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# Thinking Digitally: A Review of N. Katherine Hayles's *How We Think: Digital Media and Contemporary Technogenesis* (University of Chicago Press, 2012)

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## Abstract

This review examines N. Katherine Hayles's argument that digital media has reorganized how we think about and physically do our work in the social sciences and humanities. Some new methodologies enabled by digital media are obvious and others just emerging. A major shift that digital media have enabled is dethroning close reading as the gold-standard methodology in the humanities and augmenting it with hyper and machine reading. Hayles's argument has far-reaching implications for the social sciences and humanities, but those implications expand much further when we consider that digital media often represents contending parties' interests and that those parties are often drastically unequal in resources.

Thinking about how humans think is a challenging deliberation especially in an age when digital technology has become the primary site where we think and the primary subject we think about. This is the challenge N. Katherine Hayles takes up in *How We Think: Digital Media and Contemporary Technogenesis*. Her thesis is deceptively simple. She states that her book "explores the proposition that we think through, with, and alongside media" [Hayles 2012, 1]. She admits this is not a new idea and cites those like Marshall McLuhan who proposed this idea first. What she adds to the conversation about how we think alongside media is a discussion of "the *implications* [emphasis mine] of media upheavals within the humanities and qualitative social sciences as traditionally print-based disciplines such as literature, history, philosophy, religion, and art history move into digital media" [Hayles 2012, 1]. The effects of the "paradigm shift" that the humanities and social sciences have gone through recently as research has moved into digital spaces, Hayles suggests, has been taken for granted. Her argument is that this shift has not just affected where we do our work but that it has fundamentally changed that work and how we think about it. Thus, her book is as much about methodology as it is about the genesis of digital thinking in the humanities and social sciences. And methodology is exactly the context within which we need to be having discussions about the future of DH. 1

At this time Digital Humanities is not so much a methodology (as much as some would like to make it) as it is an orientation toward scholarship and teaching that takes the way thinking is shaped by the medium it happens within very seriously. DH also is somewhat still in its wild-west phase in that its institutional centers have yet to really be established. While some universities have initiatives and centers, and there are several DH conferences, the lack of broad institutionalization of DH has been a boon to its success. Those concerned about these realities and their implications for DH's future must read Hayles's book. Her emphasis on DH as an orientation and not a methodology is not only refreshing but essential for those of us who make little distinction between how our students think and the digital space where they do their thinking. 2

While the implications for Hayles's argument go far beyond academic work in the humanities and social sciences, she limits her analysis to those fields. Her structure for the book follows the development of her own thinking about technogenesis through eight chapters, and she proceeds by theorizing the idea thoroughly, observing technogenesis in action, and then applying her argument to two experimental print texts thus showing how even print media cannot 3

escape being understood digitally. Her first chapter reviews her main argument about technogenesis. In it she says, “The Age of Print is passing, and the assumptions, presuppositions, and practices associated with it are now becoming visible as media-specific practices rather than the largely invisible status quo” [Hayles 2012, 2]. That status quo for academics is manifest in their methodologies that are now largely digital-based. Scholars, for the most part, can do the majority of their work through digital sources. And “the ability to access and retrieve information on a global scale has a significant impact on how one thinks about one’s place in the world” [Hayles 2012, 2]. So, technogenesis is not only a reorganization of how we work but also of how we create our identities through our work. Chapter two explores the effects of technogenesis on the humanities, a field “arguably more print-based than the sciences and social sciences” [Hayles 2012, 23]. She sees the digital humanities having huge “potential for catalyzing significant change” [Hayles 2012, 24]. Moving forward, she sees two productive strategies for the field. Assimilation would entail extending “existing scholarship into the digital realm” with little disruption to existing methodologies. Distinction “emphasizes new methodologies” and “research questions” [Hayles 2012, 46].

