

AN ABSTRACT OF THE THESIS OF

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This thesis is an exploration of writing from two communities of practice addressing different aspects of hypertext--an electronic medium used to link text, images, and other content such that it can be accessed by users non-sequentially. In particular, I examine multiple narratives of hypertext development and key theoretically oriented approaches towards understanding the relationship between hypertext and printed text. I ultimately conclude that hypertext is an overdetermined concept, meaning that its complexity is often reduced to a single practice or principle. To contextualize the overdetermined understanding of hypertext, I conclude by outlining some particularly important points that emerge from the work presented in this thesis and draw some conclusions about what can be learned about hypertext as a result of this particular approach.

Revisiting Hypertext Communities of Practice

by
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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

Jeffrey Breitenfeldt, Author

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Revisiting Hypertext Communities of Practice

CHAPTER ONE INTRODUCTION

The work in front of you was catalyzed, as many such works are, by a particular moment of confusion. This moment came as I was presenting my prospectus to members of my thesis committee. In that prospectus, I introduced hypertext as an electronic medium that links text, images, and other content such that it can be accessed by users without a predetermined sequence, and I offered an explanation of the origins of the concept as well as a condensed history of the various forms hypertext has taken. As I finished this broad overview, which I had intended to serve as background for a larger argument, one committee member observed that it didn't seem like anyone could successfully write a thesis about hypertext because there didn't seem to be enough to say about "hot linking." As I was trying to imagine why this very practical understanding of hypertext as "hot linking" was not a more significant part of the scholarship I had encountered, another committee member pointed out that my review of the historical development of hypertext--which was drawn from the same body of research--seemed to neglect the roots of hypertext in printed text, such as the way a table of contents or superscript note could direct readers through a book in a non-linear way. These are the questions that--in emerging from my committee's confusion--brought about my own moment of confusion about how hypertext might be best understood.

The three differing conceptions of hypertext that surfaced in that meeting--mine focusing on the historical development of the technology, another seeing hypertext as a method of linking, and another suggesting that hypertext has notable roots in printed text--more than anything else seem to underscore the overdetermined nature of the term itself. Another thesis-related situation, explaining what I am working on to family, friends, and peers, also makes this overdetermination evident. Often, when I tell people that I am working on a thesis about hypertext--without even venturing into the particular angle I might be pursuing--I am asked what hypertext is. Though that may seem like a relatively simple question to answer, especially after a considerable amount of time reading and writing about hypertext, I am often at a loss for how to make the concept relatable while also showing its depth. Typically, I begin by explaining that hypertext is the structural system of the Internet--that it is the way in which Web pages are connected. While this is often satisfactory in terms of grounding hypertext in a familiar set of practices, I am generally anxious about what is left out when hypertext is described from this rather limited perspective.

What this second instance of confusion seems to suggest is that either hypertext--which has a complex history and deep theoretical implications--is not something most people think about, or that its present role on the Web is easily taken for granted. The question that emerges here, one that drives this thesis, can be stated simply: How can we best understand hypertext? As this thesis progresses, I hope to demonstrate that hypertext is an overdetermined concept, meaning that its complexity

is often reduced to a single practice or principle. To contextualize the overdetermined understanding of hypertext and to show its limitations, this work will explore its historical depth and conceptual richness while examining two connected approaches toward technology: technological determinism and utopianism/dystopianism.

Towards this end, the chapters that follow will look at two significant bodies of scholarship on hypertext, putting them in conversation with each other. It is important to point out that scholars have approached the study of hypertext from multiple perspectives and with varying purposes, only some of which will be addressed in this thesis. This work will not look in depth at the electronic book, virtual environments, theories of reading and writing online, popular social media, or aspects of pedagogy, as many others writing about hypertext have already addressed these issues in greater detail than is possible in this context. What this thesis attempts to offer is a selective focus on narratives that underlie the development of hypertext and on a particular body of theoretically oriented hypertext scholarship. This particular focus has the benefit of representing a wide range of writing, and it is especially productive for exploring the overdetermined nature of hypertext because it highlights both familiar and unfamiliar aspects of hypertext.

The work that follows is organized as a sequence of two chapters followed by a conclusion. The first chapter begins by outlining what I refer to as the standard narrative of hypertext, a connected series of developments that begins in the mid-twentieth century with the publication of the well-known article “As We May Think”

by Vannevar Bush. In this essay, Bush introduced a non-computerized proto-hypertext system called the Memex that was intended to turn a post-WWII “information explosion into a knowledge explosion” (Wadrop-Fruin 35). Writing about the development of hypertext systems in the standard narrative continues in the 1960s and 1970s with work on computer-based hypertext systems by Douglas Engelbart and Theodor Nelson, each of whom furthered the story commonly told about the development of hypertext in important ways. In addition to this standard narrative, the chapter also highlights two earlier moments in the historical development of hypertext--one from Hervé Platteaux about the invention of text ordering devices in the 13th century, another from Alex Wright about a comprehensive information management system developed by the Belgian inventor Paul Otlet in 1934. Beyond these perspectives, the chapter also offers an overview of the development of hypertext on personal computers and the Internet. Together, the multiple narratives in this chapter help round out a richer story for the origin and development of hypertext than is typically told.

It is important that the standard narrative presented in this first chapter emerged from what Etienne Wenger, an educational theorist, calls a community of practice.¹ This particular community of practice was oriented towards the scientific management of information and did not see itself as responsible for articulating the

¹ Communities of practice are groups “formed by people who engage in a process of collective learning in a shared domain” in order to solve problems and discuss developments (Wenger).

deep roots of the problem to which it was responding. This community, which developed amidst the technological innovations and proliferation of scientific information that followed World War II, presented hypertext as a means of freeing humanity from the seemingly modern problem of information overload. However, hundreds of years before the first hypertext system was envisioned, people struggled in similar ways to develop systems that could manage information within and amongst printed texts. The development of reading devices, such as page numbers and indices, in addition to pre-digital systems to organize and access larger bodies of data (such the one developed by Paul Otlet), suggest that the desire to manage information and clear the way for progress is not unique to the twentieth century. What is unique, however, is how the development of the personal computer and the Internet have helped to enact this long-standing aspiration.

The second chapter focuses on a different community of practice--one that shares the standard narrative with early work on hypertext systems, but that has a unique set of aspirations. In fact, the scholars that I focus on within this community--George Landow and Jay David Bolter--are not interested in developing hypertext systems to manage information at all; instead, they see hypertext as a concrete means of exploring key theories in their respective disciplines. The serendipitous circumstance that brought hypertext into conversation with scholars working outside of information technology first occurred in 1987 when a group at Brown University invited George Landow, a professor of literature, to develop a course facilitated by a

hypertext system. Landow went on to build upon this experience of teaching with hypertext and his familiarity with contemporary critical theory to explore the role he believes hypertext plays in changing the relationship between writers and readers, the role of the author, and the boundaries that exist between texts.

At the same time that Landow was writing about these issues, Jay David Bolter, then a professor of Classics, was working to build deeper connections between the emerging technology of hypertext and the historical development of writing in Western Civilization. Bolter's work focuses in large part on a concept he calls remediation, which suggests that a new medium like hypertext can take the place of older medium like printed text, but that in doing so it necessarily borrows and reorganizes characteristics of the older medium. Bolter suggests that this process of remediation makes the conventions of printed text a paradigm for the development and analysis of electronic text.

Bolter's work on the implications of hypertext as a new medium for composition sometimes overlaps Landow's work--and Landow's work with critical theory sometimes overlaps Bolter's. However, it is also their points of disagreement, especially about whether or not printed text ought to be considered as a framework for understanding electronic text, that adds depth to the way hypertext can be understood as a conceptual entity. Exploring these perspectives and placing them in conversation with the narratives in the first chapter will help to show the true conceptual richness of hypertext.

The communities of practice explored in both of these chapters--the one devoted to the development of hypertext and the one devoted to articulating a relationship between hypertext and printed text--share a common assumption that technology in general, and hypertext in particular, are powerful agents of change. This perspective, known as technological determinism, is characterized by Leslie Ragan Shade in *The Encyclopedia of New Media* (2002) as having a focus on “particular technological artifacts, or on the individuals who designed the technologies” with little or no emphasis on “the influencing factors of socio-economics, ideology, or how particular members of society were affected by, or affecting, technological change” (433). In the introduction to *Does Technology Drive History?* (1994), Leo Marx and Merritt Roe Smith typify writing from the perspective of technological determinism as having “sentences in which ‘technology,’ or a surrogate like ‘the machine,’ is made the subject of an active predicate” such as the statement “‘The automobile created suburbia’” (xi). As both chapters of this work will demonstrate, those writing about hypertext frequently make this kind of statement. For example, Theodor Nelson, an early developer of hypertext systems, claims that hypertext is “a new kind of text that will reshape the world”; and George Landow, who writes about hypertext and critical theory, states that “hypertext changes our sense of authorship and creativity” (qtd. in Kitzmann, “Pioneer Spirits,” 451; *Hypertext 3.0* 142).

Technological determinism of this variety, which is quite common in writing about hypertext, plays a critical role in reductive and overdetermined understandings

of hypertext. Moreover, because technological determinism results in either a utopian or dystopian perspective, seeing it as an agent for change implies necessarily positive or negative societal affects. The utopian view--which is most common in writing about hypertext--sees technological development as necessarily empowering and emancipating. This view most often emphasizes the potential of technology to facilitate democracy, justice, and human rights. For example, Doug Engelbart, another early developer of hypertext systems, claims that hypertext makes society more “intellectually effective” and thereby more politically effective by augmenting the human mind; and Jay David Bolter, who writes about hypertext as a medium for composition, claims that hypertext works “against the extension of...models of economic and cultural control” such that a near-future might exist free from social and economic controls of any kind (qtd. in Featherly 229; *Writing Space* 211).

