and of scholarly work. It is a social, scholarly working environment and a community of users, researchers, developers, the public, datasets, projects, publications, and networks.

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Over the past year, the ReKN team was distributed amongst several time zones and institutions, with many members of the team frequently on the road for conference travel. While this afforded some benefits, it also produced difficulties in communication and decision making. Skype conferences, for example, were difficult to schedule between Europe, Toronto, and Victoria, and as a result were usually several hours in length when finally scheduled. We also found that different work styles and personalities made project coordination difficult at times, especially as concerned software and platform deliverables. We also found that the local and individual needs of the graduate students hired as research assistants often meant that they did not want to intellectual "own" the project. The issues faced by the project with regard to geographical distance and community development is evidence of how a project, with the stated goal of community formation, must actively work to shape that culture internally. The collaborative cultures that we attempt to build on platforms like ReKN must be echoed in the teams that develop the software as well.

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Life Renewed

The Creative Media & Digital Culture program at Washington State University Vancouver (WSUV) has a strong outreach mission, due partly to the WSUV's status as a land grant institution and partly to the tight knit community that helped to found the university a mere 26 years ago. Since the introduction of the Senior Capstone course (DTC 497) to the curriculum in summer 2007, graduating seniors have learned to apply their technological and essential skills to the production of media objects for local non-profit organizations and businesses. To date, students have produced websites, apps, interactive exhibits, videos, digital marketing materials, and 2D and 3D animations for the Council of the Homeless, the Boys and Girls Club, Ridgefield School District, Fort Vancouver National Historic Site, the Oregon Museum for Science and Industry, Mount St. Helens Science and Learning Center at Coldwater Station, the YWCA, Vancouver Business Journal, iQ Credit Union, and others. Of these Life Renewed, the project produced in fall 2014 for the Mount St. Helens Science and Learning Center at Coldwater Station, stands out as most representative of the kind of project that best reflects the way digital humanities work collaboratively with other fields to produce a meaningful experience aimed at fostering learning through sound pedagogy.

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Tasked with telling the story of the plants and animals that have returned to Mount St. Helens since the 1980 eruption, the 23 students in this course began, in August 2014, to research interactive installations relating to environmental phenomena. Exploring science museums, educational facilities, art galleries, and museums from around the world, they assembled a collection of 50 exhibits. They studied these examples using the constraints provided them by the

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scientists at the Station (e.g. size, portability, wide audience interest) developing a comparative analysis that captured the students' observations. The next stage of the project's development had them creating their own exhibit. Using their research, students prepared a proposal for the way in which their exhibit would look and function and delivered this proposal to the scientists in a formal presentation. The end product was the "Life Renewed," an educational environment that includes a mobile app and an interactive installation that provides a 3D simulated flyover of the volcano, two augmented reality banners that reveal 2D hand-made illustrations and 3D animation models, and a touch screen interface for identifying plants and animals found on the mountain.

Once the scientists accepted the students' plan, production on the exhibit began. The students assembled into four teams based on interests and skills: 1) Animation/Video/GIS, 2) Augmented Reality/Interface Design, 3) Web and Mobile, and 4) Digital Marketing and Promotions. Each team worked to develop their own portion of the project, interacting with the scientists and other teams as they created their digital artifacts. Using GIS data, the Animation Team mapped 289 square miles of the volcano in 3D and created a game simulation in which visitors to the exhibit take the persona of a raven flying over the various terrains of Mount St. Helens and observing the animals and plants of that specific area of rebirth. Students also produced hand-made 3D animations of the animals and 2D scientific illustrations of the plants used for the augmented reality environment. The students on the Web and Mobile team built the computer used to power the simulation and produced a large screen and mobile version of it. The Design Team made the augmented reality banners and produced the educational booklet that accompanied the exhibit to be made available to visitors at the Station. The Digital Marketing Team developed and maintained the website that documents the production of the project and hosts many of its assets. Once completed, the exhibit was installed at the Station in celebration of the 35th anniversary of the eruption and remained on site until August 2015. So successful was this project that it won two 1st place awards for undergraduate research and has continued to be exhibited at events, like the recent Portland mini-Maker Faire (Oregon Museum for Science and Industry, September 2015) and Girlfest (Girl Scouts of Oregon and SW Washington, October 2015). While students came to this project with strong technological skills, what they learned in the process of producing the exhibit was how to work collaboratively on teams, to communicate in both written and oral contexts effectively to a variety of audiences—from students, to scientists, to the public—and solve a real-world problem that came with a healthy amount of responsibility and stress. These are the skill sets that help them stand out on the job market and explains why the hiring rate for the program stands at 90%. More importantly, students learn first hand what it means to be part of a community. The team structure encourages this understanding at a micro level as students working with other students, but the collaboration with one another, the faculty, and the scientists to build something of intellectual value for the public teaches students what it means to be citizens of the world.

