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dissertation entitled

DIGITAL RHETORIC: ECOLOGIES AND ECONOMIES OF CIRCULATION

presented by

DOUGLAS ANDREW EYMAN

has been accepted towards fulfillment
of the requirements for the

Ph.D. degree in Rhetoric and Writing

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June 29, 2007
Date

DIGITAL RHETORIC: ECOLOGIES AND ECONOMIES OF DIGITAL CIRCULATION

By

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A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Rhetoric and Writing

2007

ABSTRACT

DIGITAL RHETORIC: ECOLOGIES AND ECONOMIES OF DIGITAL CIRCULATION

By

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Digital networks, digital media, and digital production all carry their own affordances, practices, and economics, but to date there is a gap between the methods available for theorizing and analyzing digital works and the analytic tools that digital texts and networks themselves make possible. This dissertation project, situated in the field of digital rhetoric, aims to develop methodologies for research in digital rhetoric: these new methods are needed because current research methods are grounded in print-based literacies. Researching digital rhetorics and digital literacies requires an epistemological shift in focus that is not easily supported by current methods. For this project I have built a web-based tool that applies digital analytics to digital work, rather than relying on the application of analog (print-based) methods. One of the key affordances of networked communication is that work can circulate through increasingly widespread knowledge ecologies; the initial object of analysis for the digital methods I am developing is the role of circulation within the rhetorical practices of digital production, using a baseline case study that traces and visualizes the circulation, citation, and use of published online scholarship from *Kairos* and the *Journal of Computer-Mediated Communication*, followed by a series of case studies that evaluate how writers may deploy and apply these methods to their

online portfolios of work.

The aim of this dissertation is twofold: to articulate a theory of digital rhetoric that features circulation as a foundational element that effects each of the five classical canons of rhetoric (invention, organization, style, memory, delivery) and to develop both methodology and methods for tracing the circulation of rhetorical objects across and through various knowledge domains and networks. This methodology is supported by a theoretical foundation that sees circulation as a rhetorical activity that takes place within and across multiple ecologies and that is driven by economic functions particular to digital production. A key element of this methodology is understanding how to build digital systems whose function is to make visible the connections described by the theoretical framework; additionally, I argue that creating and documenting such systems is itself part of the methodology and not simply a tool whose use supports the activities of inquiry.

This work is dedicated to my parents, Bill and Janet Eyman, for all of the love and support they have offered; I would not have made it this far without them.

ACKNOWLEDGMENTS

I am very grateful to have been part of the first cohort of students in Michigan State University's Rhetoric and Writing graduate program: my fellow students, the faculty, and the support staff have all been, by turns, excellent friends, mentors, collaborators, and colleagues. I am especially thankful for the support, feedback, and hard questions provided by my committee members, Dànielle DeVoss, Jeff Grabill, and Julie Lindquist, and to my chair, Jim Porter, for the encouragement and advice he provided throughout the process.

The originality and innovativeness of the program at MSU has been coupled with deep support for its graduate students, and although there is not room here to properly thank everyone who helped, I would like to extend thanks to Malea Powell and Bill Hart-Davidson, who have been the kind of mentors that I hope to be when I grow up.

Special thanks also are due to my collaborators, whose work with me have helped to shape this project, especially Colleen Reilly and Jim Ridolfo. I must also thank my co-editors at *Kairos*, Cheryl Ball, Beth Hewett, and James Inman, for providing me with extra time and space to do this work.

Finally, I would like to thank my wife Raquel for her support and patience, and the forbearance she exhibited by not throwing my laptop out a window, no matter how tempted she was.

DIGITAL RHETORIC: ECOLOGIES AND ECONOMIES OF CIRCULATION

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Blood circulates. In each body, blood follows deliberate paths, collecting and transporting oxygen and nutrients to the various organs in a systemic cycle that fuels the body's economies of motion and activity. Changes in circulatory rhythms can have profound effects on the body, nearly all of which are detrimental. Water circulates. It moves between states of matter, from the glacial ices in which water is archived, to the liquid flows that support planetary life, to condensation that is abstracted into the atmosphere, waiting to be re-released as rain. Changes in the global circulation of water may also have profound effects, although the economies of scale at work within a global framework mean that such effects may not be immediately obvious. In both cases—the blood and the water—the activities of circulation engage the medium in complex interactions with actors, contexts, and other systems. Shifting focus from the physical to the digital, it is possible to trace similar circulatory systems at play in the flow of binary digits carried between and among digital networks in similarly complex interactions. Unlike the circulatory systems of bodies and planets, however, information and data move not through a foundation of natural phenomena, but via the actions of people who use the information, information infrastructures, and the nonhuman actors (servers, routers, search engines, spiders) that promote circulation on those networks.