This utopian view has its counterpart in a dystopian perspective that resists most technological development, especially in cases where it is perceived to threaten a valued established order. Writing about hypertext has tended to be utopian in nature, but there are a number of related dystopian claims about the Web (including hypertext on the Web) that circulate in the popular media. One such claim emerges from the tension between printed text and electronic text that is explored in the third chapter. As early as Sven Birkert’s *Gutenberg Elegies* (1995), writers have lamented an “end of print” at the hands of technologies like hypertext that change the look and feel of reading and writing.

The conclusion of this thesis will return to consider some limitations that arise from technological determinism and utopianism/dystopianism, and it will address two additional points about information overload and the connections between hypertext communities of practice and work being done in the field of literacy studies. Together, these points suggest the range of what is at stake in writing about hypertext. The concluding chapter will also focus on revisiting the multiple narratives surrounding the development of hypertext as a technology and its range of application as a concept in order to show that both have a considerable depth and richness that helps to inform how we understand hypertext today. It is not feasible, of course, to alleviate all confusion about hypertext in this thesis, but it is possible to push for a richer understanding and develop some important questions along the way. These, in fact, are the goals of this work.

CHAPTER TWO

THE NARRATIVE(S) OF HYPERTEXT DEVELOPMENT

Looking to narrative--an account of connected events through a period of time--can be a powerful way to gain perspective on hypertext. This perspective, which is broadly historical, emerges from the way in which scholars tell the story of hypertext. At its best, it offers insight into the conditions that drive innovation; at the very least, it tells a compelling tale of technological development that leads to our present moment and suggests potential directions such development might move in the future.

This chapter will begin by outlining what I have decided to call the standard narrative of the development of hypertext. I refer to this account as standard because it appears in a wide range of texts on the subject over a period of at least twenty years. With some slight variation, this narrative is commonly used to introduce hypertext as both a conceptual endeavor and a constructed object. Along with this standard narrative, I will outline two perspectives that attempt to extend the concept and object of hypertext back further than is commonly done. In addition to these perspectives, I will offer another short narrative of the move to hypertext on the World Wide Web and suggest some key questions that emerge when these narratives are looked at collectively.

While this chapter does not represent original historical work, at least not in the sense of being grounded in archival research, it does synthesize a number of

narratives that have not appeared together before. I would argue that collecting these narratives, and in a sense addressing them together, raises a number of new questions and ultimately enriches our understanding of hypertext.

THE STANDARD NARRATIVE: 1945-1968

Most narratives about hypertext, such as Jay David Bolter's *Writing Space* (1990, 2001) and George Landow's *Hypertext* (1991, 1997, 2006), begin with what is generally presumed to be the first proposed device for mechanized non-linear information retrieval--what we would today describe as a hypertext system--which dates to 1945. In his now famous *Atlantic Monthly* article, "As We May Think," Vannevar Bush proposes a "memory extender" called the Memex where "an individual stores his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility" (qtd. in Nielsen 30). The main contribution of the Memex, Bush argued, was its ability to link things together. According to Bush, the Memex "affords an immediate step...to associative indexing, the basic idea of which is a provision whereby any item may be caused at will to select immediately and automatically another" (45).

Bush's Memex did not arise without circumstance. At the time Bush began writing about the Memex, the United States was experiencing a proliferation of scientific data following WWII that made it increasingly difficult for researchers to closely monitor trends in their field (Nielsen 30). Bush framed the problem in vivid terms:

There is a growing mountain of research. But there is increased evidence that we are being bogged down today as specialization extends. The investigator is staggered by the findings and conclusions of thousands of other workers--conclusions which he cannot find time to grasp, much less to remember, as they appear. Yet specialization becomes increasingly necessary for progress, and the effort to bridge between disciplines is correspondingly superficial. (37)

The sense of information overload Bush expresses was not necessarily new in 1945, though his position as director of the United States Office of Research and Development (which he was first appointed to in 1941) likely made it seem especially urgent and practically relevant. In fact, Philip Seyer explains in his 1991 book, *Understanding Hypertext*, that Bush oversaw nearly 6,000 scientists in his role as director and used this position to speak out about the methods of sharing and reviewing information that he believed were totally inadequate (4). Bush's key observation, the one that according to Seyer underlies the development of the Memex, is that he recognized that the "means for threading through the maze of scientific publications had not changed for nearly 200 years" and already in 1945 the world had "arrived at an age of cheap complex devices of great reliability; and something [was] bound to come of it" (5).

The Memex system, despite Bush's urgency and sense of its feasibility, was never built due to technological limitations. In the 1940s, computers were largely "mathematical engines" that took up entire rooms and weighed tons (accounts from 1944 list the Harvard Mark I as having over 750,000 parts) (Ceruzzi 6). Because of their very specialized purpose, size, and cost, computers at this time were only owned

and operated by government agencies or federally funded research entities. By the early 1950s, computers were increasingly developed to handle numeric and textual information, resulting in the first commercially successful computer: the UNIVAC (Ceruzzi 13). Though the UNIVAC was intended as a commercial endeavor, its high cost (nearly \$200,000 in 1951) meant that the overwhelming majority of installations were for government agencies, such as the U.S. Census Bureau, the Air Force, the Army, the Navy, and the Atomic Energy Commission (Ceruzzi 17).

By the 1960s, computers had become smaller and more affordable due to innovations in circuit technology. It was at this point, according to Jakob Nielsen, that developers had improved computers “to the point where it would be possible to use them interactively,” but even then they were “so expensive that most funding agencies viewed as completely irresponsible the suggestion that computer resources should be wasted on nonnumeric tasks such as text processing” (*Hypertext and Hypermedia* 32). In 1962, however, the Stanford Research Institute (SRI) defied this trend and began working on a project called Augment that was intended to “develop computer systems that help us think--rather than just record and retrieve data” (Seyer 5). One part of this project, which Doug Engelbart referred to as the “oN-Line System” or NLS, was demonstrated in 1968 at a special session of the fall Joint Computer Conference (Nielsen 32; a video of the demonstration can be accessed online: <http://www.1968demo.org/web.html>). The NLS project--which clearly had its roots in efforts to improve productivity--allowed researchers to “store all their papers, reports, and

memos in a shared ‘journal’ that enabled them to include cross-references to other work in their own writings” with a colleague located hundreds of miles away at a second terminal (Nielsen 32).

Interestingly, Engelbart’s system was not the only one being developed during this period. In 1960, Theodor Nelson--who was a graduate student studying computer science at the time--began thinking seriously about his own frustration of taking notes on file cards (Seyer 6). In Nelson’s book *Literary Machines*, which was first published in 1981, he explains:

Every file card wanted to be many places at once, many needed to be pasted in the middle of several different documents and separately reworked, but needed to stay connected between documents as well. All methods of paper were wholly inadequate and imposed connective restrictions that masked the true structure of the ideas. (qtd. in Seyer 6)

The system Nelson designed to resolve this problem was “basically word processing with intercomparison of alternative versions with historical backtracking capability” not unlike word processing applications today (Seyer 6). Funding to pursue this project came in part as a result of government support in the early 1960s for what was called “Computer-Assisted Instruction” or CAI. According to Seyer, “Nelson was in favor of CAI at first, but then he discovered that its primary focus was on helping teachers deliver tightly controlled curriculum” whereas his goal, instead, “was to help students break away from highly structured and predefined learning outcomes” (6).

Following Nelson’s frustration with the CAI approach, he began to develop a different--and today, better-known system--called Xanadu. The aim of Xanadu was to

create a universal hypertext that would serve as a “repository for *everything* that anybody has ever written” (Nielsen 33). Nelson named this repository a “docuverse” and articulated a structure for information storage and retrieval where all text is linked in a “universal instantaneous hypertext publishing network” (Nielsen 4). Nelson’s Xanadu had wider purposes than Bush’s Memex and Engelbart’s NLS: not only information storage/retrieval, but also information distribution; not only individual users, but an ideally universal adoption (Cantoni and Tardini 92). In fact, on the cover of his book *Literary Machines*, Nelson describes Project Xanadu as “a step on the road toward an instantaneous electronic literature; the most audacious and specific plan for knowledge, freedom, and a better world yet to come out of computerdom.”

This widely idealistic vision was never successfully materialized, which Seyer suggests might be because in 1965 Nelson’s ideas “seemed a bit far fetched” to computer users used to punchcards and teletype machines (7). In fact, the federal government--which was the primary investor in developing hypertext systems at the time--believed Nelson’s enormous “docuverse” was “arm waving” and “blue sky” (Seyer 7). Others went on to criticize Xanadu for the enormous demand it would have on storage (since it never deleted documents) and on the telephone network (which at the time required human operators to connect every call for information) as well as for the effect it would have on copyright (because information placed in Xanadu would be available to everybody). Nelson’s response, according to Nielson, was “So what?” implying that he saw Xanadu to be worth such demands (39). Nelson

did manage to finally demonstrate a limited prototype of Xanadu in 1987, and he continues to work on a less ambitious system called XanaduSpace--though the Xanadu project is generally considered to be a failure on its own terms (Cantoni and Tardini 92). Nonetheless, Nelson's ideas were very influential on the later evolution of hypertext systems.