Chapter three outlines three different ways digital media have changed the way we read and the pedagogical implications of those changes. She reconsiders “that sacred icon of literary studies, close reading” by considering whether it is that productive anymore since as a methodology it produces formulaic results [Hayles 2012, 59]. Hyper reading, instead, focuses more on how we read in digital spaces — “filtering keywords, skimming, hyperlinking . . . and fragmenting” [Hayles 2012, 61]. Finally, machine reading is “the automatic, unsupervised understanding of text” [Hayles 2012, 70]. Chapter four wades into complex theory about how human interactions with digital media affect temporal scales. She argues that we focus more on the relationship of time technical objects have than on the relationship to time humans have as they interact with them since “technical objects embody complex temporalities enfolding past into present, present into future” [Hayles 2012, 86]. Chapter five looks at technogensis in action by examining how telegraph code books were one of the first signals that technology was changing the way we think since “monopoly capital, technical innovations, social conditions, and cultural imaginaries entwined to bring about significant shifts in conscious and unconscious assumptions about the place of the human” [Hayles 2012, 124–5]. Chapter six moves into the final section of the book in which Hayles considers the relationship between narrative and database and then applies her theories in readings of two print texts. She combats the idea that database is naturally averse to narrative and argues that they “have a mutually beneficial relation.” She argues, “Narrative . . . needs database in the computationally intensive culture of the new millennium to enhance its cultural authority,” and “database . . . demands narrative’s reappearance as soon as meaning and interpretation are required” [Hayles 2012, 176]. Chapter seven is a reading of “transcendent data and transmedia narrative” in Steven Hall’s novel *The Raw Shark Texts* about a man whose memory has been stolen thereby reshaping his sense of self. Chapter eight reads Mark Z. Danielewski’s “experimental novel, *Only Revolutions* . . . that interrogates the datasphere by accentuating and expanding the role of spatiality in a literary text” [Hayles 2012, 221].

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Hayles’s book is a specific study of how digital technology affects the minds of those working in the social sciences and humanities but is part of a larger conversation about how new forms of technology always produce shifts in our psychology. In the *New York Review of Books* Edward Mendelson writes, “Every technological revolution coincides with changes in what it means to be a human being, in the kinds of psychological borders that divide the inner life from the world outside” [Mendelson 2016, 34]. His review essay is of six new books that have come out recently on the ways the digital age has reshaped what it means to be human. And this is what, in part, Hayles argues too. She stresses the changes digital media make to our identities as academics when she says, “The small, habitual actions associated with web interactions — clicking the mouse, moving the cursor, etc. — may be extraordinarily effective in retraining (or more accurately, repurposing) our neural circuitry, so that the changes are not only psychological but physical as well” [Hayles 2012, 2]. This is an echo of Mendelson’s claim that “every technological change that seems to threaten the integrity of the self also offers new ways to strengthen it” [Mendelson 2016, 37–38]. Instead of bemoaning the threats of the digital age to academia, Hayles demonstrates — through her readings of Hall’s and Danielewski’s novels — how digital thinking can be deployed with maximum effect for the processes that define our work. She does not want to oust close reading from the humanities but wants those in the profession to think about it as a strategy that must be augmented by hyper and machine reading.

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## A New Narrative for Digital Thinking