Tracing circulation through natural ecologies can be accomplished by using tracers: in the Brazilian rainforest, radio collars are attached to golden lion

tamarinds and their movements are tracked and recorded using global positioning systems; in the hospital, radioactive isotopes are introduced into the blood and their flow through the body's system is measured via CAT scan; in municipal water systems, marker elements are added at specific points and downstream samples are extracted and chemically analyzed. In each of these cases, direct measurements are possible and the results of these measurements provide meaningful data that can be utilized to better understand the systems in which the circulation takes place. Tracing circulation of texts, however, whether print or digital, is a much more complex task. Although direct measures of textual circulation are not yet technologically feasible, indirect measures are available: the circulation of newspapers and journals is reported based on the number of subscribers or units sold ... but without access to library records and mechanisms for finding out which subscribers pass on their journals and papers to others, even this picture of circulation is incomplete. Relatively new projects, such as BookCrossing (http://bookcrossing.com) and Where's George (http://wheresgeorge.com), provide social-networking systems that allow people to record their place in the circulation of books and dollar bills, respectively, in effect also providing a window onto normally obscured processes of circulation that take place through personal interaction.

In a knowledge economy, understanding the interactions of texts and contexts can yield a more comprehensive picture of interaction than the traditional approach of rhetorical invention, composition, and delivery; it can also

provide a map of the relationships between work and activity that are often hidden because we simply don't have the means to uncover them. This is particularly useful for professional writing and technical communication because the activities in this field are based on rhetoric-as-action and because circulation analysis provides a means to more clearly view how professional writing works within institutional ecologies and through global knowledge economies (for more on ecologies and ecologies, see chapter two). I find the question of circulation a particularly compelling one for professional writing in part because I see professional writing and technical communication as grounded in rhetorical activity, and the development of a theory of digital rhetoric has the potential to re-shape the foundational systems through which professional writing activities are realized (and how professional writing and technical communication courses are taught). But it also has immediate applications to several areas of interest to professional writing research: visualizing circulation at the micro-ecological level of an individual institution can help build best-practice models for creating content within single sourcing systems; mapping the relationships of texts and actors through circulation provides another mechanism for viewing workplace communication activities in context (as, for instance, an extension of Spinuzzi and Zachary's [2000] genre ecology approach); and it furthers the professional writer's notion of audience to include not just people, but the network systems that move, collect, and link the written products of rhetorical activity.

Digital networks, digital media, and digital production all carry their own

affordances, practices, and economics, but to date there is a gap between the methods available for theorizing and analyzing digital works and the analytic tools that digital texts and networks themselves make possible. The goal of this dissertation project is to develop methodologies for research in digital rhetoric: these new methods are needed because current research methods are grounded in print-based literacies. Researching digital rhetorics and digital literacies requires an epistemological shift in focus that is not easily supported by current methods. One of the key affordances of networked communication is that work can circulate through increasingly widespread knowledge ecologies; the primary object of analysis for the digital methods I am developing is the role of circulation within the rhetorical practices of digital production. The initial tests of these digital methods include (1) an investigation of how they may be applied to individual authors' online portfolios of digital texts; and (2) a baseline case study that traces and visualizes the circulation, citation, and use of published online scholarship from the journals *Kairos, Computers and Composition Online,* and the *Journal of Computer-Mediated Communication*.

The aim of this dissertation is twofold: to articulate the role of circulation within a theory of digital rhetoric, and to develop both methodology and methods for tracing the circulation of rhetorical objects across and through various knowledge domains and networks. This methodology is supported by a theoretical foundation that sees circulation as a rhetorical activity that takes place within and across multiple ecologies and that is driven by economic functions

particular to digital production.

At the core of the project are two deceptively simple questions: What happens to writing/scholarship/knowledge once it is delivered? How and where does it circulate, and what are the effects and consequences of its circulation? My hypothesis is that circulation will have differential effects depending on the ecologies in which rhetorical objects circulate (that is, different economies of circulation will be at work within the various contexts of distribution and uptake), but a circulation analysis will also provide evidence of the influence of both human and non-human interaction with digital texts—circulation analysis, in other words, will provide a method for seeing and engaging multiple audiences – not just the human audiences that rhetoric has heretofore addressed, but also (in a very Latourian move) non-human actors such as spiders, scrapers, data-mining aggregators and the very networks that carry our work.