In fact, one of Nelson's ideas has been more influential than just about any other in the field: the term "hypertext." In a paper presented at the 20th National Conference of the Association for Computing Machinery in 1965, Nelson explains:

Let me introduce the word 'hypertext' to mean a body of written or pictorial material interconnected in such a complex way that it could not conveniently be presented or represented on paper. It may contain summaries, or maps of its contents and their interrelations; it may contain annotations, additions and footnotes from scholars who have examined it. (144)

In addition to this definition, Nelson also notes some implications:

Let me suggest that such an object and system, properly designed and administered, could have great potential for education, increasing the student's range of choices, his sense of freedom, his motivation, and his intellectual grasp. Such a system could grow indefinitely, gradually including more of the world's written knowledge. (144)

These implications touch upon Nelson's initial interest in the limitations notecards imposed on his ability to organize information as a student and on the flexibility he believed a hypertextual system could provide for students. Moreover, they set the stage for hypertext as a means for breaking down boundaries between texts--something that informed later work on hypertext.

Another important hypertext system, the Hypertext Editing System (HES), was developed at Brown University in 1967 by Andries van Dam with Theodor Nelson and Douglas Engelbart as consultants. HES had two purposes: 1) to “produce printed documents nicely and efficiently,” and 2) to “explore the hypertext concept” (van Dam qtd. in Landow, “Educational Innovation,” 107). The hypertext features of HES, which Nielsen describes in *Multimedia and Hypertext* as “linking and jumping to other documents,” were text-based and required users to type exactly where they wanted to be redirected (36). The primary focus of the project, more-so than the development of a rather difficult to use hypertext system, was on text manipulation and printing--which turned out to frustrate Nelson and strain his involvement with van Dam. In 1969, development of HES at Brown was ended by IBM, the organization responsible for funding the project, and it was sold to NASA to produce documentation for the Apollo space program (Wright 218). Perhaps more significant than HES itself, or the development of its very similar successor, the File Retrieving and Editing SyStem (FRESS), was that the work was being done at Brown University--work that, according to Alex Wright, “lent an institutional imprimatur to the possibilities of hypertext in the academy” (219). This connection between the development of hypertext and Brown became important again in the mid 1980s, a point explored later in this chapter.

In *Hypertext in Context* (1991), Cliff McKnight, Andrew Dillon, and John Richardson (all based at Loughborough University in England) explain in a very

appropriately titled chapter “How Did We Get Here?,” that “[w]e can see Bush, Nelson, and Engelbart as representing three different views of hypertext which continue to attract adherents today” (9). As they explain:

The Bush view sees hypertext as somehow ‘natural,’ reflecting the mind....From this perspective, hypertext should feel easy to use. The Engelbart view of hypertext is an augmentation environment; the user of hypertext should be able to achieve more than would be possible without it....[Nelson’s] view of hypertext is as a storage and access mechanism; the user of hypertext should be able to access any document. (McKnight, Dillon, and Richardson 9)

These views are not mutually exclusive, and in many ways, they build from each other. What they show in their diversity--at least according to McKnight, Dillon, and Richardson--is that hypertext “is not a unitary concept, not a single thing which can be defined precisely” (9).

While the individuals and hypertext systems that populate this standard narrative are diverse, they arguably represent a shared discursive trajectory. That trajectory--which characterizes the development of hypertext as an evolutionary process beginning with technological innovations and the proliferation of scientific knowledge after WWII--reflects an ongoing assumption that tomorrow’s innovation can lead humanity out of information overload and into a revolutionary future. Neglected in this standard narrative is a broader historical perspective that contextualizes the development of technology intended to help manage information. In fact, thousands of years before the Memex was envisioned by Vannevar Bush,

inventors struggled to develop systems that could organize information and clear the way for never-before-seen progress.

ADDITIONAL NARRATIVES: BEFORE THE MEMEX

The historical context of information management is expansive, but there are two perspectives in particular that I believe help enrich the story of hypertext. The first comes from Hervé Platteaux, a media scholar based at the University of Fribourg in Switzerland. Platteaux's essay, provocatively titled "Hypertext Was Born Around 1200," seeks to offer an historical perspective on textual navigation. Platteaux wrote this essay for an anthology published in 2008 that was concerned with how multimedia documents impact the perception, comprehension, and use of information (Rouet, Lowe, and Schnotz 2). In his essay, Platteaux explains that Theodor Nelson's definition of hypertext, which emphasizes non-linearity as the "core difference between printed and hypermedia documents," neglects the history of "book structuring devices" (such as the index, table of contents, bibliographical list, page numbers, section titles) and their effect on reading in the Middle Ages (204). Platteaux goes on to suggest that seeing hypertext as uniquely non-linear confuses the text with the way a text is read, and that "[a] linear document can be used in a non-linear way" (204). His primary claim is that:

Text structuring tools play a central role in the concept of non-linearity. On the one hand, they break the linearity of a text by proposing links to other text passages. On the other hand, they support the non-linear reading activity of the reader who can activate or not the proposed link, according to his navigation aims. (Platteaux 204)

The force of this observation is two-fold: it both suggests that the motivation for reading in a non-linear way resides at least partially with the reader and that the invention of textual devices to make this possible has a history that extends back to the early development of printed text.

Platteaux's main point here--that the development of textual devices allowed for non-linear reading in the Middle Ages--is itself rooted in a fascinating story. Platteaux explains that up until the 4th century, the primary mode of expression was still oral speech (207). The variation inherent in oral speech became particularly problematic as oratory began to be used more directly as a means for transmitting Christian dogma (Platteaux 207). Here the advantage became clear: written documents could be repeated accurately over and over again whereas oral speech was subject to the variations of memory. While the first written texts of this kind were intended to be read beginning to end in total, Platteaux suggests that this practice began to change with a swift succession of individual reading tools intended to make references to specific passages easier: first, pages and the table of contents in 4th century, then the separation of words in the 8th century, and eventually numbered pages, cross references, and the names of cited authors in the 12th century (208). Platteaux goes on to note that these innovations were "slowly transforming the linear, speech-like text into an autonomous, non-linear artifact," and with it, non-linear reading was beginning to develop (209). This development, Platteaux explains, meant the introduction and facilitation of a selective, "fragmentary, non-linear way of using texts" that is a

“continuity...rather than an absolute rupture” with computer-based hypertext today (211, 220).

Another development before the Memex, one that arises from a similar spirit of continuity over rupture, can be found in Alex Wright’s 2007 book, *Glut: Mastering Information Through the Ages*. In this work, Wright introduces the Belgian inventor Paul Otlet and his hypertext-like system for information organization, the *Bibliographique Universel*, which he began working on in 1894 (186). This system, while pre-dating Vannevar Bush’s Memex by quite a few years, was similarly motivated by a sense that there was an urgent need to develop “new mechanical approaches to coping with a growing flood of published data” (184). Interestingly, Otlet, who worked extensively with methods of information classification and systems for data management, is described by Wright as “the Internet’s forgotten forefather” (185). In fact, Otlet’s vision in 1934 for what Wright describes as a “new kind of networked, multi-media rich information space” is a revolutionary kind of working environment, especially for the time, and it has interesting parallels to the Web today (185):

Here, the workspace is no longer cluttered with any books. In their place, a screen and a telephone within reach. Over there, in an immense edifice, are all the books and information. From there, the page to be read...is made to appear on the screen. The screen could be divided...if multiple texts and documents had to be consulted simultaneously.... Cinema, phonographs, radio, television: these instruments, taken as substitutes for the book, will in fact become the new book, the most powerful works for the diffusion of human thought. This will be the radiated library, and the televised book. (qtd. in Wright 185)

Wright notes that this proposed system, also called the *Mundaneum*, “would do more than just let users retrieve documents; it would also let them annotate the relationships between them, ‘the connections each [document] has with all other [documents], forming from them what might be called the Universal Book’” (186). The parallels here with Bush’s motivation for storage and retrieval, Engelbart’s view of hypertext-aided augmentation, and Nelson’s proposed “docuverse” as a repository for all texts make it particularly surprising that Otlet’s story is not typically included as part of the standard narrative.

What both of these alternate narratives offer, I would argue, is an additional perspective from which to view a key motivation for the development of hypertext-like systems. This motivation, which seems to underlie both the invention of reader devices to structure a text and systems to structure those texts in a larger non-linear way, arises from what we might frame today as information overload. This problem, which I believe is suggested by the narratives Platteaux and Wright offer, is if nothing else a widespread and particularly complex context for the sustained innovation of hypertext as a means for organizing and accessing information.

SUPPLEMENTAL NARRATIVES: 1986-1993

Moving to a different time, the period after Engelbart and Nelson, two narratives accompany the transition from hypertext as experimental system--the forms developed by Engelbart and Nelson (as well as many lesser-known projects)--to

hypertext on the personal computer, and then from the personal computer to hypertext on the World Wide Web.

The shift for hypertext to the personal computer began in 1986 with the release of Guide, a program developed in the UK by a private company, Office Workstations Limited (Nielsen 39). Jakob Nielsen, who has written extensively about hypertext systems, explains that Guide “was the first popular commercial hypertext system” released for both the PC and the Macintosh (90). The interface of this system looked like a series of standard note cards, an interface that echoed Nelson’s note cards mentioned above, and links created and inserted within each card could be activated in order to direct a user to a different section of the same card (Nielsen 91). This system worked well to direct readers of a long text to more information about the contributors, sources, or endnotes located at the end of the document, but its primary limitation was that it did not link between note cards.

A later, perhaps more popular, and certainly better-known hypertext system for the personal computer was HyperCard, a program bundled free with the Macintosh computer. This system used the same note card style interface as Guide, but it allowed linking between cards so that a user could create a more complex hypertext environment (Nielsen 91). Despite this rather significant improvement, HyperCard was best known for being accessible to any novice user (Seyer 8). Whereas Guide, according to Nielsen, marked the “transition of hypertext from an exotic research

concept to a ‘real world’ computer technique for use in actual applications,”

HyperCard signified the “final step to ‘realworldness’” (40).

