Critically Making Humanities Cyberinfrastructure

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Abstract

Background: This writing uses the language of the z-axis and Pedagogy Toolkit projects to map diversity at the heart of new knowledge in digital spaces. Drawing on modernist models of space, the introduction argues that genuine advances in knowledge require looking past existing conceptual models to embrace a diversity of worldviews.

Analysis: This argument is then anchored in feature developments for two projects: the z-axis mapping project and the Pedagogy Toolkit project, which open the door for students with multiple literacies to discover uncharted space in the tools/projects landscape of humanities cyberinfrastructure.

Conclusion and implications: The conclusion advances concrete next steps for expanding cyberinfrastructure into such uncharted spaces, pinpointing diversity as a core mode of thought required to set these steps in motion.

Keywords: Cyberinfrastructure; diversity; geospacial analysis; pedagogy

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Introduction

Global maps suggest no frontiers remain, that spaces previously seen as other have been safely assimilated and universally understood. Yet this suggestion self-annihilates when we question the promise of universal understanding on which it lies – space is not singular. Contemporary mapping methods rely upon Geographic Information System (GIS)-specific space, which is often at odds with literary and historical texts written before the advent of GPS technology. These texts come with their own spatial codes, their own contingent frames of reference that contextualize the meaning of what they say. Such codes are never our own. Imposing universal constructions of space upon texts that understand space differently alters our vision; it causes us to see two distinct frames of reference as fused when they are, in fact, superimposed. Understanding these texts therefore means adjusting our sight to encompass multiple representative systems. It means incorporating culturally, historically, and political diverse materials into our systems to confront frontiers we silently assumed had been safely conquered. Making critical connections across these frontiers requires sustained partnerships that cultivate the soil of the econtones where new knowledge grows.

New knowledge environments make space for alternative frames of reference. They serve as models that attempt to reconstruct the diverse cultural contexts from which others write themselves. Doing so affords scholarly engagement with diverse concepts in those concepts' own terms, making space through which others might speak back to us. The relationship between space and speech such a claim presumes is not mere metaphor. Many authors, particularly (though by no means exclusively) in the modernist period, use spatial codes as a way of speaking about issues that cannot be addressed directly. This is not because these authors are incapable of writing directly about the concepts they describe, but instead because doing so would mean superimposing a normative frame of reference upon a concept that assumes no such frame. Djuna Barnes, who describes the spatial experience of queer life in interwar Paris, is one such author. Her 1936 novel *Nightwood* uses veiled and vague place-name references to allude to queer activity. These references are not imprecise because the reader, or Barnes, does not know where the action takes place; they are veiled because the reader is not supposed to know where the action takes place. This hiding/showing strategy corresponds to spatial practices of queer modernity: people often relied on the anonymity of public space to express queer desire without being located or identified (doing so would risk persecution). The experience of space this practice made possible differs drastically from the place-based paradigm other novels (not to mention contemporary mapping environments) assumed; not knowing exactly where someone or something was precisely the point. Like other queer writing of the period, Barnes's novel does not hide place-name references because it cannot talk about those places, but instead because it needs to talk about them in a different way. In order to cultivate new knowledge that genuinely expands our current conceptual and theoretical frameworks, digital humanities platforms should continue to be designed to let scholars speak in different ways.

In what follows, the z-axis and Pedagogy Toolkit platforms are explored as two projects that strive to chart a path forward to spaces where we can learn from what our others say. The article continues with the z-axis project as a case study for diverse platform

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design and then turns to the Pedagogy Toolkit project to discuss the role of teaching in expanding the ecosystem of humanities cyberinfrastructure. It concludes with practical next steps for building humanities tools and platforms that open spaces for new forms of scholarly discourse – new knowledge environments.