I'm interested in the answers to these questions of circulation as they apply to the field of rhetoric because I see circulation as an undertheorized rhetorical activity; John Trimbur (2000) argued that circulation should be re-introduced in writing instruction, but as with much of the work in rhetorical theory, he sees circulation as an element or result of delivery. Trimbur argues that

> neglecting delivery has led writing teachers to equate the activity of composing with writing itself and to miss altogether the complex delivery systems through which writing circulates. By privileging composing as the main site of instruction, the teaching of writing has taken up what Karl

> Marx calls a "one-sided" view of production and thereby has largely erased the cycle that links the production, distribution, exchange, and consumption of writing. This cycle of interlocked moments is what Marx calls *circulation*. (190)

My view of circulation as distinct from but effected by delivery is at odds with Trimbur's conflation of Marx's concept of circulation and the rhetorical practice of delivery. This is partly due to complications that arise from addressing the issue of consumption of social capital and partly due to Marx's use of circulation to refer to the entire process of production, distribution, exchange and consumption; I see circulation as influential in each of these activities, but not as a container for them.

Much of the recent work on recovering memory and delivery that has been spurred by an interest in developing a digital rhetoric has not addressed circulation as anything but an extension of delivery (cf. DeVoss & Porter 2006; Porter, 20005b; Ridolfo, 2005). I see circulation as a separate process; as, in effect, a rhetorical meta-canon that derives its analytic and productive powers from the contexts and movements of rhetorical objects themselves (as a form of post-rhetor agency). Theorized thus, the circulation of texts (which I designate rhetorical objects because they may be composed of several media and modes) through digital networks offers one possibility for realizing a comprehensive digital rhetoric that is based on the interactions between digital networks and media and classical principles of the rhetorical canon—circulation becomes the

glue that ties rhetorical production and post-production activity .

Because I do not see circulation as simply an effect of delivery, it is important to understand how I articulate my definitions of delivery, distribution, publication, and circulation, and their relationship to both classical and digital rhetorics. In classical terms, delivery is "right management of the voice to express various emotions" (Honeycutt, 2007/Aristotle, 1404a) and is tightly coupled with style; current approaches to delivery as rhetorical activity address "the choice of tools for production, reproduction, and distribution of digital 'information,' knowledge of systems which govern, constrain and promote publishing ... and awareness of the ethical and political issues that impact publishing practices" (DeVoss & Porter, 2006, p. 26). Following DeVoss and Porter (2006), then, I use "delivery" to speak of rhetorical activity that is embodied in the deliberate choices made by the composer of a given text-- and it is clear that the rhetorical canon of delivery becomes far more important for a digital rhetoric than it was considered in classical rhetoric (Aristotle, for instance, argued that "delivery is ... not regarded as an elevated subject of inquiry" [Honeycutt, 2007/1404a]). Distribution is the path or mechanism by which a text is delivered and circulated, whereas publication is the process of delivery which makes texts available to the public. Within particular contexts, a given text can said to be distributed (as, for instance, an intra-office memo), but not necessarily published. Conversely, a text may be published (via posting to a web page), but not necessarily distributed. Circulation constitutes both the movement of a text

through a network and its use by other actors once it has been delivered. The rhetoric of delivery includes the *choices made* in the *production* of the text, distribution is the *mechanism*, publication is the *process*, and circulation is both *movement* and *effect*. Reproduction, particularly in digital networks, is an instance of circulation.

This theoretical model of circulation is valuable because it can be applied as both analytic and heuristic with regard to digital production. There are also practical applications that can benefit a wide variety of fields: understanding circulation can help us to map the development of scholarly discourses and fields of study as rhetorical constructs; it can help both distinguish and blur the boundaries of disciplinary domains and surface trans- and interdisciplinary activity across these boundaries; applied to rhetoric/composition, engaging circulation in terms of ecologies and economies can help students recognize and visualize the connections within the work they do between and across courses; it can add a further dimension to the tracing of genre ecologies (workplace writing/knowledge-building activities); and it can help to articulate coherent research projects (for individuals) and institutional identities (for social networks).

Investigating the interrelationships among memory, delivery, and circulation can also help producers to make informed decisions about the most appropriate means and methods of communication when coupled with a theory of the (sometimes unintended) consequences of circulation; this is essentially the argument made by Trimbur (2000), but applied with, not as part of, delivery.