Revealing the Seams

In large part, the challenges to new systems of evaluation and credit are not technological or infrastructural per se. Instead, they are social, habituated by longstanding disciplinary norms and expectations. They are deeply embedded in administrative norms and processes, from informal expectations to the literal paperwork used within universities. They find expression in tenure and promotion guidelines or traditions that ignore or disincentivize collaborative work and processes, frame digital scholarship as service, or overemphasize the "final product" of digital scholarship. In evaluation frameworks like the Research Excellence Framework in the United Kingdom or the Excellence in Research for Australia, we can observe the nationalization of these standards in an attempt to repatriate scholarship into the limited roles of training a citizenry, which continue to overvalue monographs in rigid point-based systems that determine funding. We see these disciplinary norms in requirements for depositing dissertations as PDFs that often preclude digital work outside that limiting file format. The habits of student evaluation and curriculum development further disincentivize faculty from engaging their students in collaborative teams and training undergraduates and graduates to complete digital projects. Students see faculty trumpeting the arrival of their new book and using it as a calling card for their expertise, while eliding the pressures of tenure and promotion. Finally, students run the risk of emulating these worn out modes of scholarly communication and sacrificing their education to repeat the cycle.

Through our case studies, we hope to narrativize how a project's processes, participation patterns, and outcomes can cast these formally and informally institutionalized values in relief. At its core, the approach is humanistic: we tell the stories of our projects in an attempt to glimpse the connectedness that holds true collaboration and ethical distribution of

credit as a core value. Our case studies bring to light our attempts at flattened hierarchies and, within such a two-dimensional model, the sites of overlapping knowledge and abilities that are sewn together into the fabric of our projects. To return to Ratto's terminology, our approach embraces its "seamfulness" [Ratto 2007]. The seamlessness of contemporary consumer electronics contains a rhetoric that elides the process of development, which we argue is the key moment when new knowledge and insights are created. By embracing the collaborative development as a core concern for digital humanities pedagogy and research, we reject the consumerist privileging of a final product and embrace an evolving model of social knowledge creation. As a development ethos guiding projects, Chalmers and Galani describe an approach to interface that "involves deliberately revealing seams to users, and taking advantage of features usually considered as negative or problematic" [Chalmers and Galani 2004, 1]. For our purposes, the seam is not a failure but a redoubling that results from layered, overlapping systems; our seams strengthen rather than weaken interpersonal signals. Nevertheless, the seams are sites of contestation in both Chalmers's formulation and our adaptation thereof: in both instances, the seam troubles the system and are "negative or problematic." Ratto pushes the logic of seam*fulness* into an ethical domain by highlighting how consumers of seamless electronics become "passive agents" [Ratto 2007, 24], who are unable to modify or repair the technology they purchase. The ethics of seamlessness is an ethic of disempowerment. When we elide the seams between teaching and research, our students become passive agents and mere consumers of education. Giving them the awareness of the seams between teaching and research allows them to take agency of their education.

As we think through the utility seamful design, there is a danger in adopting tantalizingly figurative formulations: "Seamfully integrated tools would maintain the unique characteristics of each tool, through transformations that retained their individual characteristics" [Chalmers and Galani 2004, 2]. While we certainly want to celebrate our "unique characteristics," the metaphor implies a problematic association between the computational tools and those who use them. We want to continue to push against that gadgetization of human contributorship that Lanier laments and adapt a model that lays bare human networks of overlapping agency, displaying the joints where our projects become knit together. Dean Rehberger, the Director of Matrix at Michigan State University, has helpfully defined Digital Humanities as quilting [Rehberger 2014].[10] Perhaps, if we stretch the needlecraft metaphor even further, we might think of it instead as a motley patchwork of projects that comprise the canvas for our big tent view of DH. We can strengthen that fabric with intentional, ethically designed knowledge networks that, when viewed through a humanistic lens, get us closer (as a large community of practice) to evaluative structures that allow for responsible, care-full accreditation and that foster intentional growth rather than sprawl.

<div style="text-align:right">31</div>

Notes

[1] We have used the Taxonomy of Digital Research Activities in the Humanities (TaDiRAH) to describe our contributions to this article. Please find the full reference of activities here: https://github.com/dhtaxonomy/TaDiRAH/blob/master/reference/activities.md This taxonomy was brought to our collective attention at the 2015 Scholarly Communication Institute by the "Modeling contributorship with TaDiRAH" team, comprised of Cassidy Sugimoto, J. Britt Holbrook, Korey Jackson, Zach Coble, April Hathcock, and Micah Vandegrift.

