Articles

Connecting the dots: Integrating modular networks and narrativity in digital scholarship

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Abstract

Lev Manovich posits that new media and the World Wide Web are modular or layered in nature, similar to structural computer programming in that their distinct elements are combinative while retaining independence. Modular structures and systems (such as Lego, mobile apps, computer software, and even language itself) exchange precision, specific connectivity, narrative stability, and a focus on progressive products for flexibility, general compatibility, adaptiveness and a focus on aggregative processes. These attributes are well suited for new knowledge environments: Peter Schillingsburg sees modularity at the heart of dynamic digital collaboration and Susan Brown (et al) liken the modularity of digital projects to the cumulative nature of academic periodicals but caution that such projects are still often judged "as if they were a book," or by their apparent finishedness. While scholarly journal articles and monographs, as finished products of scholarly activity, are not often constructed to demonstrate modularity or to function as modular components in broader arenas of scholarly communication, they could be reimagined as such (beyond citation). This is something that the NewRadial environment encourages through its modular design and in the kinds of modular scholarly communication that it facilitates.

Lev Manovich soutient que les nouveaux médias et le World Wide Web sont de nature modulaire et superposée, semblable à la programmation informatique structurale, en ce sens que leurs éléments distincts sont combinatoires tout en conservant leur indépendance. Les structures et les systèmes modulaires (comme Lego, les applications mobiles, les logiciels, et même le langage lui-même) échangent une précision, une connectivité spécifique, une stabilité narrative, et une attention aux produits progressifs en termes de flexibilité, de compatibilité générale, d'adaptabilité, et d'attention aux procédés agrégatifs. Ces attributs sont bien adaptés aux nouveaux environnements de connaissances: Peter Schillingsburg voit la modularité au cœur de la collaboration numérique dynamique et Susan Brown et al. font un rapprochement entre la modularité des projets numériques et la nature cumulative des revues universitaires, mais précise toutefois que ces projets sont souvent jugés « comme s'ils étaient un livre », ou d'après leur aspect fini apparent. Bien que les articles et les monographies de périodiques, comme produits finis de l'activité érudite, ne sont pas souvent édifiés de façon à démontrer la modularité ou à fonctionner comme éléments modulaires dans les arènes plus vastes de la communication érudite, ils pourraient être ré-imaginés comme tels (au-delà de la citation). C'est un concept que l'environnement NewRadial encourage par l'entremise de sa conception modulaire et dans les types de communication érudite modulaire qu'il facilite.

Introduction: Modularity and Digital Humanities

Lev Manovich posits that new media and the World Wide Web are modular or layered in nature, similar to structural computer programming in that their distinct elements are combinative while retaining independence (2002, 31). Following from this idea, we've been prototypically exploring modularity's potential in the scholarly use of humanities databases via INKE's NewRadial environment. Whereas traditional scholarly communication obscures its modular aspects through narratively constructed illusions of finishedness and completeness, through work defined by production and consumption, the INKE NewRadial prototype--through its design and in the unique kinds of scholarly communication and exchange that it encourages—foregrounds, embraces and extends "playful making" opportunities in a dynamic environment. The modular nature of this prototype promotes a productive co-existence of networked and narrative approaches to digital scholarship. Such experiments are necessary in our transitional research climate, in which reading and writing practices are becoming increasingly mediated and augmented by digital platforms. We need to take full advantage of the ways that these platforms can help us to confront and explore the networked complexity of, and between, a multitude of narrative histories. However, since stories remain the primary means of understanding our world in a humanities context, visualizing multiple narrative pathways through emerging networks of humanities data also enables users to better comprehend these large-scale networks of information without losing perspective or meaning.

Enabling narratives and networks through modularity

Whereas networked understanding reveals clusters of associative relations, narrative understanding relies on assumptions and constructed pathways of temporal continuity and causality. While these logic patterns may appear to be opposed to one another, modularity has the potential to enable a constructive simultaneity of network and narrative perspectives. This opportunity is not something that is exclusively facilitated by the shift to digital platforms, however. One pre-digital model for the way that modularity can generate the contemplation of narrative networks and network narratives is Samuel Beckett's short story "Lessness." The 120 sentences of the piece, which are divided up into 24 paragraphs, suggest a sense of underlying structure through image and aurality but they are assembled entirely randomly. To create the short story text, Beckett composed each of the sentences and then drew little slips of paper out of a container to determine the order they would appear in. As a result, the version Beckett published represents only a fraction of the possible combinations, and the text can be reassembled into "8.3 x10^{81} possible orderings" (Haahr and Drew 2000) according to how the reader constructs the meaning of the text for themselves. Drawing on this potential, Elizabeth Drew and Mads Haahr created "Possible Lessnesses" (https://www.random.org/lessness) a website which generates all the different potential versions of "Lessness" one at a time for the user. What is notable about Beckett's piece is that while it is composed of modular components, the nodes that collectively comprise the network of the text are designed to be reconfigured into multiple narrative configurations.

The different sentences which are the nodes of Beckett's piece are all thematically associated, existing in a multi-directional relationship with one another. "Lessness" is thus a possibility field full of potential meanings because its narrative structure is not pre-rendered. Instead, the modular nature of the nodes encourages the user to employ both linear and relational logic; readers are empowered to assemble single-direction patterns, constellating the already-networked material in specifically narrative ways. But no narrative pattern which the reader creates is ever authoritative or final. Each time "Possible Lessness" is refreshed, the modular nature which is obscured by the display of a single linear narrative pathway is revealed, enabling the user to produce different, and just as legitimate, narrative pathways in the relational "network" of the story. "Lessness" is therefore eternally a work in process; it can never be definitively "finished" because the building blocks are constantly being re-formed by each reader's individual experience. This esoteric literary experiment utilizes modularity to enable a rich, fluid environment in which networks and narratives co-exist, reminding us of the textile network or woven heart of textual narrative.