My own interest in circulation was initiated by an investigation into whether works published in *Kairos* (the journal of which I am co-editor) have been valued, either by virtue of linking (in digital networks) or citation (in print bibliographic networks). Thus, as a technorhetorician and editor of an electronic journal, my particular goals for the work I've done to date have been to examine the circulation of academic work with the aim of improving the use and influence of digital scholarship, and following this initial area of inquiry, I became interested in how bibliometrics and cybermetrics (as the primary current forms of circulation analysis) can be used to visualize relationships between the work of authors whose publications cited some of the same references, regardless of whether these individual authors were aware of each other's scholarship. In these cases, the relationships between the knowledge production of these authors is not visible except by tracing the circulation of their publications; the effects of the work they have taken up would remain invisible if not for the connections revealed through the bibliometric method.

Bibliometrics, however, has a very limited scope: it only traces circulation that is, in effect, branded by an author function (by way of citation in journals that achieved a highly-rated journal impact factor) and has thus far only been used to trace evocations of authors rather than a more direct assessment of what work (what ideas or knowledge disseminated in the publications of those authors) has been appropriated and used. Moreover bibliometrics is primarily a method without a rhetorical basis; that is, it functions quantitatively (measuring numbers

of citations) but rarely qualitatively (engaging motivation, genre affordances, or the rhetorical choices of the authors of works that appear in the citation-counting metrics)—I therefore have begun to articulate a rhetorical theory that can account for the effects of circulation by examining the contexts and the motivations that both constrain and propel circulatory action.

Ecologies and Economies: Theories of Circulation

The theoretical basis of my investigation of circulation is derived from a two-part framework: ecologies of circulation represent the contexts of activity (and serve as the boundaries for the scope of the study, set at increasingly wider fields) and economies of circulation represent the value-exchanges that motivate and animate the circulation of rhetorical objects (these exchanges also take place between the objects and other actors in the ecologies in which they circulate).

Ecologies represent specific, bounded locales where circulation takes place; and although circulation occurs across and through multiple ecologies, the effects are best observed within particular localized systems; thus, ecologies represent the scale at which research on circulation may be most profitably undertaken. In describing circulatory activity as taking place within an ecological context, I am drawing heavily on two specific works that also use the ecological metaphor: Nardi and O'Day's (1999) "information ecologies" and Spinuzzi and Zachary's (2000) "genre ecologies." Each of these formations plays a role in the

structure of circulation ecologies, as both "information" and "genre" influence and are influenced by circulation, but I would suggest that information is too broad and genre is too narrow to effectively describe the interaction, movement, and exchange that occurs with the digital circulation of rhetorical objects. Information implies an object but does not incorporate use as an intrinsic component of that object's character. Genres shift and change not only over time, but through the processes of circulation. What is useful here, however, is the articulation of how both information and genres function within complex networks of interaction: ecologies.

Ecologies can be described in terms of the specific interactions between people, texts, and technologies. Thus, any method for examining or researching circulation must take into account not only the actors, networks, and interactions, but also the specific articulation of media and technology within those networks. Ecologies, then, have rhetorical, technical, and social dimensions that influence the possible routes of (and interactions made possible by) circulation. Ecologies can be framed as networks within specific and situated institutions (such as a department within a university or workplace) but they can also be framed in terms of digital spaces that are bounded by genre and activity (e.g. Ebay, Flickr, Citeshare, Wikipedia).

Economies of circulation represent the mechanisms that motivate circulation, primarily through the process of production, distribution, and exchange (using Marx's terminology). The key to how and where a given text will

circulate is based upon the value of that text, which can be assessed in terms of either use-value or exchange-value. Because Marx's work is concerned with material production, his framework includes consumption as an integral (and cyclical) component of the production process (which is also required for the establishment of value). Consumption, however, becomes useful only at a metaphorical level when the object of the exchange is digital: exact reproductions can be made that do not consume the original products. Consumption can be described in terms of external resources (such as the living expenses of the scholar(s) who develop digital texts), but it not longer plays a direct role in the economies of circulation (although one might substitute "use" for consumption in order to fulfill all of the requirements of production in Marx's theory). It is important to note at the outset that I will *not* be using Marx's notion of circulation here, because his use of circulation is both limited in scope and is divorced from production (which is the opposite of my contention that, rhetorically speaking, circulation plays an important role in all of the processes of classical rhetoric, from invention to delivery). Instead, because digital circulation does not function in the same way as material production, it is better to approach the question of exchange-value not through Marxist theory, but via Bourdieu's theory of cultural capital. Particularly in terms of scholarly work and knowledge management ecologies, digital objects are not typically traded for material or monetary gain; instead, the exchange-value of the work comes from the accrual of cultural or social capital.