Z-axis research

The z-axis project, funded by the Social Sciences and Humanities Research Council (SSHRC) and developed by Implementing New Knowledge Environments (INKE) and the Modernist Versions Project (MVP) research groups with Compute Canada, is one attempt to enable diverse forms of scholarly discourse. In short, the project mines geographic data from literary texts and then expresses that data through historical maps in 3D (see Figure 1). Doing so anchors geographic data from a historical novel in cartographic materials that represent cultural and political contexts for interpreting that data, such as population density, zoning, death rates, and so on. It further resists GIS-specific visions of literary space, modelling the non-specific spatial reference frame that Barnes and other queer writers often use. Further descriptions of the z-axis method and findings can be found in "Arguing Through Archival Objects: A Z-Axis Method for 3D-Printed Interpretation," (Christie 2015) "Z-Axis Scholarship: Modeling how Modernists Wrote the City," (Christie, Ross, Sayers, Tanigawa, & the INKE-MVP research team 2014) and "Intersections Between Social Knowledge Creation and Critical Making" (Arbuckle & Christie 2015).

Figure 1: Z-axis map of Compton Mackenzie's *Sinister Street* (1913) expressed through Charles Booth's Poverty Map of London (1889-1990). Areas are color coded by income.

Source: (http://www.zaxis.uvic.ca)

As argued in "Mapping Modernism's Z-Axis: A Model for Spatial Analysis in Modernist Studies" (Christie & Tanigawa, 2016), Barnes (1936) creates her own literary rendition of Paris that deliberately transforms and skews the geography of actual Paris. Doing so, in turn, writes into existence the experience of Parisian space from the perspective of Barnes's queer characters. Barnes undertakes unreal transformations of

Parisian geography, substituting locations for each other, describing non-linear pathways through the city, and deploying place names as encoded references to lesbian activity (rather than literal locations that describe where such activity takes place). "Through its resemblance to the actual geography of Paris, *Nightwood*'s conflation of space and place enables the partial elision of marginal experiences for their very transgressive nature, masking them beneath the guide of geographic realism" (Christie & Tanigawa, 2016, p. 124). Barnes's queering of the place-name geography of Paris articulates a spatial frame of reference that runs counter to heteronormative constructions of the city. Whereas heterosexual encounters occur safely at or in fixed locations within a Paris that has knowable places, queer encounters take place within a different Paris altogether, one that operates in a probabilistic mode. From the perspective of place-based mapping, Barnes's Paris appears strange and unrealistic; however, this unrealistic appearance is only created by the imposition of an empirical frame of reference on a concept that rejects that framework and that vision. Barnes's description of Parisian space challenges the ability of a normative, empirical framework to account for a diversity of lived experience and thought.

Barnes's vision of Paris appears unreal only to the extent that it challenges normative models of spatial reality against which Barnes wrote her fiction. In this way, visions that appear unrealistic serve moreover as invitations to expand existing models to include perspectives they could not have previously envisioned. This phenomenon is both literary and historical, a method through which modernists responded to the techniques of nineteenth-century realism and naturalism. These earlier movements attempted to depict a range of human experience (not necessarily excluding diverse individuals) from an objective and stable vantage point. As Lawrence Schehr (2003) explains:

> Instead of reducing the other to a version of the same, by which it is considered an inferior version of that which shows identity, realist narrative attempts a double movement: an extension of narrative toward the other and an inclusion of the other within a universal. Realist narrative seeks to maintain the particular nature of that which it discovers, describes, or represents while making itself the universal discourse that contains all others. (pp. 13-14)

In response to this attempt at universal objectivity, which often took the perspective of the white, middle-class man as its unquestioned frame of reference, many modernists distorted and deformed the "universal discourse" of realist form. Through such modernist formal experimentation, "the very space of representation is reformulated because the variable subjects bring their own laws of representation and form: as it moves toward a universal, or at least a sum, realism is its own undoing" (Schehr, 2003, p. 14). In other words, realist narrative is often top-down, whereas modernist formal experimentation is bottom-up. Barnes's representation of space is but one instance of a large variety of diverse worldviews.

The z-axis map of Barnes's *Nightwood* (1936) explores knowledge environments both past and present. In writing her own spatial framework into existence, Barnes authored a literary environment in which her concept of spatialized queer experience could be properly understood. This representational environment offers the context upon which Barnes's narrative relies to communicate its meaning. Z-axis mapping strives to

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account for the historical space of discourse that others have made for themselves. At the same time, it equally makes space for emerging forms of scholarly discourse expressed through new media scholarship. (These two environments – historical and contemporary – need not always resemble each other, though they are often deeply connected.) Inspired by modernist constructions of subjective space, z-axis maps explore an alternative to GIS-specific representations of space. In so doing, the maps offer a new knowledge environment in which geospatial arguments of a different nature might take root and grow. Of course, it is not the only alternative to GIS-mapping and is not diametrically opposed to that representational system. Spaces are always plural.