Except for a few updates and imitations of Guide and HyperCard, the next step for hypertext did not come until it moved to the World Wide Web. The Internet--which is the international computer network the World Wide Web is built upon--had its start in the late 1960s when the United States Department of Defense set out to build “a network of computers that could withstand the loss of several machines without compromising the the ability of the remaining ones to communicate” (Musciano and Kennedy 2). This system, which was then known as ARPAnet (Advanced Research Projects Agency Network) remained accessible, for the most part, only to defense contractors and academic institutions until the late 1980s when the household availability of computers and modems for computerized communication made it possible for a wider range of individuals and organizations to link in (often indirectly) to the early Internet (Musciano and Kennedy 2). This model--which was still very restrictive--began to open up in the early 1990s following pressure on network providers (which at the time were mostly research universities) from individuals and organizations eager to take advantage of the Internet as a medium for global communications (Musciano and Kennedy 3).

As the same time this movement for access continued to spread, a group of physicists at CERN (the European Particle Physics Laboratory) hired Tim Berners-Lee, a computer scientist, as a contractor to resolve a problem: their worldwide

scholarly community needed to share information, but they did not have a common computer system (Berners-Lee 23). In 1990, Berners-Lee offered a solution that “put together hypertext and computer networks” with the standardized authoring language (Hypertext Markup Language, or HTML) and the shared distribution network (Hypertext Transfer Protocol, or HTTP) that persists to this day as the World Wide Web (Cantoni and Tardini 29). This development took place in 1990, but by nearly all accounts the World Wide Web did not become widely available until the development of the Web browser Mosaic at the University of Illinois in 1993 (Musciano and Kennedy 3). Although Mosaic was not the only means to view HTML pages (what we now call Web pages), it was the first browser to incorporate an easy-to-use interface, the ability to view text and images, an integrated method for uploading new pages, and perhaps most importantly to early users, it was free (Musciano and Kennedy 3). This model was later applied (by many of the same people from the University of Illinois) in the ongoing development of early Web browsers like Netscape Navigator and Microsoft Internet Explorer (Musciano and Kennedy 4). The result of these advances was expanded access and incredible growth. In this way, hypertext helped to tame, or at least contain, an early wave of information overload online--an accomplishment that offers some validity for the early work of Otlet and Bush.

HOW CAN THIS PERSPECTIVE ENRICH OUR UNDERSTANDING?

Looking at hypertext through all of the narratives presented here helps develop a sense of the conditions which gave rise over time to hypertext on the Web, which is

what we experience today. Examining the various ways in which these conditions are manifest, a few points seem clear.

First, the development of hypertext appears to arise amidst a shared sense of being overwhelmed with information. This was the case most clearly for Vannevar Bush, but it is also evident in earlier work by Paul Otlet and in text structuring devices of the Middle Ages, as well as subsequent efforts by Engelbart and Nelson, computer programmers in the 1980s, right on through to the development of the Web today. Moving forward, as the challenges of information inundation are certain to persist, developers working with hypertext are faced with a very practical question: How can this technology be used to make information more navigable--not in some abstract sense, but in a way that has a clear purpose of helping us to do more?

Second, information overload--though it often feels new and a sign of the times--is actually quite old. Perhaps part of why it can seem new is because the Web, which is central to how we interact with information today, is itself a rather recent phenomena. The long view, as I hope suggest, is punctuated periodically by advances that have changed the landscape of this condition--the invention of textual devices for printed text, the mechanized storage and retrieval of information, the development of computerized systems, the personal computer, and the World Wide Web--but the underlying conditions are surprisingly similar. As hypertext research moves forward and new ways of handling information are developed, we might ask what can be

gained from a look to the past. Is it possible that seeing hypertext through the context of a longer tradition can help direct future development?

Finally, the prospect that hypertext can act as an agent for positive change--which is the utopian technological determinist position--is, and perhaps always has been, a way of sustaining hypertext projects. Articulating this as a motivation for continuing the tradition--and continuing work about the tradition--is an important part of justifying hypertext as more than just a technology for technology's sake. Whether or not this is an impediment, more might be done to explain precisely what is at stake and what is gained in the relationship between hypertext, people, and culture. That is, it seems important as the narrative of hypertext is extended to ask what tangible benefits this work has brought. In a very selfish way, we might ask "What is it that hypertext actually does for *us*?" I would argue that answering this question, and considering the response in the context of the narratives that precede it, is bound to be an important part of figuring out how best to understand hypertext.

Knowing more about what hypertext does and can do in terms of information management--though quite important--represents only one way of looking at hypertext. In addition to its appeal as a system, program, or structure for the Web, hypertext has also been seen as a powerful conceptual model. The chapter that follows will look closely at a second body of scholarship surrounding hypertext that, while not entirely isolated from the development narratives, takes as its focus the implications of hypertext in terms of theory.

CHAPTER THREE

HYPERTEXT, CRITICAL THEORY, AND THE PARADIGM OF THE BOOK

Whereas the previous chapter looked at the narratives that contribute to a story of how hypertext was developed as a means to organize information, this chapter focuses on how hypertext has been applied to solving a much different set of problems. This additional perspective is important both because these articulations represent a second major body of scholarship for hypertext as a field of study, and also because it goes a long way in demonstrating the conceptual richness of hypertext that is overlooked by thinking strictly in terms of either its technological development or its current manifestation on the World Wide Web. Seeing both perspectives together and in conversation is especially important, I would argue, because it helps develop a richer understanding of hypertext.

The problems addressed by the most prominent scholars within this second body of work--George Landow and Jay David Bolter--arise primarily from a sense that hypertext can serve as a kind of “laboratory in which to test” key claims about textuality in critical theory and the role of the book in shaping hypertext conceptually (Landow, *Hypertext 3.0*, 2). It is important to note that in writing about hypertext, Landow and Bolter share the standard narrative of its development--the one that presents Bush, Engelbart, and Nelson as founding figures--in order to introduce hypertext as a technology and to suggest precedent for “rejecting some of the fundamental assumptions...that had increasingly dominated--and some would say

largely created--Western thought since Gutenberg” (Landow, *Hypertext 3.0*, 13). Two points seem particularly important in this quote by Landow: first, that those working with hypertext on a conceptual level are generally familiar with the standard narrative of hypertext development; and second, that neither Landow nor Bolter make it their focus to problematize the standard narrative because they are more interested in challenging different aspects of textuality than those addressed in early work on hypertext, which as the last chapter explained, centered largely on the management of information.

This chapter will begin by looking closely at the contributions from Landow and Bolter mentioned above: hypertext as critical theory and the book as a paradigm for hypertext. Though Landow and Bolter are not the only scholars working with hypertext from these perspectives, their works are more widely read and referenced than others. After a brief overview of their respective approaches, I will suggest some points at which their work overlaps--and where they overlap with the narratives of hypertext development in the previous chapter. I will also explore criticisms which broadly characterize both approaches as being utopian and deterministic, the two most common contentions against this body of scholarship. My own contention in this chapter is that putting Landow and Bolter into conversation--with each other and with a body of work that has different aspirations--can help further our understanding of hypertext conceptually and thereby productively supplement the narratives of its development as a technology, as described in the previous chapter.

HYPERTEXT AND/AS CRITICAL THEORY

The convergence of hypertext and critical theory, two concepts that seem unrelated at first glance, begins with a chance encounter. In 1986, George Landow, a professor of English and art history, was invited to work with Brown University's Institute for Research in Information and Scholarship (IRIS). IRIS was established in 1983 by Andries van Dam (who, as the previous chapter notes, had been working on hypertext systems at Brown since the 1960s) with the explicit goal of "finding new ways for computing technology to help scholars in their daily work" (Mitchell). By 1985, this mission had lead IRIS to develop Intermedia, an application intended to "organize on the computer screen a compilation of educational materials including texts, resource materials and illustrations" (Mitchell). The first use of Intermedia, and hypertext, in the classroom came in 1987, when Landow adapted a course titled "English Literature from 1700 to the Present" to link primary and secondary sources for access in a single application made accessible to students (Nielsen 51).

Landow explains in "The Paradigm Is More Important Than the Purchase" (2003) that joining the Intermedia project and working with Andries van Dam directed him to the writings of Vannevar Bush, Theodor Nelson, and Doug Engelbart--early hypertext pioneers who, as I have noted, played a central role in the standard narrative of hypertext development (42). Following this exposure and his continued use of Intermedia in other courses at Brown, Landow explains that he came to recognize the many ways in which hypertext "converged with contemporary critical

theory” and facilitated his desire to challenge the authority of conventional modes of written representation (“Paradigm” 43). During this period in the mid 1980s, when post-structuralism was at the height of its influence, Landow had been reading French theorists in the context of his own work but often finding them “interesting, often annoying, and almost never of much use in understanding either literary texts or cultural institutions” (“Paradigm” 43). Through the lens of hypertext, however, Landow discovered that “digital information technology made critical theory much easier to understand, and equally important, [that] the critical writings of Barthes, Bakhtin, Derrida, Baudrillard, and (later) Deleuze and Guattari provided the best explanation...of the way computer-based texts function” (“Paradigm” 43). This is the point at which, through what is largely a chance encounter, hypertext became associated with critical theory. Today, critical theory is integral to research on the ways in which hypertext challenges assumptions about textuality, and it has been seen as a means to test revolutionary ideas about authorship, the writer/reader relationship, and intertextuality.

LANDOW: HYPERTEXTUAL DERRIDA, POSTSTRUCTURALIST NELSON?