6 While Hayles outlines the promising potential for thinking about how digital technology shapes the way we think, there are some challenges the reader may face getting through Hayles's implementation of her argument. The first is the structure of the book which does not flow from chapter to chapter seamlessly. But with so many examples of how technology shapes the way we think, she had to settle on only a few. More limiting is the narrow audience the book sets for itself. While reading this book, colleagues and friends noticed the title and commented how interesting it sounded. Upon browsing the table of contents, they offered befuddled expressions. She also delves into technical language that could confuse those with a casual interest in digital humanities. Chapter five discusses "the first globally pervasive binary signaling system" [Hayles 2012, 123] and the codes that made it work. As someone who does not code — a deficit I consistently regret — this chapter presented technical challenges. Chapter four, in which she outlines theories of complex temporalities, is the most conceptually complex. But complexity is what we are trained to deal with in the social sciences and humanities. So, the book's limited audience might be an extension of Hayles's argument that the social sciences and humanities must allow themselves to be as transformed by digital media as the human brain has. Indeed, she highlights much-needed developments within traditional academic fields and in the way we think about our scholarship. Hayles might have written a book describing emerging methodologies, but she also wrote a book that should act as a wakeup call to those who long for the days when "scholars used to haunt the library" [Hayles 2012, 2]. What does this mean for these veteran academics? How can we bring them into thinking digitally as well? I have two recommendations — one for newer academics and one for veterans. Younger academics must avoid talking down to veterans who show disregard or even hostility toward everything digital. Engagement and even repartee with veteran colleagues about digital thinking can go a long way in bridging the digital divide in departments. The advice for veterans comes from Leonard Cassuto. He likes to think about the future of DH in the context of the history of critical theory in departments. Cassuto explains that after the mad rush to hire theorists, "those job openings for theorists went away. That didn't mean theory itself went away . . . it was absorbed" [Cassuto 2017]. He foresees the same process happening with DH. I think Hayles would say this is a good thing.

7 The most engaging part of the book is Hayles's discussion of the relationship between data and narrative. In chapter six she challenges the idea of narrative and data as "natural enemies" arguing instead that they are "natural symbionts [,] . . . organisms of different species that have a mutually beneficial relation" [Hayles 2012, 176–77]. She expands this idea:

> Whereas database reflects the computer's ontology and operates with optimum efficiency in set-theoretic operations based on formal logic, narrative is an ancient linguistic technology almost as old as the human species. As such, narrative modes are deeply influenced by the evolutionary needs of humans negotiating unpredictable three-dimensional environments populated by diverse autonomous agents. [Hayles 2012, 179]

This measured emphasis on the actual relationship between data and narrative is necessary at a time when film, narrative fiction, and mainstream media consistently frighten publics with the impending war between them. Benjamin Peters writes, "That digital systems point to nondigital elements of reality approximately (without computational precision) helps limit or check the mistaken threats and promises of our current digital age, including the now-dated prophecy of a digital singularity and other forms of technomillenialism" [Peters 2016a, 94]. A more practical application on this relationship is provided by Philip Howard in *Pax Technica: How the Internet of Things May Set Us Free or Lock Us Up*. He argues that in the age of big data "The roles of winner and loser will go to the actors who can demonstrate through big data gathered over the internet of things and disseminate those truths over social media" [Howard 2015, 256].

8 Indeed, Hayles's rearticulation of the relationship between data and narrative is another extension of her argument about how digital media have contributed to the evolution of the human brain and contemporary culture. While narrative explains data, data has become a narrative itself and produced narratives about itself. As Hayles makes clear, "Although narratives will not disappear, their forms and functions are being transformed by the seemingly irresistible force of digital databases" [Hayles 2012, 198]. This, for Peters, is how "culture, by blending with information technology, renews its staying power as a significant frame for life" [Peters 2016b, xxxviii]. Hayles puts forward the implications of

her own argument:

> We are now in a period when the interests of individuals are in dynamic interplay with the vested interests of large corporations, sometimes working together to create win-win situations, other times in sharp conflict over whose interests will prevail. Contemporary technogenesis encompasses both possibilities . . . This book . . . attempts to intervene in locally specific ways in the media upheavals currently in progress by showing how digital media can be used fruitfully to redirect and reinvigorate humanistic inquiry. [Hayles 2012, 18]

And Hayles does accomplish this throughout. She describes the upheavals in detail and then outlines how humanities and social scientists have responded with verve. Ultimately, the most useful part of her book is that it simply gets the reader to think about how she or he thinks. Only then can they begin to organize what that means for thinking digitally. If thinking is how we frame the world we live in, then the ability to merge and critique data collected about the world with the narratives we create about that data is crucial for any profession or individual attempting to understand if not survive the complexities of the digital age. But that understanding must happen on the local level as we dissect the source and context of each stream of data consistently asking whose interests a certain set of data advances. That is material I would like to see Hayles take up in her next book.

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