As illustrated by "Lessness," the potential of modularity to encourage a simultaneity of network and narrative perspectives is not something that has been recently or exclusively enabled by the shift to digital platforms. Take languages, for example: each modular piece at each scale (letters, words, sentences, paragraphs, pages and books) has resulted in a robust and recombinative system of representation that has traded restrictive resemblance for efficient yet flexible expression. Another familiar example would be the commercially successful *Lego* building system which, while a toy, functions like a language. Users creatively, innovatively and practically construct and configure pieces into aggregate symbolic shapes that others can recognize and make use of. Lego has thus become a flexible maker system that promotes unique creative inventions as well as reproducible designs and patterns. Generally, these modular structures and systems exceed precision, specific and restrictive connectivity, narrative stability, and a focus on progressive products, via flexibility, general compatibility, adaptiveness and a focus on aggregative processes. These attributes are well-suited for new knowledge environments and for the migration of more traditional means of scholarly communication to such environments. As Susan Brown suggests:

> Many ongoing digital publications should be understood by analogy with journals, for whom "done" can be applied to particular issues but not to the relevant research area. Continuing work despite previous publication is then part of the mandate, rather than the extraordinary burden it would seem in comparison with a book. The analogy applies only in part, because of course the entire text of a digital publication is fluid and subject to ongoing revision as that of a print journal is not. ([Brown et al. 2009](#))

Journal issues (whether print or digital) are not "done"—they are amalgamations of process, signposts that mark a number of potentially related threads of past and possible academic conversations, nodes that define intersections in a network of branching argumentative routes. This position is influenced by Roland Barthes' distinction between "work" and "text," which—while rooted in linguistic preoccupations and critical theory —functions as a kind of prologue to the questions and issues that impact the digital humanities, helping us to conceptually broaden pragmatic, structuralist perceptions of language as a model for knowledge to include post-structuralist, poetic perceptions. In "From work to text," Barthes suggests that "text" is subversive, a plurality that is composed of a web of signification whose intertextuality has no origin or destination. The "text" is a methodological field, a social space of play related to process ([Barthes 1977](#), 157), whereas the "work" is a materialized commodity, encouraging passive consumption and reductively relying on the assumption that there are static, predictable skeletal structures or patterns at the heart of and between every text. Like Barthes' "work," indexes are built via ontological categorization, whereas relational databases incorporate a more "textual" flexibility. However, digital knowledge environments, interfaces and tools can be developed to more fully embrace Barthes' idea of "text" in that they don't have to respect or preserve structural foundations in the types of representation, scholarship and communication that they encourage. Digital environments offer the opportunity to play with ideas of publication, argumentation and meaning-making processes as defined by print cultural practices.

However, Brown et al. recognize that that digital projects that rely on modularity are still often judged "as if they were a book," or by their apparent finishedness:

> Thus, while structuring projects modularly is highly desirable for a range of reasons, truly modular publication may present challenges with respect to audiences from beyond the digital humanities community. Research domain, project conceptualization, and publication options are all crucial determinants of how "done" will be defined for a particular project. Project members need to arrive at a shared understanding of what constitutes an acceptable degree of intellectual maturity, critical mass of content, and technological finish at initial publication. This is particularly important since projects often seem to be judged by both funders and traditional humanities users according to their state at first release, as if they were a book. Once a first set of

material is released, staged publication — such as the addition of new components, functionalities, or alternative interfaces — and incrementation — such as additions to or enhancement of existing content — become easier. ([Brown et al. 2009](#))

Although we have traditionally perceived existing scholarship as contributing to new publications in modular ways (i.e. the literature review in a doctoral dissertation or relevant quotations used to buttress ideas in articles or monographs), as Brown suggests, our print-based sensibilities have conditioned us to perceive published work as the product of a finished process, an academic commodity, rather than an orientation point in a continual development process. This perspective (unfortunately reinforced by "funders and traditional humanities users") is detrimental both to the affordances and to the content of fluid, digital knowledge environments.

While Brown suggests that such products be seen as sets, we counter that the idea of "truly modular" humanities publication needs to evolve from the idea of first appearance as final version, toward a model that extends beyond Brown's suggestion of establishing a baseline "set" of material. Beyond simply adding to, enhancing or ornamenting a core database, humanities scholarship that takes full advantage of the complex interplay between narrative and network logic should remain vulnerable to iteration, versioning, forking and replacement. In narrative terms, the perspective of individual scholarship is never objective, but offers one narrative spoke that contributes to the overall circumference of ideas, questions and provocations relating to a particular subject area. In spatial terms, scholarly critical work traces and evaluates particular routes through and between regions of ideas. Perhaps this is the key to successfully preserving and extending modular practices from print cultural practice to digital environments: maintain the idea of versions or witnesses, but also realize that such versions are reconfigurable and interoperable, but not necessarily progressive or corrective.

Peter Schillingsburg supports such a model and sees modularity at the heart of dynamic digital collaboration, suggesting that

> … we need to develop a collaborative electronic workspace for the construction of textual "knowledge sites" that will be dynamic, interactive scholarly environments. To be collaborative, the contributions of each scholar should be made up of modular components, connectable, and extendible, such that the parts can be enhanced, repaired or replaced without damaging the network that comprises the whole — whatever it is that the whole turns out to be. The products of our scholarly activities should not aim to be finished mega-wholes to be looked at but not touched; instead, we should aim to contribute component parts to be worked with and enhanced. We should contribute to a growing work site, added to by many different scholars to create wide-ranging knowledge, where users can take control of their copies of the archives and editions to do with as they see fit, and not be restricted to uses and materials the developers saw fit to foresee. ([Shillingsburg 2009](#))

The question that arises from Shillingsburg's observations is: what should constitute the component parts of this productively modular model of digital scholarship? Shillingsburg's promotion of modularity suggests that each scholar's contribution be comprised of modular parts, which implies that he views scholarship overall as an aggregation, an unfinal arrangement or patterning of pieces which offers meaning but also configurable and extensible potential. If this is the case, then digital equivalents of articles or monographs are preconfigured narrative collections of modular pieces that preserve an openness by remaining open to reconfiguration and recombination. It is difficult to determine what constitutes a modular piece in Schillingsburg's model: a paragraph? An idea? A quotation? An example? A smaller quotation or sentence? A literary or theoretical term? Perhaps all of these?