Landow begins the most recent edition of his best-known work, titled *Hypertext 3.0: Critical Theory and New Media in an Era of Globalization* (2006), with an important claim about a critical intersection and a note about a key separation:

A paradigm shift, I suggest, has begun to take place in the writings of Jacques Derrida and Theodor Nelson, Roland Barthes and Andries van Dam. I expect that one name in each pair will be unknown to most of

my readers. Those working in computing will know well the ideas of Nelson and van Dam; those working in literary and cultural theory will know equally well the ideas of Derrida and Barthes. (1)

Landow's point here is that despite their different communities of practice, "[a]ll four, like many others who write on hypertext and literary theory, agree that we must abandon conceptual systems founded on ideas of center, margin, hierarchy, and linearity and replace them by ones of multilinearity, nodes, links, and networks" (*Hypertext 3.0* 1). Establishing this new notion of text, as Landow sees it, is a project that unites critical theorists and hypertext scholars--albeit in projects notably different than might be typically carried out by either community on its own.

Landow's writing begins to explore the convergence of hypertext and critical theory by looking at Barthes' concept of "ideal textuality"--which was articulated in *S/Z* (1970)--as a point where critical theory "precisely matches that which in computing has come to be called hypertext" (2). Here, it is worth repeating Barthes at length:

In this ideal text, the networks are many and interact, without any one of them being able to surpass the rest....it has no beginning; it is reversible; we gain access to it by several entrances, none of which can be authoritatively declared to be the main one. (5-6)

Barthes' language here, though written without hypertext in mind, does elicit an important parallel, particularly the reference to "networks" and "several entrances"; and, quite interestingly, Landow reads Barthes as emphasizing a non-sequential nature of text (having "no beginning") in a way that is parallel to Theodor Nelson's early

definition of hypertext as “non-sequential writing--text that branches and allows choices to the reader” (qtd. in Landow, *Hypertext 3.0*, 2-3). More important for Landow than these points of overlap is an articulation of text as connected and unstable that challenges the authority of authorship and the presumed boundaries that exist between texts.

A second intersection between critical theory and hypertext that Landow explores in detail centers on the relationship between writers and readers and again comes from Barthes. In *S/Z*, Barthes introduces a distinction between “readerly text” and “writerly text.” By Barthes’ definition, a “readerly text” does not require one to generate his or her own meanings, but rather expects that a reader will consume “ready-made” interpretations (4). On the other hand, a “writerly text...aims to make the reader no longer a consumer but a producer of the text” (4). Landow takes this “basic typology” (as Barthes calls it), and suggests that the “distinction between readerly and writerly texts appears to be essentially a distinction between text based on print technology and electronic hypertext” (4). As an example, Landow cites the description of Intermedia given by van Dam:

Both an author’s tool and a reader’s medium, a hypertext document system allows authors or groups of authors to link information together, create paths through a corpus of related material, annotate existing texts, and create notes that point readers to either bibliographic data or the body of the referenced text....Readers can browse through linked, cross-referenced, annotated texts in an orderly but non-sequential manner. (*Hypertext 3.0* 17)

Here, the presumption is that linking material imposes a need for readers to interact

with text in order to produce meaning. This point can be made more familiar by considering reading on the World Wide Web as a hypertext environment and considering the way readers are generally required to activate hotlinks in order to move between bits of text, other pages, or different websites. Landow's contention is that readers of any hypertext (including hypertext on the Web) generate meaning based on the links that are followed; in printed text, on the other hand, Landow believes that readers only consume a meaning already intended by an author since there are no links to activate (*Hypertext 3.0* 4).

Interestingly, Landow seems to be suggesting in this passage that printed texts cannot be read non-sequentially, which would overlook the reading devices that Hervé Platteaux believes make it possible for readers to make their way through a text in any order they choose by using a table of contents or an index and page numbers. Despite this perspective on non-sequentiality in printed text, Landow does believe that readers actively create meaning in both print and hypertext environments (*Hypertext 3.0* 7); in hypertext, however, Landow believes readers become "very active readers" by "creating the document they read from the informed choices they make" and the links they follow (*Hypertext 3.0* 9). This still seems to neglect that the model for hypertext articulated by van Dam emphasizes an author created network, thereby offering readers a plurality of choices rather than a set of options based on links created by a hypertext creator. Nonetheless, it does seem fair to suggest that non-sequential reading--which is in fact a characteristic of hypertext, albeit not hypertext alone--

changes the relationship between writers and readers by allowing readers greater control over the meaning of a text.

The points from Barthes that Landow addresses--about authorship, the writer/reader relationship, and intertextuality--are not the extent of Landow's attempt to explore the intersection of hypertext and critical theory. Much of *Hypertext 3.0* is devoted to furthering these convergences through the work of Jacques Derrida, Michel Foucault, Mikhail Bakhtin, Giles Deleuze and Félix Guattari, as well as exploring their implications politically. This final move in Landow's work, a relatively recent development found for the first time in the third edition, is particularly interesting because it seems to suggest an application of hypertext beyond the explication of poststructuralist critical theory, itself a body of work that many suggest has lost its currency in recent years to more politicized approaches to literary and cultural artifacts. This relationship between evolving theoretical trends and hypertext, as I suggest later in this chapter, raises important questions about the flexibility of hypertext to move beyond poststructuralism and its focus on textuality.

HYPERTEXT AND THE PARADIGM OF THE BOOK

Another development that has occupied the attention of hypertext theory as a body of scholarship emerges from the evolving relationship between printed books and hypertext. As we have seen, early hypertext systems were developed by computer scientists with very little interest in the larger history of technologies associated with reading and writing. However, by the mid 1980s, personal computers began to put

hypertext into the hands of a wider audience, and as a result, scholars started to think of it as a versatile medium with a direct precedence in the history of print. Such an observation may seem obvious today when we think about the World Wide Web having “pages” that bear some marked similarities with the printed page, such as headers and paragraphs. But in the days before the Web, it was a revolutionary development to see hypertext as a place for reading and writing similar to the book.

In fact, the earliest example of such thinking appears in a paper delivered at the first professional conference on hypertext--Hypertext '87--by Jay David Bolter, a professor of classics, and Michael Joyce, a writer and professor of literature. As Bolter and Joyce explain in 1987, “[t]he idea of hypertext, which seemed daring only a few years ago, is now emerging as a sensible way to use the computer for reading and writing” (41). They go on to note:

Technical writing and pedagogy (interactive communication between teachers and students) are obvious and important applications for hypertext systems. But hypertext may in fact apply to the whole range of human literacy, including the writing and reading of fiction. (Bolter and Joyce 41)

Towards this end, Bolter and Joyce (in collaboration with John B. Smith) developed a system for interactive fiction--though not strictly limited to fiction--called Storyspace (Bolter and Joyce 43). Storyspace, which is still commercially distributed by the software company Eastgate Systems, aimed to free “both author and reader from restrictions imposed by the printed medium” and thereby enable “new experiments in literary structure” (Bolter and Joyce 41). Notable here is the way in which Storyspace

aimed to augment the book, not altogether unlike the way early hypertext pioneers sought to augment the human mind, in order to expand the range of possible reading/writing activities and bring about revolutionary possibilities for literacy practices. In many ways, this meant maintaining the conventions of narrative, but altering the interface to allow readers the ability to choose a path through the story. Both Landow and Bolter have written extensively about Storyspace as a medium and its potential to enable a new variety of active reading, but their approach to the relationship between hypertext and printed text is notably different.

JAY DAVID BOLTER: THE OLD AND THE NEW IN DIGITAL WRITING

Jay David Bolter, a key figure in the conceptualization of hypertext, begins his book *Writing Space: Computers, Hypertext, and the Remediation of Print* (2001) by exploring the ways in which the paradigm of the printed book and electronic text are connected--the direct opposite of Landow's approach. The fundamental concept for Bolter's work is remediation, which he defines as a shift where "a newer medium takes the place of an older one, borrowing and reorganizing the characteristics of writing in the older medium and reforming its cultural space" (*Writing Space* 23). As Bolter sees it, "[r]emediation involves both homage and rivalry, for the new medium imitates some features of the older medium, but also makes an implicit or explicit claim to improve on the older one" (*Writing Space* 23). In this way, Bolter conceives of remediation as "a process of cultural competition between or among technologies,"

the precedent for which goes back to the tension between alphabetic writing and oral tradition in ancient Greece (*Writing Space* 23-24).

In *Writing Space*, Bolter builds on his background as a classicist to outline a continuous series of remediations that begins in Antiquity. His claim is that early prose attempted to imitate and improve on oral presentation in the form of the linear scroll; that the early codex--a manuscript in book form--attempted to imitate and improve the papyrus scroll by dividing it into parts that could be engaged separately; and that in the Renaissance, “the printed book remediated the manuscript by appearing to provide the same visual space as the manuscript with the added benefits of mass production” (*Writing Space* 24). Bolter’s most important contention is that hypertext “is turning out to be one of the more traumatic remediations in the history of Western writing” in part because “digital technology changes the ‘look and feel’ of writing and reading” like never before (*Writing Space* 24).

Despite this sense of discontinuity in the transition from printed text to hypertext as a writing space, Bolter argues that “[t]he best way to understand electronic writing today is to see it as the remediation of printed text, with its claim to refashioning the presentation and status of alphabetic writing itself” (26). In fact, Bolter states definitively that “[h]ypertext in all its electronic forms--the World Wide Web as well as the many stand-alone systems--is the remediation of print” (*Writing Space* 42). Between hypertext and printed text there are aspects of imitation, such as the use of paragraphs and “pages” to separate content, and layouts modeled on

newspapers or magazines; and, moreover, there are aspects of improvement, like the ability of text to be widely associative, dynamic, and reader ordered (Bolter, *Writing Space*, 43). In this way, hypertext, according to Bolter, is both old and new--it confronts the tradition of printed text but it also “means that our culture will have at least some different uses for electronic texts” (Bolter, *Writing Space*, 45).