Building subjective frames of reference into digital tools corresponds with recent calls for data visualizations as interpretive objects in their own right. Such calls echo the foundational claims by Alan Galey and Stan Ruecker (2008), Cheryl Ball (2004), and Johanna Drucker (2003), among others, that prototypes and new media scholarship communicate critical arguments. As we turn from prototype to production, such claims continue to be equally true of digital tools and platforms (as well as humanities cyberinfrastructure generally). When we build humanities cyberinfrastructure, we build in theories and values that frame the scholarly discourse that cyberinfrastructure enables. This means that scholarly arguments double (at least) both in complexity and in promise as we move from digital prototyping to platform and tool production. In the manner of Barnes, we may now explore representative systems through which scholars can express arguments that had no preexisting context. The interpretive possibility of the digital humanities is therefore approaching a critical tipping point. Prototypes allowed us to build new knowledge. Production lets us build the conditions for knowledge we could not have previously anticipated. (The environmental conditions become still more complex when we consider constellations of discipline and period-specific digital production.)

In order to implement this critical production process, the INKE and MVP teams are building an open source z-axis mapping tool that lets scholars create their own warped 3D maps of texts. The tool is currently online as an open beta, with development ongoing by myself, Daniel Brendle-Moczuk, Colin Jones, Belaid Moa, Stephen Ross, and Katie Tanigawa, with additional input from the INKE and MVP research groups. Details on the initial development of the tool were shared the 2015 "Social Knowledge Creation in the Humanities" conference during the Digital Humanities Summer Institute (DHSI), with further information available on the z-axis tool site. The tool is being used to reformulate z-axis mapping as a form of research open to all, facilitating the rapid creation and dissemination of z-axis maps online. The first user test of the tool was conducted through a seminar at the 2015 Annual Modernist Studies Association conference, in which a group of modernist scholars mapped different novels set in London using the tool and shared their findings with the group. Responses included literary novels and theories that had not yet been considered, and led to productive discussion suggesting further directions for both z-axis interpretive mechanisms and ways in which the tool might facilitate them. At present, the following additions to the z-axis tool are being considered: labelling each instance of warping on the map; visualizing centre/periphery connections in which authors connect urban

spaces to distant locations outside the city; including the ability to layer multiple maps and alter their opacity/transparency; and allowing users to populate the z-axis variable with custom text encoding initiative (TEI) tags (uploading their own xml-tei files for the tool to visualize). We envision an open ecosystem in which scholars create multimodal arguments that blend scholarly writing with embedded copies of warped maps, as well as an ecosystem of interpretive maps through which scholars create and respond to each other's multimodal arguments.

The core element of this knowledge environment is the fact that we do not know what scholars will do with it. The tool is designed to let scholars visualize texts in their own domains of expertise, as well as adjust the visual display of the z-axis map and (eventually) allow scholars to set their own z-axis variables. In other words, scholars can experiment with both the form and the content of their new media arguments using the z-axis tool. In this way, they may create affective maps of London, longitudinal maps showing how an author's writing changes over time (perhaps correlated with changing immigrant populations over a series of decades), comparative maps that relate meaningful differences between two authors to corollary geographic or spatial phenomena, and so on. While Katie Tanigawa and I (2016) explore case studies of z-axis research, the method remains wide open for new scholars to shape and evolve in directions we do not anticipate. It is from this space that others might share new knowledge within the tool environment (perhaps even rethinking the assumptions, the frame of reference, on which the tool is constructed). Cultivating the soil of this new knowledge space means opening it to our students, who might explore and expand the environments we are just discovering. This requires teaching forms of digital thought and argumentation that we ourselves continue to evolve, deploying pedagogy as an intellectual enterprise in which we sustain the environmental conditions that enable students to speak in new ways.