These uncertainties remind us that we're at a transition point in which we find it difficult to conceptualize

anything new through anything but traditional frames. Johanna Drucker reflects on the potential opportunity that emerges from such transition, suggesting that

> "all acts of migration from one medium to another, one state of instantiation to another, are mutations. The antidotes to the familiarity that blinds us is embrace of parallax, disaggregation of the illusion of singularity through comparatist and relativist approaches, and engagement with fragmentation and partial presentations of knowledge that expose the illusion of seamless wholeness." ([2013](#))

The mutations that Drucker associates with transitional forms of mediation (and which we're extending to transitional forms of scholarly communication) ARE the antidotes to familiarity in that they simply expose us to features that have been present all along, but which which we have become habitually blinded to. The uniqueness of Beckett's literary mechanism/platform in "Lessness" is actually a common feature of a knowledge community's scholarly communications: secondary scholarship is composed of networks of intersecting and interdependent conversational narratives built up around primary nodes of expression. However, rather than embracing the potential of this feature, traditional literary criticism reductively emulates the form and function of its subject matter by obscuring its modular aspects through constructed illusions of finishedness and completeness, and through the conventions of print-based production, dissemination and consumption. Beckett's experiment reminds us of the continuing importance of poetic accidents, metaphorical methodologies and inferential illogics that remain essential to our encounter with meaningful complexity in humanities work. Taking Beckett's cue, digitally-enabled environments such as NewRadial can be designed to encourage scholarly practices that embrace and extend playful networking opportunities while retaining narrative logic as a meaningful form of construction and assertion, as such environments can be calibrated to foreground the inherent modularity of scholarship and of language.

NewRadial: Prototyping ideals, ideas and intentions

The [NewRadial](#) prototype, enabled by the INKE Major Collaborative Research Initiative and a research team composed of colleagues and graduate students, is an interactive web-based platform for searching, sorting, collecting and curating data objects that can be pulled in and mixed together from open content databases.

Figure 1: NewRadial models modular critical perception by displaying the content of multiple databases in the same visual field.

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Currently, NewRadial works with image and text-based content and visually maps this content as groups of nodes arranged in circles or radials. Nodes often represent a single data object, but in the case of written texts (such as plays, poetry or prose) or linked data structures users, can "drill down" to expose new radials of nodes that represent finer distinctions (such as specific paragraphs or lines of poetry), or—in the case of linked data—categorical associations and related data objects.

Figure 2: Users can drill down through nested scales of representation. NewRadial displays these different layers together.

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This web-based interface uses javascript adapters to query existing databases and to display search results

from multiple (often incompatible) databases on NewRadial's webpage canvas. Each data object is represented as a modular node object that can be connected to or grouped with any other node.

Figure 3: Data objects as modular nodes in NewRadial.

Data objects as modular nodes in NewRadial.

Collections of modular nodes can thus be remixed, reconfigured or combined with node objects from other databases. Essentially, NewRadial has been constructed to offer a way for scholars to bridge close and distant reading practices and to create compatibility between distinct datasets using software adapters rather than requiring larger-scale metadata correlation.

NewRadial prototypically employs modularity to construct a space for scholarly research and communication that draws the user's attention to the modular nature of the products of scholarly research, reshaping scholarly work as a process of active thinking through construction, recombination and experimentation within a larger system. Such modular structures and systems rely on flexibility, general compatibility, adaptiveness and a focus on aggregative processes, which are well suited for new knowledge environments. While scholarly journal articles and monographs, as finished products of scholarly activity, are not often constructed to demonstrate modularity or to function as modular components in broader arenas of scholarly communication, they could be reimagined as such (beyond simple citation practices). This is something that INKE's NewRadial environment encourages through its modular design and in the unique kinds of scholarly communication and exchange that it encourages.

NewRadial generates a fluid environment that promotes movement and exchange between narrative and network logics. Such methodological braiding fundamentally changes the nature of narrative and network approaches to scholarship. Networked narratives retain linear and causal perspectives, but exchange the conclusiveness of traditional narratives for dynamic fluidity that makes them adaptable to new regions in the field of ideas. Similarly, the sense-making function of narrative logic enables NewRadial users to make sense of large-scale networks of data because NewRadial's workspace preserves the relational network, the larger regional map onto which the linear pathway is traced. Thus the user remains aware of the multiplicitous narrative pathways that still remain untravelled, and the platform helps the user to bypass the illusion of completeness that following a single narrative pathway often produces. In the same way that NewRadial attempts to bridge close and distant reading practices, narrative pathways through networks produce inclusive meaning opportunities that resist an exclusive focus on either small, isolated portions of a database (preventing holistic comprehensions) or a "hairball" mass of connections (which can lose significance or meaning). Narrative and networking logics become available simultaneously to knowledge communities as users map concurrent, multiple and intersecting perspectives through datasets in the NewRadial platform.

Roland Barthes argues that interdisciplinarity "begins effectively when the solidarity of the old disciplines breaks down" in the interests "of a new object and a new language neither of which has a place in the field of the sciences that were to be brought peacefully together" (Barthes 1977, 155). Extending Barthes' ideas regarding the erosion of disciplinary and methodological limitations, we are using the NewRadial prototype to frame the argument that truly modular scholarly work can only be produced when scholarly output dissolves the boundaries of author/reader, finished/in progress, and narrative/network. By doing so it takes on a new object: the continued production of collections that rely on modularity for their assemblage and which further function as modules for further scholarly inquiry. Such collections expand networks of knowledge while also making room for multiple narrative and dialogic opportunities in a dynamic visual environment.