Bolter’s perspective on the role printed text plays in our understanding of hypertext seems to raise at least two key points. The first is that hypertext is not entirely without precedent as a medium for reading and writing--though it is a rather substantial transition both visually and operationally. This suggests that there may be something to gain by focusing on similarities as well as differences between hypertext and printed text, and it offers an important complication to narratives of development (such as those explored in the previous chapter) that portray hypertext as one successive advance after another. Second, there is some possibility--though not directly explored in Bolter’s work--that remediation entails limits on the ability of a new medium to reach its full potential. In fact, early developers of hypertext systems like Theodor Nelson have criticized hypertext on the Web--which has followed some key aspects of printed text, such as the use of pages and headers--for not taking advantage of the radical potential to re-envision these conventions in a new medium.² This may also offer at least one explanation for why hypertext has failed to live up to

² The website for Nelson’s current Project Xanadu argues that “The World Wide Web (another imitation of paper) trivializes our original hypertext model with one-way ever-breaking links and no management of version or contents.”

the bold proclamations that suggest a revolutionary future will necessarily result from particular technological developments. These points aside, Bolter's work opens the development of hypertext to the larger development of literacy--especially the role technologies have played in the history of writing and reading from ancient Greece to the Renaissance to electronic text--which helps to enrich our conceptual understanding of hypertext today.

CRITICAL INTERSECTIONS: THEN AND NOW

It is important to note that even though these brief summaries of key concepts from the work of Landow and Bolter have largely focused on different aspects of hypertext, there are key points where they overlap and also where they disagree. Looking at Landow and Bolter in comparison and largely through their best-known contributions to hypertext scholarship is particularly important because it calls attention to two sustained areas of focus within a community of practice, and because it offers a much-needed sense of depth for the theoretical work surrounding hypertext which might otherwise be reduced to a singular perspective.

One point where work by Landow and Bolter intersect is introduced in "The Paradigm Is More Important Than the Purchase," where Landow claims that early hypertext theory and poststructuralist theory "make us self conscious about the paradigm one uses for educational and other forms of hypertext" (43). That is, Landow argues that they make it possible to see how we "base our ideas about the nature of reading, the purpose of documents, and their relation to individuals and communities

on the mistaken assumption that electronic documents are essentially the same as books” (“Paradigm” 43). Landow goes on to suggest that it is the intersection of these theoretical perspectives that makes it possible to “observe that the importance of hypertext theorists, such as Nelson and van Dam, is that they speak very precisely about the specific qualities of the book that they wish to change or surpass” and that they also “conceive these innovations in terms of social and political roles in more direct and effective, if more limited, ways than do most poststructuralist cultural and literary theorists” (“Paradigm” 43). Landow further adds that, alternatively, “[t]he value of the poststructuralist theorists, who are essentially more negative in their approach than hypertext theorists, is that they forcibly call attention to the book as a thought-form,” in so much as they “offer a self-conscious awareness of the nature and limits of the book and of the literary and other cultural forms it generates” (“Paradigm” 43-44). From these points, it seems clear that if we ignore theory and see electronic text as too similar to the book, Landow believes that we fail to take advantage of all that electronic text has to offer.

While Landow, like Bolter, acknowledges that “[o]ur understanding of the new is almost always mediated by our knowledge of the old and the familiar,” he insists that “mediation too often masks the new, making it invisible to most of us” (“Paradigm” 36). This point of disagreement between Landow and Bolter is one place where differing theoretical perspectives--especially their fundamental approach to electronic text and its relationship to printed text--shows diversity amongst a

community of practice that helps to complicate the overdetermined nature of hypertext. If, for example, hypertext is seen as a radical departure from printed text as Landow suggests, then its place within the larger context of literacy technologies is lost. Likewise, if hypertext is seen through its relationship to printed text as Bolter argues, then its potential as a new medium risks being continually framed through the limitations of the older medium. Keeping both perspectives in play helps to situate hypertext in a less reductive way, and ultimately it shows a conceptual richness that might otherwise be overlooked.

In another critical intersection, Bolter follows Landow's lead in addressing the convergence of hypertext and critical theory. In *Writing Space*, Bolter explains that this "would seem to be a natural alliance": "Just as electronic writing can be interpreted as a radical departure from traditional writing, the many poststructuralist and postmodern theories have also identified themselves as radical departures from traditional ways of understanding literary texts" (161). Even though Bolter believes "the work of the poststructuralists is no longer the dominant critical discourse," a point Landow might not explicitly agree with, he argues that "it is worthwhile to review the relationship" because--like Landow--he believes "poststructuralism clarifies the cultural significance of hypertext....and also helps us to see how poststructuralism belonged to a moment in the late age of print" (*Writing Space* 171). While Bolter's observation seems to make sense given the emphasis on textuality in much of poststructuralist theory, it is important to note that even at its height the link between

hypertext and poststructuralism “did not have the impact on the critical community that some had anticipated” and that it did not “lead to widespread engagement with or acceptance of hypertext in humanities departments” (Bolter, “Theory and Practice,” 19). Bolter suggests that this is partly because “hypertext remained an esoteric activity of relatively few scholars” and in part because “poststructuralist theory was waning at precisely this time in favor of various forms of postmodern theory, feminist theory, and cultural studies” which were more politically relevant than earlier theoretical perspectives (“Theory and Practice” 19). In this way, the intersection of hypertext and critical theory is framed to accommodate changes in the way scholars approach texts and their larger contexts--a point that again suggests an important degree of diversity for this particular community of practice.

Yet another critical intersection can be seen between these communities of practice as much of the writing by Landow and Bolter addressed in this chapter overlaps with parts of the standard narrative of the development of hypertext explored in the previous chapter. Two of the more obvious correlations can be seen in claims made by Landow about critical theory and about the book as a paradigm for electronic text. First, Landow suggests that poststructuralist theorists like Derrida and Barthes, and early developers of hypertext like Theodor Nelson and Andries van Dam, both “argue that we must abandon conceptual systems founded on ideas of center, margin, hierarchy, and linearity and replace them by ones of multilinearity, nodes, links, and networks” (*Hypertext 3.0* 1). This can be seen directly by reviewing claims found in

the previous chapter that outline Nelson's insistence that hypertext is interconnected and non-sequential writing not possible in print, but perhaps even more directly by considering van Dam's understanding of Intermedia as a means to link information, create paths through related material, and allow readers to browse through texts in a newly non-sequential manner.

Second, Landow claims that the "importance of hypertext theorists, such as Nelson and van Dam, is that they speak very precisely about the specific qualities of the book that they wish to change or surpass" and that they also "conceive these innovations in terms of social and political roles in more direct and effective, if more limited, ways than do most poststructuralist cultural and literary theorists" ("Paradigm" 43). Here, a parallel can be found in Douglas Engelbart's view that hypertext should augment printed text such that more can be done than would be possible without it, and with Theodor Nelson's political claim that hypertext is "the most audacious and specific plan for knowledge, freedom, and a better world yet to come out of computerdom" (*Literary Machines*). Summarizing these critical intersections between work within the community of practice focused on hypertext development--the one explored in the previous chapter--and the community of practice focused on the conceptual relationships between hypertext and printed text--though at times tough to follow--shows that these different perspectives are more related than might seem apparent on the surface and goes some way towards contextualizing the overdetermined nature of hypertext.

CRITICISMS: TECHNOLOGICAL DETERMINISM AND UTOPIANISM

The claims by Engelbart and Nelson outlined above also suggest a less desirable place where Landow, Bolter, and the standard narrative of hypertext development converge, namely in their general characterizations of technology itself as an agent for positive change. In Landow, this tendency is embodied in claims that underlie the conclusion of *Hypertext 3.0*, which suggests that hypertext enables an “increasing democratization or dissemination of power” without acknowledgement that such a process is dependent on wider social conditions—including cultural, political, and economic influences (339). In Bolter, there is also a tendency to portray hypertext as an “autonomous agent” which emphasized that “technologies themselves could change the way we organized and expressed our literary and cultural forms and even the way we think” (*Writing Space* xii). It is important to note here, however, that Bolter acknowledges the problems in this perspective, and in the second edition of *Writing Space* he has made a deliberate move to respond to the issue of technological determinism by openly acknowledging that “writing technologies do not alter culture as if from the outside, because they themselves are part of our cultural dynamic” and as such “shape and are shaped by social and cultural forces” (xii). Nonetheless, this perspective still finds its way into writing that implies the ability of hypertext to change the social landscape, largely because the perspective is such a prominent and long-standing approach towards technology in general. As an example, the standard narrative of hypertext explored in the previous chapter demonstrated a tendency

towards determinism by portraying the systems envisioned by Bush, Engelbart, and Nelson as technological innovations to manage information that would lead humanity out of overload and into a revolutionary future of never-before-seen progress. As this framework is shared, repeated, and often left un-problematized, there is the potential that determinism will continue to find its way into discussions of hypertext.

The notion that hypertext necessarily changes literary and cultural forms, a point that characterizes the early narratives of development and more recent theoretical work, leads to another important criticism, this time about the overly utopian spirit underlying the advances purportedly associated with hypertext. The sense that hypertext is a means to transcend the limits imposed on progress by current systems for managing information can be seen in Bush's endeavor to create a supplement to human memory, Engelbart's system to augment the flawed human mind, and Nelson's dream of personal freedom through the unrestricted exchange of information. In Landow, it can be found in claims that "several key features of hypertext systems intrinsically promote a new kind of freedom and empowerment" (*Hypertext 3.0* 343) of which "the result has always been to democratize information and power" (*Hypertext 3.0* 338). In Bolter, such idealism (though subdued in comparison) surfaces in the expressed belief that hypertext is "working subtly against the extension of older models of economic and cultural control" through "decentralization, local autonomy, and flexibility" such that a near-future exists free from social and economic controls of any kind (211-212).