Pedagogy Toolkit

Teaching others to speak from their unique frames of reference requires learning to encounter worldviews that are different from our own, cultivating an environment where new knowledge grows at the ecotones between established models and methods. Cultivating such emerging practices and techniques means facilitating diverse forms of thought: equally as Barnes experimented with forms of spatial representation in her writing, so too may scholars experiment with the form of new media scholarship. In this way, modernist literature's expansions upon realist technique show a way forward for the landscape of humanities cyberinfrastructure, one that expands our existing knowledge by making space for alternative frames of reference, alternative ways of expressing knowledge that come from others who think differently than us. Doing so requires inviting others into our scholarship and allowing them to question the theories and values built into existing projects; in this way, expanding humanities cyberinfrastructure requires teaching platform literacy to students who will build future humanities projects. The Pedagogy Toolkit project (see Figure 2) is designed to these diverse ends.

Pedagogy Toolkit is a reflexive platform that strives to teach both the tool and platform literacy critical cyberinfrastructure development requires. This project is funded by the

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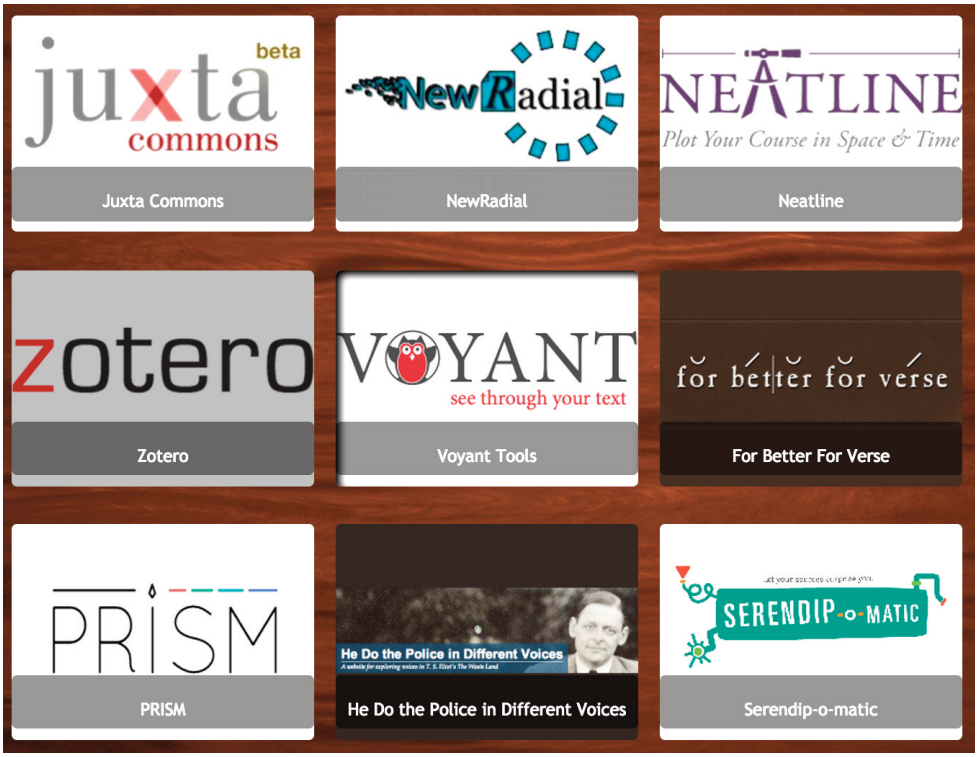
Figure 2: Community-authored guides to teaching with digital humanities tools on Pedagogy Toolkit.