While NewRadial does not eliminate the possibility of argumentative narrativity, of mapping specific routes through possibility fields, it moderates the authority and finality of such routing by offering an environment in which all routes are aggregately mapped and by emphasizing networked uses of and alternatives to critical

narrativity. Beyond providing a surface upon which these multiple routes can be mapped, NewRadial's ability to represent larger data objects in multiple scales of granularity (at the levels of sentence, paragraph, chapter, and monograph in the case of prose databases) emphasizes the fundamental modularities of language and scholarship as essential to the philosophical building its workspace encourages. Argumentative narrativity and traditional close-reading practices become building blocks in a larger, modular whole that leaves space for creative building as well as fine-grained deconstruction.

Figure 4: There is no exclusive or preferred path, just accumulated traces of use that reveal the flexible modularity, associative possibility and narrative potential of each node.

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In his article "Digital fabric, narrative threads: Patchwork designs on history," Paul Arthur suggests that interactive digital media provide a practical way of facilitating the accommodation of differing perspectives in academic work because such mediation allows multiple lines of inquiry to be given equal weight. He argues that the digital humanities have "accelerated the plurality and relativity that are characteristics of history as it is widely understood in the 21st century" (2008, 107). Arthur's statement carries a residual romanticism about DH, characterizing its practices and outcomes as the potential extension of postmodern decentralization and the elimination of privileged strategies or authoritative frameworks. However, digital mediation involves a re-conscription of information rather than a liberation of information. Like a book, the NewRadial environment is both a location and an experience of learning and exchange. However, while printed book technology invites reader responses, it still offers a largely private and pre-rendered encounter with narratively organized information. In contrast, NewRadial's web-based, socially-constituted knowledge environment offers social tools for critical navigation, collection, curation and conversation within and between humanities databases. In other words, NewRadial generates a public learning and exchange potential by presenting humanities cultural data in a dynamic and customizable HTML5 interface. Its reliance on modular design (both in relation to the NewRadial software itself and the processes that it encourages in relation to the data that it displays) encourages users to construct and communicate via the generation of narrativized and networked data objects by foregrounding the fundamental modularity that already exists in scholarship and in language.

Contrasting print-based narrativity with interactive narratives in 2001, Jane Yellowlees Douglas points out that "there is only one path through all but the most experimental of print narratives" (2001, 44). This not only confirms that a text like Beckett's "Lessness" is an exception to most traditional print-based narrative architectures, but it also implies that such architectures are both constrained and enabled by specific forms of mediation. Narrativity is a logic and a technique by which the connected plot elements of a story are communicated, and the types of mediation used as well as the ways that such media are employed are an essential part of a narrative's point of view. The range of available perspectives and techniques are--at least partly--technologically determined, and specific narrative habits, guided by the affordances and constraints of any mediation process, result in particular architectures that, over time, can become naturalized and normative. Traditional scholarly processes, determined by the affordances of the physical book or monograph and motivated by argumentative rhetoric, tend to result in narrative habits that promote one linear, causal path through information at the expense of other causal and relational pathways that could be explored. Technological shifts often result in defamiliarizations and denaturalizations of such habits, resulting in an increased and pluralized narrative opportunity. As Umberto Eco asks in *The open work*, "How often have new creative modes changed the meaning of form, people's aesthetic expectations, and the very way in which humans perceive reality?" (1989, 83). Migrating the playful potential of Barthes' idea of "text" to his concept of the "open work," Eco goes on to define the "poetics of the open work" as:

a culture that, confronting the universe of perceivable forms and interpretative operations, allows for the complementarity of different studies and different solutions; here is a culture that upholds the value of discontinuity against that of a more conventional continuity; here is a culture that allows for different methods of research not because they may come up with identical results but because they contradict and complement each other in a dialectic opposition that will generate new perspectives and a greater quantity of information. ([1989](#), 83)

NewRadial's design and functions are intended to preserve and extend existing narrative architectures, offering a balance between the *pragmatics* of humanist scholarship, the careful and deliberate tracing of causality and history to expose existing narratives of meaningful illumination, and the *poetics* of such activity, the necessity of encouraging and contributing to a rich, networked connectivity that relies on associative, metaphoric, creative and often counter-intuitive juxtapositions. This productive fusion of network and narrative paradigms is achieved by embracing both processes in the design of this prototype. Rather than approaching synthetics and analytics, poetics and pragmatics, networking and narrativity as methodological oppositions, NewRadial's workspace functions as a field in which these supposed oppositions become compatible and supplement rather than oppose each other. Users can thus construct models of texts that disrupt the apparent inertia of traditional printed material by imagining such materials as flexible objects without boundaries between elements or versions. In this way, NewRadial prototypically establishes a humanities workspace to encourage experimental innovations in scholarly communication. It offers an environment where we can begin to understand and explore potential relationships between modular networks and narrative connectivity.

Pushing against influential scientific currents that blindly subject humanities cultural history to computation, datafication and reductive big-data analysis, INKE's NewRadial environment foregrounds the generative interplay between narratives and networks, encouraging an encounter with texts that is not exclusively reliant on macroscopic reductivity or microscopic limitations. While still allowing users to constellate their own experiential routes through possibility fields of information it resists the tendency to assert any single ontology, structure, pattern, network or narrative as dominant or constitutional. This is done through an acknowledgement of and reliance on modularity through multiple scales, through a flexible toolkit and through the social nature of its web-based, multi-user environment. The critical scholarly methods that it encourages are inherently influenced by its reliance on the modular, recombinable, distributed, communicative and memory features of modern information and communication technologies ([Pentland and Feldman 2007](#), 784-5). Without rejecting narrativity as an instrument of inquiry, NewRadial promotes structure without closure, a "stereographic plurality" ([Barthes 1977](#), 159).