[1] In *Communities of Practice: Learning, Meaning, and Identity*, Etienne Wenger posits a social theory of learning advanced by the formation of communities of practice. Wegner argues for "three dimensions of the relation by which practice is the source of coherence of a community": "mutual engagement… a joint enterprise … a shared repertoire." [Wenger 1998]

[2] We have worked to extend John Maxwell's definition of "open scholarship" in "Beyond Open Access to Open Content" to imagine open access publishing alongside social media and collaborative practices [Maxwell 2015].

[3] Even as the term "digital native" became anchored in common terminology, contemporary criticism of the coining remains as clear and important then as now: Timothy VanSlyke's "Some Thoughts from the Generation Gap" in *The Technology Source* (2003) offers an even handed rebuttal to the initial enthusiasm for the term. Somewhat tellingly, the conversation about the term occurred largely in blogs, like that of Henry Jenkins. His post "Reconsidering Digital Natives" (2007), on his blog *Confessions of an Aca-fan*, does a remarkable job of laying bare the assumptions that Prensky uses to form his rough analogy between digital nativists and immigrants. By 2011, Michael Thomas was able to edit an anthology tasked with *Deconstructing Digital Natives*. The term had become myth and now required a more thorough rereading as a corrective to the popular uptake of the term.

[4] Miriam Posner shares a similar sentiment in a blog post entitled, "Money and Time": "We want to believe that we can be agile and innovative, like Silicon Valley says it is, by making DH run with short-term grants, app contests, and temporary labor. We want to have a sort of Uber-style sharing economy for DH-research. But this is not how one supports careful, enduring scholarship and teaching."

[5] *Digital Scholarship in the Humanities*, *Digital Humanities Quarterly*, *Digital Studies/Le champ numérique*, *Journal of Digital Humanities*, and *DH Commons* all accept research that is in-progress. The expectation of a completed project, as one would expect a completed and static monograph, is simply not possible. Susan Brown et al., in "Published Yet Never Done," describes this reality in relation to the long development and evolution of the Orlando Project [Brown et al. 2009].

[6] This is a well worn genre within scholarly communication, but a range of concerns persist, from tenure and promotion committees, institutional reform, and the economics of publishing: Jennifer Wolfe Thompson's "The Death of the Scholarly Monograph in the Humanities? Citation Patterns in Literary Scholarship" details the relationship between publications through tenure and promotion processes in particular [Thompson 2007], Blaise Cronin and Kathryn La Barre's "Mickey Mouse and Milton: book publishing in the humanities"" has offered an analysis of institutional language supporting the monograph [Cronin and La Barre 2004], and Carlos J. Alonso et al., in a proceedings published by the American Council of Learned societies, "Crises and Opportunities: The Futures of Scholarly Publishing," describe the problem as both an issue of university self-governance, peer review, and economic factors [Alonso et al. 2003].

[7] The drafting of this article was made possible by the Slack platform. However, members of this team have used Yammer and Basecamp to similar success in linking teams through the logic and interface of social media.

[8] Sean Michael Morris and Jesse Stommel have also drafted a "Bill of Rights and Principles for Learning in the Digital Age" that works to enshrine the quality and care of face-to-face education in an online environment like MOOCs. While this Bill of Rights is critical for students and faculty to enshrine pedagogical values like openness and inclusivity in an online environment, this document does not focus directly on the collaborative project based methods of many digital humanities. We also are not concerned with politically motivated "academic bills of rights" that seek "to end the political abuse of the university and to restore integrity to the academic mission as a disinterested pursuit of knowledge" [Academic Bill of Rights]. These rights are promoted by the David Horowitz Freedom Center, a conservative think tank, which seeks to depoliticize education with the goal of promoting racist, classist, and sexist policies [David Horowitz Freedom Center]. We highlight these viewpoints to express how politicised the "rights" of students has become and how online environments are proving to be a point of contention from several perspectives.

[9] The CrediT project is an activity of Consortia Advancing Standards in Research Administration Information (http://casrai.org/CRediT), and TaDiRAH is a project initiated by DARIAH (https://github.com/dhtaxonomy/TaDiRAH).

[10] Dean Rehberger defined digital humanities during the 2014 Day of DH in the following way: "Metaphorically it is like making quilts: it takes many hands, it is about making, it is about reuse & remix, it is an art & science, and while devalued by some it is ultimately empowering and transformative" (http://dayofdh2014.matrix.msu.edu/members/deanreh/).

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