Source: (http://www.pedagogy-toolkit.org)

Association for Computers and the Humanities (ACH) and the University of Victoria Learning and Teaching Centre (LTC); it is accessible online. The Toolkit includes community-authored guides to teaching with digital humanities tools, including Juxta Commons, NewRadial, Voyant Tools, Serendip-o-matic, Scholarslab Prism, and more. These guides allow students and teachers alike to construct scholarly arguments using these tools, as well as using digital humanities projects as tools for honing their own critical thinking skills. In this way, the project proliferates strategies for cultivating the digital literacy that new media scholarship requires. At the same time, the Toolkit also teaches platform literacy that invites scholars to examine the theories and values built into the platforms they use, as well as learn to build their own values into open source scholarly platforms. To this end, the project strives to make its own guides legible at the level of code. Deployed as a workshop at the 2015 Social Knowledge Creation in the Humanities conference, Pedagogy Toolkit includes a guide that shows users how the toolkit platform itself is constructed, inviting users to reshape and remix the project's open source code to create their own teaching platforms and websites for free. The guide, called "Getting Started with Pedagogy Toolkit Templates," (Christie 2015) is available online. Using it, teachers can create their own teaching websites with minimal technical experience; in so doing, they learn to manipulate the code upon which the Toolkit platform itself is constructed. This invites users to directly engage the project's values of open and social knowledge construction by socially recoding the Toolkit website to create their own knowledge platforms (aligned with the interests of each teacher's unique individual, institutional, disciplinary, and classroom contexts). In addition, the project

includes a syllabus templating tool that lets teachers create their own draft syllabuses by selectively incorporating and editing open access components of other syllabuses digital humanists have shared with the project; the templating tool is available as a public beta.

Combined with the project's documentation, the templating and syllabus building tools strive to cultivate what Steve Jones refers to as "platform thinking." As Jones (2014) writes:

> platform thinking is about acknowledging that scholars themselves are the ones to make and remake—not just inherit—the means of production when it comes to their own research; fewer zombies, more Frankenstein's monsters that we stitch together ourselves and for which we take responsibility. In this way, the digital humanities may well play a leading role in reconceiving scholarly publishing." (p. 289)

Jones' reference to Kathleen Fitzpatrick's conception of the book as undead is more than passing, since it suggests that new forms of knowledge representation go hand-in-hand with new communities of scholarly engagement. Creating diverse frames of reference for digital knowledge – diverse platforms that express different theories and values – requires partnering with communities of practice that carry frames of reference different from our own. In this way, expanding digital scholarship by exploring new forms that scholarship might take (and new communities that might read and write such new forms) is an exercise in diverse community building. As I wrote of the Pedagogy Toolkit project following the 2015 "Sustaining Partnerships to Transform Scholarly Production" conference: "in building community, we build the intellectual crosswalks our future work will traverse" (Christie, 2015). Social relations animate the spirit of critical cyberinfrastructure development.

Sharing knowledge across representative systems means acknowledging the identities others represent to us. In the classroom, it may be our students. From the perspective of emerging digital pedagogues, it may be the developers of the tools they teach. From the perspective of developers and practitioners, it may be literary theorists. From the perspective of a white male academic, it may be a queer female modernist. In all cases, the digital venues in which such partnerships participate serve as possibility spaces for incorporating still more diverse voices. This perspective comes with tangible next steps for cyberinfrastructure building in the humanities, next steps that envision critical cyberinfrastructure to: 1) facilitate social knowledge creation, 2) allow scholars to access and critique the theories and values that figure into its production (being transparent and open source), 3) teach students how to make their own forms of cyberinfrastructure that respond to the theories and values of the original project (and actively promote such new endeavours), and 4) experiment with emerging forms of scholarly discourse that engage diverse communities in scholarly publishing. Across these practical production values, one message rings clear: we should resist making digital tools and platforms with only ourselves in mind. Making tools for others to use makes space for them to reveal the lacunae in our current frameworks, charting a social knowledge ecosystem with partnerships as its intellectual currency. Through sustained partnerships across diverse knowledge systems, we sustain the complex and in-between terrain where diverse perspectives meet, at the ecotone. It is for this reason that pedagogy continues to be of critical importance as digital scholars move from

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prototype to production. Teaching students to think across multiple representative systems allows them to represent to us gaps in our current systems of knowledge. This calls, in turn, for new forms of scholarly discourse, still new knowledge environments through which others speak for themselves.

Websites

Pedagogy Toolkit, http://pedagogy-toolkit.org/

Z-Axis Mapping Tool, http://zaxis.uvic.ca/

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