In "Narrative Networks: Patterns of Technology and Organization," which pragmatically focuses on understanding the relationship between technology and organization, Brian Pentland and Martha Feldman propose "narrative networks" as a way to conceptualize such interactions. Their model can be recontextualized to illuminate the processes and opportunities enabled by the NewRadial prototype. They suggest that "organizational forms" (patterns of interaction and use) ([2007](#), 782) and "organizational routines" (patterns of action) ([2007](#), 786) enacted within modern information and communication technologies are emergent, ([2007](#), 782), consisting of "modular, recombinable fragments that...designers, participants and observers combine to create patterns that cohere through sequence, interdependence and purpose" ([2007](#), 793). To conceptually describe and theorize such activity, they propose the idea of "narrative networks," methodological devices for "representing the actual and potential narratives that can be created within some sphere of activity" ([2007](#), 789). While NewRadial operates in a different context than Pentland and Feldman's organization-themed research, their suggestion that a narrative network is a "way of representing and visualizing patterns of action that preserves the multiplicity of possibilities inherent in any organizational form" usefully clarifies the purposes and processes that this prototype encourages.

The NewRadial knowledge environment models modular critical perception because it moves beyond monographic narrative illusions of holistic and comprehensive containment and extends the dialogic, serialized and multithreaded aspects of journal-based communication towards a more aggregative and dynamic modularity. This counters the predispositions of academics, as Ian Bogost observes, towards "semiotic obsession [and] an overabundant fixation on argumentation, such that pedantry replaces curiosity" (Bogost 2012, 91). Following from Pentland and Feldman's suggestion that modern information and communication technologies instantiate use as a means of emergent design, NewRadial's synthesis of modularity and narrativity model research and creative thought as a single process of doing, an active construction of textual models that are malleable, interactive, and experimental. NewRadial's environment encourages users to extend traditional critical processes, to answer questions about relationship and to explore new narrative pathways, embracing the pragmatics of research and the poetics of creative building and collaborative exchange. It thus reflects what Bogost terms "philosophical carpentry" which "may serve myriad other productive and aesthetic purposes, breaking with its origins and entering into dissemination like anything else" but is "first constructed as a theory, or an experiment, or a question—one that can be operated" (2012, 100). Like philosophical carpentry, NewRadial encourages the production of malleable collections that users can manipulate and contribute to in order to consider research questions and explore perspectives. Rather than promoting static finished products, this prototype encourages "producerly" activity, generating virtual makerspaces in which data can be recombined and mapped in multiple ways.

NewRadial's initial design was motivated by the idea that connectivity itself is valuable and enriching in an environment filled with distinct objects. It thus models the scholarly, critical and argumentative curation of sources as a networked and networking process, encouraging the use of edges drawn between nodes to define a topological rather than geographical relationship between collected objects, privileging the way that this information was connected or put together rather than the inherent shape of such connections (which many static statistical visualizations mathematically rely on as a source of meaning potential). This way, the patterns that emerge from user-generated connections, while based in the pragmatic scholarly practice of establishing relationships between secondary and primary sources also becomes a creative activity as the user privileges those areas of the network which inspire their curiosity. In addition, the creation of edges between nodes or groups of nodes requires a user to include textual commentary. This commentary is akin to the first post in a discussion group, and while this means that each connection becomes an opportunity for critical dialogue, it also means that new connections between the same nodes begin new conversations, and all conversations in the NewRadial environment are simultaneously available to browse and contribute to.

Figure 5: Edges in NewRadial function as a site of connection, commentary and potential conversation.

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Users are thus able to observe the various ways that modular nodes are being differently and simultaneously used in multiple configurations and conversations.

David M. Berry's concept of "collective intellect....an association of actors who can think critically together" is the kind of collaboration that digital platforms like NR strive to enable. He argues that communities like this enable "a rolling process of reflexive thinking and collaborative rethinking" (Berry 2012, 10). These communities foreground the modular elements of scholarly praxis, modelling critical thought as an active, communal construction and re-combination of modular elements. Such communities break down the distinction between the pragmatics of research and the poetics of creative, collaborative work through a constant process of making. NewRadial affords fluid movement between individual and communal work, eroding the distinctions between such traditional perspectives by enabling users to see how their modular units are used and commented on by other users. This affordance is distinct from the modularity present in current scholarly practices of citation by modelling this exchange as active and dynamic on both sides,

treating individual and communal work as part of a larger, unified process of building and exchange, aggregation and experiment.

Iterative illuminations: Prototyping as research

Reflecting on the iterative development of this prototype foregrounds some essential questions relating to scholarly research and praxis. In earlier versions of NewRadial, user-created and predefined edges were both limiting and enabling: limiting users to insert commentary as part of a connection or comparison, and enabling them to find, map and argumentatively justify unique connective patterns in cultural datasets. Initially, edges simply represented connection without direction, encouraging users to generate networks of association that did not imply or favour a particular pathway. This affordance emulated connective and comparative modes of print-based critical inquiry, but also deviated from the causal and progressive structures of rhetorical writing. Reflecting on the advantages of such "directionless" edges in a blog post, Robinson writes: "Instead of one linear path to meaning with a beginning and an end, networks reveal many paths, many relationships" (2014). Drawing from Moretti, Robinson goes on to observe that tools such as NewRadial (which encourages the construction of networked relationships between nodes within particular data sets via directionless edges) recreates a model of texts. This remediative remodelling resists conventional narrative architectures and expands scholarship from researching and responding to printed texts via printed texts to a more flexible and multimodal experimentation via the construction of dynamic and multiple relational networks.

What's crucial about Robinson's observations is that the networked model of the text that NewRadial's affordances produce lead to multiple narrative pathways. Given that stories are a fundamental way that we make sense of the world to ourselves and to each other, scholarly communication relies on narrativity, on stories and rhetorical pathways that define a progressive, causal and conclusive perspective. Furthermore, Robinson concludes that NewRadial's environment enables users to visually define and comment on a plurality of narrative pathways through data, effectively creating a network of narrative possibilities. These narratives are facilitated by aggregative research and connective interpretation processes, confirming that network and narrative processes can work in tandem and enrich each other in scholarly research and communication.