In stark contrast to these utopian claims about hypertext, there is also a dystopian perspective that frequently finds its way into writing about the World Wide Web in general. One critic, Silvio Gaggi, argues in *From Text to Hypertext* (1998) that the Web has the equally likely potential to bring about a negative scenario that “is very different from the nonhierarchical egalitarian society” described by Landow, Bolter, and early hypertext pioneers (116). Gaggi states that “[i]f hypertext is to have the emancipating and broadly empowering potential that is envisioned, several conditions must be obtained” (118). First, Gaggi argues that hypertext must be “accessible to large numbers of people and be inexpensive and ‘friendly’ enough to be available to anyone who wants or needs to engage it” (118). Second, “hypertext must remain interactive, not only in its exploratory capacity but also in its constructive capacity” (119). Finally, “the choices available in hypertext--the texts included and the links among them--must be significant” (121). These conditions, which intersect with larger cultural, political, and economic issues, are intended as prescriptive guidelines for future development, but they can also be read as the evidentiary burden facing the more common utopian claims for hypertext. That is, taking this point of view into consideration when evaluating claims about “increasing democratization or dissemination of power” helps to situate agency back in the larger, and perhaps more complex cultural dynamic where it belongs (*Hypertext 3.0* 339). Within the context of the larger argument this thesis presents, accounting for cultural, political, and economic conditions has the potential to further problematize the overdetermined

nature of hypertext by magnifying the multitude of ways in which it is used and conceptualized--thereby avoiding a tendency to reduce hypertext to a single practice or theoretical perspective.

HOW CAN THIS PERSPECTIVE ENRICH OUR UNDERSTANDING?

Exploring hypertext through the work of Landow and Bolter--including criticisms of their general approach toward technology--helps develop a sense of the ways in which hypertext as a constructed object has been theorized. Looking at Landow and Bolter in conversation, and in conversation with the standard narrative of development explored in the previous chapter, a few particularly important points emerge.

One point is that critical theory does seem to help explain aspects of hypertext--but the audience for this explanation is most likely those who already have a certain amount of exposure (and perhaps tolerance for) the complexity of poststructuralism. The same might also be said for the ability of hypertext theory to explain aspects of poststructuralism--again, an audience would need a fair amount of exposure to the relative complexity of hypertext. Because of these limitations, I think it is important here to question the value added when hypertext and poststructuralism are considered together. Is there something that poststructuralism adds to our understanding of hypertext that can direct the development of particular practices in the future? It is one thing to claim, as Landow does, that hypertext “creates an almost embarrassingly literal embodiment” of poststructuralism (*Hypertext 3.0* 52); it is

another thing, however, to suggest that this relationship will have an effect beyond a relatively small community of devoted scholars.

Another point that emerges from looking at writing by Landow and Bolter is that identifying a paradigm for understanding hypertext is a divisive issue within hypertext theory. On the one hand, many--including Landow--want to separate hypertext and the book so that electronic text can be conceptualized as something altogether new. Landow argues that thinking of hypertext in this way is the only means to develop systems with the widest range of functions--functions that more completely fulfill the visions of early hypertext pioneers and move away from the limitations of printed text. Bolter argues, on the other hand, that maintaining the paradigm of the book for hypertext--and not characterizing it as altogether new--opens more doors than it closes. He believes that there is a strong case to be made that understanding hypertext in this way, through the familiarities of printed text, is an important step in making it available to scholars in other fields, teachers, and students, and that it connects hypertext more directly with the broader study of literacy technologies.

The question of how we think about electronic text is not an issue that can be easily resolved, but recognizing each paradigm separately--both the pros and the cons--may in fact prove just as important as choosing one or the other. That is, there seems to be value in thinking about the connection between printed text and hypertext and value in considering the potential for hypertext to evolve in radically different and as yet unforeseen ways.

A final point from this chapter is that there is some sense that hypertext can break from its tendency towards technological determinism following the direction Bolter advocates in the second edition of *Writing Space*. There, Bolter acknowledges that “writing technologies do not alter culture as if from the outside, because they themselves are part of our cultural dynamic” and “shape and are shaped by social and cultural forces” (xii). This move might find its counterpart in literary theory with cultural studies, which in recent years has begun to focus on the agency of individuals within economic and political structures. Little work has been done to explore the potential value of this intersection in terms of understanding hypertext, but Bolter notes that because cultural studies has been “concerned as much with visual as with verbal communication,” that it might be an ideal way to look at hypertext on the World Wide Web, a medium that has made extensive use of multimedia in ways not possible on the hypertext systems that existed when Landow began exploring intersections with poststructuralism (183). Furthermore, it is Bolter’s contention that cultural studies, even more than poststructuralism, “has the resources to examine the wealth of new forms and genres produced on the Web” such as home pages, fan sites, blogs, and popular social media (184).

Exploring a community of practice focused on theorizing the relationship between hypertext and printed text through literary theory and the paradigm of the book, which has a set of problems and aspirations different than the community of practice examined in the previous chapter, helps to demonstrate a conceptual richness

overlooked by considering only technological development or hypertext on the World Wide Web. In addition to the benefits this offers in terms of contextualizing the overdetermined nature of hypertext, there is more to consider in the two broader approaches toward technology--determinism and utopianism/dystopianism--that underlie writing about hypertext in both communities.

CHAPTER FOUR CONCLUSION

The previous chapters have revisited two different hypertext communities of practice, both to show the depth and richness of writing about hypertext and to suggest some particularly important points that emerge from the work scholars have done to develop and theorize hypertext in the past. In this concluding chapter, I will summarize a few of the key moments from those chapters and draw some conclusions about what can be learned about hypertext as a result of this particular approach.

REVISITING NARRATIVE(S) OF DEVELOPMENT

Most scholarly work about hypertext begins by outlining what I have called the standard narrative of hypertext development. This collection of events that spans roughly 1945 to 1968 begins with an overview of Vannevar Bush's proposed Memex system, a device designed as a means for mechanized, non-linear information retrieval. Bush's Memex, which was presented as a kind of "memory extender," was envisioned as a means to manage information overload following the proliferation of scientific research that followed World War II (qtd. in Nielsen 30).

Though the claims made by Bush about the progress possible in a world not overwhelmed by data sparked widespread interest, technological limitations delayed the first working hypertext system until the late 1960s. By 1965, Theodor Nelson had given the method of linking text that Bush proposed a name--hypertext. Shortly after, in 1968, Doug Engelbart publicly debuted the "oN-Line System" (NLS), which was

part of a larger project to “develop computer systems that help us think--rather than just record and retrieve data” (Seyer 5). Though different than how Bush articulated the purpose of the Memex, Engelbart’s NLS system also had its roots in efforts to improve productivity.

The system produced by Engelbart was followed by a number of equally noteworthy projects. Theodor Nelson, who coined the term hypertext, developed a system inspired by a movement towards computer aided instruction that was largely a document repository for “everything that anybody has ever written” (Nielsen 33). At Brown University, whose commitment to hypertext remains evident to this day, Andries van Dam developed what he called the Hypertext Editing System (HES) in order to both facilitate the production of printed documents in an age before word processing and to link those documents in a localized database.

This standard narrative, as I have called it, tells a compelling story about the development of hypertext as a technology--though it neglects a broader historical perspective that provides context for the persistent problems of information management early developers of hypertext were largely attempting to address. Two additional narratives help to show the depth of managing information as an aspiration and thereby add depth to the history of hypertext. The first narrative, which comes from Hervé Platteaux, suggests that navigating text in the non-linear way hypertext scholars propose goes back as far as the invention of “book structuring devices” (such as the table of contents, index, and page numbers) in the Middle Ages (204). With

these devices, Platteaux suggests that a “linear document can be read in a non-linear way,” which makes it easier for readers to handle large quantities of information (204).

Another historical narrative, this one more recent, comes from the story of the Belgian inventor Paul Otlet and is retold in Alex Wright’s *Glut: Mastering Information Through the Ages* (2007). Beginning in 1894, Otlet worked on a proto-hypertext system that he called the *Bibliographique Universel*, which like Bush’s Memex was a “new mechanical approach to coping with a growing flood of published data” (184). Otlet’s system was particularly noteworthy because it not only allowed users to retrieve information from a vast body of documents, but also because it allowed them to annotate the relationships between texts (Wright 186).

Beyond these historical additions, which I think play an important role in explaining the depth of hypertext as a constructed object, there is a compelling and often overlooked supplemental narrative that explains the transition of hypertext from large institutions and research centers to the personal computer and eventually the Internet between 1986 and 1993. Just as hypertext systems in the 1960s developed rapidly and simultaneously, hypertext on the personal computer took many forms and changed in important ways in a relatively short period of time. Likewise, hypertext moved quickly from the personal computer to the Internet, and on the World Wide Web it has seen many different visual orientations--from early text-only websites, to multimedia-rich pages, to wikis and blogs in recent years.

REVISITING CRITICAL THEORY AND THE PARADIGM OF THE BOOK

Whereas the community of practice explored in the first chapter focused on solving problems of information management in a shared domain of technological development, another community of practice formed in the 1980s has looked more directly at the relationship between hypertext and printed text through both critical theory and the paradigm of the book. The two most prominent scholars in this second body of work--George Landow and Jay David Bolter--focus on hypertext as a “kind of laboratory” to test claims about textuality that have persisted over thousands of years. These claims center on issues of authorship, the reader/writer relationship, intertextuality, and the relationship between printed text and electronic text.