Two recently added features further strengthen the ways that NewRadial promotes modular perceptions and networking critical practices while also preserving narrative potential. The first is the ability for users to import nodes that are not part of any existing database or adapter, essentially creating new modules for use in larger modular configurations. In this way, users are not limited to working with the preconfigured collection of database content that NewRadial's adapters provide. Such customizability allows users to creatively circumvent editorial authority and to extend beyond the illusory completeness or finality of particular database collections.

Because many of the essential networking processes involved in scholarly research are often eclipsed and eventually masked by the print-based narrative architectures that frame traditional forms of scholarly communication, INKE's NewRadial development team began to question the prototype's exclusive reliance on networking processes via directionless edges, and instead decided to explore ways to add and include narrative opportunity. At the same time, we also attempted to extend NewRadial's functionality to include compatibility with relational datasets in which edges require a specific direction to make sense of the relation (as in an RDF triple), and this requirement, along with the illuminations resulting from Robinson's reflections, prompted us to introduce the second feature: an opportunity for the creation and display of single-direction edges.

By default, NewRadial's edges were directionless, simply establishing compatibility between modular pieces

and constellating nodes in a networked, non-hierarchical manner in the same way that metaphorical or symbolic associations establish connections between and mutually illuminate two distinct nouns.

Figure 6: Initially, edges simply represented connection without direction, encouraging users to generate networks of association that did not imply or favour a particular relational direction or overall pathway.

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With the addition of single-direction edges, users can now trace a *specific path* through a collection of nodes, a narrative route through a data map.

Figure 7: Single direction edges enable the connection of specific paths through a collection of nodes, akin to mapping a particular narrative through a data environment.

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The availability of directional and directionless edges produces multiple possibilities for user-created connections between two modular components. While this seems like a small "tweak" to the features and functionality of the prototype workspace, the ability to create narrative pathways is something that earlier iterations of NewRadial prohibited through its design choices. As well, many connections between nodes cannot always be adequately defined by a single edge. For example, the ability to add directional edges (visually differentiated from straight-line directionless edges by a parabolic curve and an arrowhead which points to the second of the two connected nodes, indicating a progressive and directional relationship) to connect nodes on the NewRadial canvas means that a directional edge can be added from a "Fred" node to an "Alice" node that defines Fred as Alice's uncle, another directional edge can be added from the "Alice" node to the "Fred" node that define Alice as Fred's niece, and a directionless edge can be added to define a more general familial relationship. As a result of these modifications to its connective edges, the NewRadial environment has become a site in which the relationship and potential intersections between narrative and networked models can be explored in the context of humanities research.

The importance of preserving narrativity

Essay, article and monograph-length arguments are effective tools for scholarly communication, but their continued dominance is puzzling in an age of multimedia and multimodal options. The unnecessary persistence of pedagogical habits, along with the constraining function of a large-scale system of scholarly capital that unimaginatively values books and journal articles above all else, severely limits rhetorical opportunity, conversation and ideas themselves from effectively circulating through knowledge communities. And even more puzzling are the restrictions that we continue to place on the narrative features of our written scholarship: while print-based communications are essentially structured by narrative architectures, students are still instructed to depersonalize and objectify their critical path of argumentation, to make their arguments appear as universally applicable and objectively asserted as possible. Against such advice, Don Bialostosky's "Dialogics as an art of discourse in literary criticism" offers Mikhail Bakhtin's idea of dialogic discourse (which acknowledges an essential synthesis between people and their ideas) as an alternative to the Aristotelian binary of dialectic (sift or support theses) and rhetorical (defend or attack persons) modes of argumentation ([1986](#), 788-789). He suggests that "as practitioners of dialogics we would…[strive] both to recognize the mutual bearings of diverse voices and to answer them from our own perspectives" ([1986](#), 789). In a way, then, Bialostosky at once advocates for narrative and anti-narrative modes of critical discourse that acknowledge specific cultural, temporal and individual contexts: on the one hand, he embraces a critical

subjectivity while on the other, he avoids the reductive beginning, middle and end arc of storied representation.

Approaching this from another route and drawing from Roland Barthes' ideas, Hayden White suggests that narrative is a metacode, a translatable solution to the problem of how to convert knowing into telling (1980, 5-6). He goes on to assert that the absence or refusal of narrative is "an absence or refusal of meaning itself" (1980, 6). However White complicates and clarifies this further by listing epitome, meditation and anatomy as non-narrative modes of historiographical representation that do not refuse meaning, and suggests that these are examples of ways in which critical discourses can be narrated without narrativizing, or imposing the form of a story on their content (1980, 6-7). *Narrativizing* processes tend toward an objective mode, universalizing the story, whereas *narrated* examples grammatically acknowledge subjectivity and perspective at the heart of the story. He concludes by recognizing, however, that "value attached to narrativity in the representation of real events arises out of a desire to have real events display the coherence, integrity, fullness, and closure of an image of life that is and can only be imaginary" (1980, 27).

While agreeing with White's implications that "the narrative form…produces fictions of moral completion and order," Jerome McGann also mourns the disconnection between this hermeneutical type of critical analysis, and non-narrative forms of critical inquiry (such as those related to textual and bibliocritical discourse) (1985, 406). These latter forms "do not merely provide us with "facts" that may elucidate certain words or passages; they characteristically define those vast and regulating structures which alone give meaning to the poetic semiosis. Through such critical works we begin to unravel the inception and reception histories of literary products and thereby the textual structures which re-present those histories in iconic forms" (1985, 401-402). Taxonomically differentiating between narrative and nonnarrative forms of discourse, subdividing the latter into hypothetical, practical, array and dialectic types (1985, 399), McGann explores a bibliographic entry as an arrayed form, noting that

> "arrayed forms organize their materials in certain pre-established patterns and grammars…[and that this] standardized format…declares that…one cannot decide in advance how and in what way these matters will be significant." Further, "an arrayed form …demands that people master its grammar and usage if they are to read it[,]… presupposes the reader's familiarity with the larger context…[and] sets…the gestalt in terms of which all the details can find their possible lines of interconnection." (1985, 404-5)

Unlike White, then, McGann attempts to escape from the ubiquity of narrativity (and the attendant reductivism that accompanies exclusive storytelling paradigms) in critical discourse via an exploration of non-narrative forms and a faith that limited and limiting narratives will inherently deconstruct themselves within larger contexts:

> Particular works have their limits defined for them in the endless discourse whose text can never be established (since it is always being modified and extended). The narratives of literary criticism, then, will have their limits exposed, necessarily, by other critical views and scholarly narratives. Nevertheless, this exposure offers no criticism of the form of narrativity itself or of the apparitions of order and completeness which that form insists upon. (McGann 1985, 410)

McGann's critique of narrative's reductive aspects, along with White's recognition of its meaningful necessity, creates a vital and persistent tension at the heart of critical inquiry. What has changed, however, since their print-based exchange in the 1980s, is that the digital frame offers significant and additional alternatives to print-based forms of critical engagement and communication which simultaneously support narrative and non-narrative modes of meaningful discourse.

While print-based narrative architectures retain their well-established value, the linear, progressive and

evolutionary argumentation that characterize such narratives reinforces illusions of "seamless wholeness." Since stories are such a ubiquitous part of our experience, the habitual dominance of narrative logic can obscure its relational connections to other routes; the habit of following one narrative route from beginning to end in order to complete the text blinds us to the multiplicitous other pathways and networks to be explored. This illusion of seamlessness, formalized through print as a dynamics of narrative cause and effect and through oral traditions as a product of progressive dialogue and debate, is necessary to establish authority at the heart of argumentative work, and has thus become a part of the print-based tradition of scholarly communication. Operationally, these practices reinforce the antagonistic values at the heart of critical argumentation: hierarchy, consensus, competition and elimination. To move beyond such limitation and to take full advantage of digital, networked platforms, we need to see differently, to move beyond the hegemonic habits of critical narrativity.

We are thus using the NewRadial prototype to shatter the seemingly isolated aspects of print-based monograph arguments that employ "narrative form to generate an illusion of completion and moral finishedness" (McGann 1985, 409) and to repurpose the modular opportunities and networked models available through journal serialization (despite the inherent structures of linearity, progress and inheritance that journals embody within their individual articles), while enabling new layers and patterning opportunities within and between those existing forms of scholarship. Creative advances in narrative architectures, enabled through technological affordances, can alter perceptual, pedagogical and practical habits. When perception changes, understanding changes.

Braiding narratives and networks in critical environments

By supporting both narrative and network models, NewRadial disrupts the hegemonic potential of both, placing them on equal footing. While narrative has been the dominant form of discourse in the humanities, Adeline Koh observes that Digital Humanities' wholesale adoption of modularity as "common sensical" masks "the actual political and social moment from which it emerges" (2012). She argues that "as literary theory [has] given critics insights that hide their own foundations, the logics of computation have given us a certain type of structure, a type of tacit understanding, a sort of visible logic and knowing that have simultaneously obscured their own foundational assumptions." Koh contends that even in a discipline that privileges "hack" over "yack" a theoretical metalanguage must be developed in order to expose these underlying assumptions. Modularity, which helped to deconstruct the dominant discourse of narrativity by exposing the networked system of knowledge production which underlies it, must itself be interrogated. While Koh offers only a call for such interrogations, the way in which NewRadial's design enables a fluid shifting between these two discourses seems to offer one means of deconstructing both narrative and network logics by rejecting their identification as binaries. In order to produce a truly self-conscious practice, scholarship must involve a lucid process of shifting perspectives, a continual evaluation and re-evaluation of the constructed nature of all discourse, representation and categorization.

This is, in part, why fluidity between narratives and networks, pragmatics and poetics, the literal and the figurative is so critically important. Judith Butler observes that sedimentation of gender norms produces the phenomenon of the "normal" or "natural" subject and in the same way, sedimentation of any individual perspective or configuration of narrative necessarily becomes normative or, in Koh's terms, "common sensical" (2012). The only means to avoid sedimentation is to conceive of humanities cultural objects, the scholarly discourses that surround and connect them, and the modes and media that critically re-present them as fluid, as constantly changing and exchanging, as being involved in a process which produces a network of narratives along with a narrative of networks rather than an authoritative version. Both narratives and networks have patterns of logic that, when uncritically utilized, prescribe the user's employment and inviting one kind of completion while obscuring other perhaps more open-ended, potentials. By prototyping

unfamiliar environments to expose the constructed nature of all scholarly inquiry, we can come to habitually recognize the affordances and constraints inherent in the fabricated, complex, textile-like weave of any perspective we adopt. As Bethany Nowviskie observes,

> *We need analytical and interpretive* platforms, too, that help us embrace our own subjective positioning in the systems in which we labor–which means, inevitably, to embrace our own complicity and culpability in them. And we need these, at the same time, to help us *see beyond*: to see patterns and trends, to read close and distantly all at once, to know how to act and what to do next. We need platforms that help us understand the workings of the cogs, of which we are one. ([2014](#))

Our prototype argues that the way to encourage the renovation of scholarly habits promoted by Nowviskie is to treat academic work as the act of participating in the construction of intersecting networks and narratives by collecting, curating, configuring and commenting upon modular data objects in an experimental environment. This privileging of experimental and even playful "doing" as a means of developing and sharing scholarly work participates in what Alan Liu identifies in a blog post as a gestalt-shift that is taking place within the humanities "that recasts acts of discourse as acts of "making" and "building"" ([Liu 2014](#)). NewRadial exposes the generally unseen processes which take place between the formulation of an idea or argument and the finished product. In the words of Kathleen Fitzpatrick, it makes explicit "the scholar's work in process, as fragments, that precede the finished product in the form of a book or journal article. Instead of the monograph springing fully formed from the mind of the scholar, we begin to see the building blocks, like a painter in her studio" ([Lopez 2015](#)).