Landow begins exploring the intersection of hypertext and critical theory by suggesting that those writing about both argue that “we must abandon conceptual systems founded on ideas of center, margin, hierarchy, and linearity and replace them by ones of multilinearity, nodes, links, and networks” (*Hypertext 3.0* 1). To further explain this connection, Landow cites examples where perspectives from the standard narrative of hypertext development overlap with the work of poststructuralists like Roland Barthes, Jacques Derrida, Michel Foucault.

Landow’s work on the connection between hypertext and critical theory not only adds richness to hypertext as a concept, it also points to the role printed text plays in shaping the way electronic text is understood. While Landow emphasizes the radical difference between hypertext and books, Jay David Bolter has written

extensively about the connection between both media as reading and writing spaces. Bolter's calls his framework for exploring these connections remediation, which he defines as a shift in which "a newer medium takes the place of an older one, borrowing and reorganizing the characteristics of writing in the older medium" (*Writing Space* 23). This process of "cultural competition between or among technologies," which Bolter sees as both homage and rivalry, is one explanation for why a new medium like hypertext on the Web imitates some features of printed text--such as the use of pages, headers, and paragraphing--while also making an explicit claim about the improvements a new medium brings over the old (*Writing Space* 23). Bolter's perspective does important work historicizing hypertext by emphasizing a connection to the broader development of writing technology, a move that again enriches hypertext as a concept.

Even though my summary of the work done by Landow and Bolter emphasizes their differences, there are a number of points where they overlap. One such place is in their characterization of technology itself as an agent for positive change. In Landow's writing, this perspective--which is a kind of utopian technological determinism--is embodied in claims that suggest hypertext necessarily enables democratization or the dissemination of power without recognizing that such a process is dependent on more complex social conditions (*Hypertext 3.0* 339). In Bolter's writing, the tendency towards utopianism and technological determinism, though less direct in the second edition of *Writing Space*, portrays hypertext as an autonomous agent that directly

changes our literary and cultural forms as well as the way we think (xii). The roots of this perspective extend to the writing of Bush, Engelbart, and Nelson explored in the standard narrative of hypertext development, and continues to play a critical role in writing about communications technologies.

CONCLUSIONS

Looking at narratives of hypertext development and the ways in which hypertext has been theorized in relation to critical theory and the paradigm of the book as this thesis has done, a few conclusions emerge.

First, the problem of information overload that early hypertext developers endeavored to resolve is in fact a persistent issue that has driven technological innovation for thousands of years. Because information overload is often perceived to follow developments that increase the rate at which information is produced and the ease by which it can be distributed, it has been associated recently with the advent of the World Wide Web. However, looking at writing about Vannevar Bush's article describing the Memex in the 1940s and Hervé Platteaux's account of text ordering devices in the Middle Ages suggests that conditions older than the Web have prompted a similar sense of being overwhelmed by information and encouraged similar technological solutions. While this may seem to be a simple observation, it plays an important role in contextualizing the motivations and aspirations of early hypertext developers that underlie hypertext as a system to link and order information on the Web today.

Another point, one underlying both communities of practice explored in this thesis, is that technological determinism--a view that assumes technology is itself a kind of active agent that affects society--plays a direct role in shaping writing about hypertext. However, much like the problem of information overload, determinism is not a problem unique to hypertext. For example, the historian of technology Merritt Roe Smith notes in "Technological Determinism in American Culture" (1994) that advertisers in the twentieth century began to use the idea of a technological fix to sell new products that could be directly associated with "thoughts and feelings of efficiency, elegance, family affection, freedom, modernity, patriotism, sexuality, status, and youth" (15). In 1920, for example, electrical appliances like the Simplex power ironer were marketed with ads directed towards "the 'intelligent' housekeeper who courageously sought to 'meet the overwhelming demands upon her time' by making ironing easier" (Smith 15). As Smith explains, countless advertisements like this one "assured readers that the products of the new technology not only saved time but also made users 'happier, healthier, and more cheerful when the work is finished'" (15).

At its worst, technological determinism of this variety reduces the complexity of human history to singular causes with inevitable effects; at its best, it offers a way to explain new activities that a technology might enable--and that are so often used to market new technologies as the key to greater efficiency and happiness. Both characterizations have been criticized in various forms for implying inevitability and

dismissing the role a whole host of cultural, political, economic, and other factors play in the development of any technology, no matter how revolutionary and unprecedented it might seem. Both characterizations, it is worth pointing out, can be found in claims made about hypertext, especially assertions about the political and the social effects of hypertext in a culture otherwise overwhelmed by information and bound by the limitations of printed text.

Technological determinism leads inevitably to utopian or dystopian perspectives, but writing about hypertext almost always expresses the position that outcomes associated with hypertext will be necessarily positive. The basis for this assumption generally has its roots in popular claims about technological innovations beyond hypertext; historically, advances in medicine, agriculture, engineering, and computing were widely considered to have made daily life more convenient, safer, increasingly productive, and comfortable. In popular writing about the World Wide Web today, the utopian point of view typically argues for the positive value of changing social dynamics. It can be found in books like Henry Jenkins' *Convergence Culture: Where Old and New Media Collide* (2008), Howard Rheingold's *Smart Mobs: The Next Social Revolution* (2003), and Clay Shirky's *Here Comes Everybody: The Power of Organizing Without Organizations* (2009).

The dystopian point of view, unlike the utopian perspective described above, emphasizes dangers rather than benefits. Claims in writing that adopts a dystopian stance toward technology frequently suggest that the Web isolates people from

geographical communities, that access is unfairly limited, or that it overwhelms users with low-quality information and challenges or diminishes individual creativity and responsibility for ideas.

Such dystopian anxiety about the relationship between communications technology and society is not new either. For example, Plato has Socrates make a detailed argument against writing in the *Phaedrus*, claiming that it is artificial, destroys memory, and is not responsive like a spoken dialogue. As far back as 1520, not too long after the development of movable type and the expanded distribution of Gutenberg's Bible, Martin Luther wrote that "[t]he number of books on theology must be reduced and only the best ones published" so that a man might be made "more learned in the Scriptures" and therefore "more godly" (qtd. in Gilmont 221). In the eighteenth century, Denis Diderot famously wrote that a "time will come when it will be almost as difficult to learn anything from books as from the direct study of the whole universe," and that because the printing press never seemed to rest, "the world of learning...will drown in books" (qtd. in Schultze 47). More recently, critics like Andrew Keen have argued that the Web is "creating an endless digital forest of mediocrity: uninformed political commentary, unseemly home videos, embarrassingly amateurish music, unreadable poems, essays and novels" (qtd. in Flintoff). Other popular dystopian accounts, which mostly claim the Web is necessarily changing the way we think, communicate, and interact in negative ways include Nicholas Carr's often-cited *Atlantic Monthly* article "Is Google Making Us Stupid?" (2008) as well as

his more recent book *The Shallows: What the Internet Is Doing to Our Brains* (2010), and Jaron Lanier's popular book *You Are Not A Gadget* (2010).

My analysis of hypertext as an overdetermined term and my investigation of its genealogy in two communities of practice makes it clear, I hope, that both utopian and dystopian views of hypertext in particular, and of the Web in general, oversimplify. Like other communication technologies, hypertext is best understood through situated, materially grounded analysis. Given this fact, it is hardly surprising that there are potentially powerful connections between work done in hypertext communities of practice and literacy studies.

It is not within the scope of this thesis to explore these connections at length, but I would like to conclude by pointing toward them, so that future researchers might benefit. Those studying hypertext and the Web would do well, first of all, to embrace Brian Street's ideological model of literacy, which is described at length in his 1984 study *Literacy in Theory and Practice*. In this study Street argues that technologies of communication do not have inherent power--only power that comes from the ways in which they are used in specific contexts. This ideological approach is an important corrective to autonomous models, like technological determinism, that see socio-political contexts as neutral or otherwise unimportant.

Another potentially significant connection with literacy studies arises from criticisms of writing about technology that address the issue of technological determinism. One example is indicated in the preface to the second edition of Jay

David Bolter's *Writing Space*, which explains that as early as 1994 some in the hypertext community were in the position of having to address criticisms related to technological determinism (xiii). At that time, scholars like Richard Grusin, who was working in other areas of new media research at the time, began to insist that those writing about hypertext needed to be more aware of the fallacy involved in thinking about technology as an agent. In "What is an Electronic Author?" (1994), Grusin called for scholars to reconsider characterizations of hypertext as a direct agent for change by turning to "thick historical or ethnographic descriptions" that focus on challenging the belief that technology and culture are "distinct, autonomous realms capable of 'acting' upon one another" (483). The "thick historical or ethnographic" research that Grusin advocates to combat technological determinism has not become wide-spread in writing about technology since 1994; however, it has become increasingly common in literacy studies and can be found in books like *Literate Lives in the Information Age* (2004) by Cynthia Selfe and Gail Hawisher, *New Literacies: Everyday Practices and Classroom Learning* (2006) by Michele Knobel and Colin Lankshear, and Lisa Nakamura's *Digitizing Race* (2007). As this list suggests, a growing number of scholars are studying literacy practices online, and this can only benefit our understanding of hypertext and of the Web.

These conclusions should make it clear that there is a lot at stake in writing about hypertext. The communities of practice that I revisit in this thesis address a wide range of issues, which each have a considerable depth and richness that helps to

inform how we might address hypertext today. Despite this potential, hypertext remains a largely overdetermined term--with its complexity often reduced to a single practice, such as hotlinking, or a single principle, like its relationship to printed text. To better contextualize this overdetermined understanding of hypertext, it is important to consider more than one perspective and to fully explore multiple narratives and conceptual approaches.

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