NewRadial's reliance on modularity is actually quite unremarkable in a digital context, but the prevalence of modularity in our computing environments has brought this kind of model into a critical foreground. The NewRadial prototype provides a liquid environment in which modularity informs networked and narrative types of scholarly work simultaneously.

Figure 8: NewRadial provides a liquid environment in which modularity influences and allows for the combination of networked and narrative types of scholarly work.

NewRadial provides a liquid environment in which modularity influences and allows for the combination of networked and narrative types of scholarly work.

Although traditional journal articles and monographs are largely narrative in structure, print-based scholarship treats primary and secondary sources in modular ways, harvesting and integrating necessary components from these predecessors into new constructions. Citation networks (emerging from print-based Works Cited pages and bibliographies and tools such as Zotero, Mendeley and Endnote) thus demonstrate an existing model of networked exchange and use that is not exclusively linear or serial, but multiple, parallel and complex. Digital knowledge environments potentially enhance the speed and malleability of such exchanges, while also offering users the opportunity to more easily perceive the dynamic network maps that modular nodes participate in and circulate through.

From prototype to practice

One example of a project that benefits from the synthesis of networked and narrative perspectives in the NewRadial platform (and which only scratches the surface of scholarly research and communication possibilities that the NewRadial environment offers), involves an attempt by Davita DesRoches to challenge limited and limiting critical perspectives relating to the 92 sonnets that make up Romantic period writer Charlotte Smith's *Elegiac Sonnets* collection. The initial problem motivating DesRoches' research was a

dissatisfaction with the ways that Smith scholars tend to reductively illuminate small samples of her work through a biographical critical lens. As a result, Smith's poems are often critically narrated as the melancholy musings of a woman writer who experienced a number of emotionally challenging personal crises. DesRoches employed a unique and unconventional method to question such critical gender profiling.

She started work on this project in the summer of 2015 and produced the following hand-drawn graph:

Figure 9: DesRoches' hand-drawn graph of some of the associative networks (thematic, stylistic and subject-based) that weave through Smith's Elegiac Sonnets *collection*

DesRoches' hand-drawn graph of some of the associative networks (thematic, stylistic and subject-based) that weave through Smith's Elegiac Sonnets collection

After close reading all 92 *Elegiac Sonnets* and filling a handwritten notebook with observations, correlations and keyword tags, DesRoches used her knowledge of graph theory to map thematic, situational and formal associations between all of the sonnets in Smith's collection. This hand-drawn graph, which she calls "a network of networks" was the result. A closer view of DesRoches' efforts not only reveals the complexity of her engagement with Smith's work, but also graphically demonstrates the limitations of most traditional scholarly narratives that have been asserted regarding Smith's sonnets.

Figure 10: A close-up of DesRoches' hand-drawn graph

A close-up of DesRoches' hand-drawn graph

In fact, this single graph includes and radically exceeds the entire corpus of critical work on Smith's sonnets to date. More incredibly, the still-evolving graph's clusters easily reveal a dozen potential graduate thesis topics and both its method and findings raise some unique possibilities for Smith studies.

This ideal application of distant reading methods avoids some of the hands-off problems relating to data-driven cultural analytics methods. DesRoches' project reminds us of the necessity of maintaining an intimacy with our source material, of methodologically contextualizing our critical narratives within larger, meaningful networks. While this is exciting stuff on a number of different levels, the difficulty of communicating the implications of DesRoches' work within a traditional thesis frame was frustrating. Flattening the complex associative energies of Smith's texts and DesRoches' open work into an academic prose argument without engaging in a radical amputation of perception and understanding presented significant challenges, simply because the complexity and non-linearity of some of the graphed connections are better represented visually.

Recognizing the communicative limits and relative fragility of her pen-and-paper graph, DesRoches recreated a static representation of her hand-drawn graph in the open-source VUE mindmap software.

Figure 11: The VUE Mindmap version of DesRoches' graph (a static representation of associations which features numerous changes and revisions in relation to the original graph. Such changes emerged as she continued to study the collection.).

The VUE Mindmap version of DesRoches' graph (a static representation of associations which features numerous changes and revisions in relation to the original graph. Such changes emerged as she continued to study the collection.).

Unfortunately, it is not easy to export this effort for use in other software programs, and its appearance of finality betrays the inherent desire for dynamism that generated and sustained the project. Ideally, it would be useful to resituate this graph in a dynamic digital environment where users could visually explore the extent and limits of existing connections and classifications, as well as add additional illuminations and engage in

discussion and debate on site. Given the opportunities inherent in DesRoches' thesis work, the NewRadial team has added a local database of Smith's Elegiac Sonnets to the platform and created and customized a collection that approximates DesRoches' initial categorical clusters.

Figure 12: DesRoches' initial clustering work rendered more dynamic and open to further play, reorganization and connectivity via its inclusion within the NewRadial environment.

DesRoches' initial clustering work rendered more dynamic and open to further play, reorganization and connectivity via its inclusion within the NewRadial environment.

Unlike the VUE map or the thesis document, NewRadial's canvas invites further experimentation with Smith's sonnet network and further conversation with DesRoches' argumentative narratives and constellations. Unlike the thesis model that she was required to conform to for her program requirements, this opportunity places DesRoches' work and method into a dynamic public space where knowledge communities are invited to participate in, inhabit, augment and renovate, rather than simply consume or cite, her work.

Conclusion: The open work

Critical arguments which acknowledge associative, multi-directional connections, cohere into complex networks of information, and which rely on the accumulation of a number of particular narrative pathways through such a possibility field, represent a progressive movement in scholarly communication. Enabled by modular and fluid mechanisms, scholar-users can be empowered to trace narrative vectors through digital environments composed of humanities cultural data and to map multiple perspectives and routes through such networked data without restricting plenitude and potential. In its rejection of the authority of any singular narrative or author through supporting the continual and communal reassembly of its data, NewRadial models such scholarly potential and transparently reveals the creativity at the heart of scholarly work. The NewRadial prototype represents critical, scholarly space as a communal psychotropic house whose network retains narrative traces of the knowledge community that inhabits it.

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