Social and cultural capital operate at the level of activity: although it is possible to exchange social and cultural capital for material capital, gaining social capital is not as simple as purchasing material goods. Social capital – academic capital in particular – is, like material capital, a product of labor. The difference here is that the labor is intellectual and self-motivated, rather than physical. The circulation of rhetorical objects is part of the process of production that leads to greater or lesser degrees of social capital for the composer (as well as for others who appropriate and use the compositions as the basis for further production).

Economies of circulation, then, must account for both the use-value and exchange-value acquired by rhetorical objects as they circulate through digital networks as well as the social capitol these works are exchanged for by their authors and appropriators. As with circulation ecologies, these processes are complex and interdependent, relying on the relationships between human and non-human actors who are connected via digital networks.

Digital and Rhetoric

Because I view professional and technical communication as a field that takes rhetoric as its epistemological foundation and primary research methodology, one of the initial connections that I make for circulation is to use it as a remediating force for classical rhetoric. While a comprehensive theory of digital rhetoric should engage and reconfigure both contemporary and classical rhetoric, I have chosen to focus on the implications of circulation for classical

rhetoric for this stage of my investigation.

In 2002, Michael Cohen argued that no one had yet successfully articulated a "rhetoric of the digital arts"; that, indeed, for digital texts, there is "nothing like the tradition of classical rhetoric, which, among other things, served to contain, arrange, and codify the choices available to an author" (online). But since the advent of networked, multimedia communication, critics and theorists have been struggling to develop a rhetorical theory that can account for multi-modal communication, and the rapid development of digital networks and media has brought forth several attempts to harness the power of rhetoric as both an analytic and a mode of production for creating persuasive communicative works enacted via these new forms of media and distribution. The focal point, however, of Cohen's complaint, is the lack of a comprehensive digital rhetoric. While several attempts have been made to construct such a program, most have focused on particular aspects of digital production or the critique of digital works. As James Zappen (2005) notes, current work toward developing digital rhetoric has thus far resulted in "an amalgam of more-or-less discrete components rather than a complete and integrated theory in its own right. These discrete components nonetheless provide at least a partial outline for such a theory, which has potential to contribute to the larger body of rhetorical theory and criticism" (323). I suggest that the circulation of texts (rhetorical objects) through digital networks offers one possibility for realizing a coherent theory of digital rhetoric that is based on the interactions between digital networks and media and

classical principles of the rhetorical canon. Here then is a brief overview of the relationships between the classical canons of rhetoric and the activities of circulation that are the object of study in this dissertation, and to which I will return in successive chapters.

Invention

In Aristotle's famous formulation, rhetoric is "the art (*technē*) of finding out the available means of persuasion" (1991, p. 37), and the primary means of finding these means is through the faculty of invention, which describes "how individuals might employ a theoretical framework to discover arguments that might be effective in public deliberation and judgment" (Sauer, 2003, p. 3). Casting invention as a process of discovery fits neatly with current practices of digital production, as writers now seek out materials to inspire---and in some cases to incorporate into--their own digital work. Invention, as a function of digital rhetoric, includes the searching and negotiation of networks of information, seeking those materials best suited to creating persuasive works, as well as knowing which semiotic resources to address and draw upon (aural, visual, textual, hypertextual) and what technological tools are best suited to working with those resources. The availability of semiotic resources is dependent upon circulation; for without both distribution (or publication) and circulation, such resources would not be usable for appropriation and re-use within the process of invention.

Arrangement

Once materials, arguments, and media have been selected, the rhetor needs to consider the organizational schema that would best serve the purpose and audience of the composition. Arrangement in classical rhetoric is typically a formal system of organization that delineates each part of a speech based its purpose: Aristotle (who was more concerned with invention than arrangement) recommended four parts, Cicero suggested six divisions, and Quintilian divided the oration into five parts (the genesis of the five-paragraph essay). For classical rhetoricians, though, this system of organization was not fixed and orators where not bound to follow the conventions in every case. Doug Brent (1997) suggests that in classical rhetoric, "arrangement is determined more by the context, the audience, the rhetorical purpose--the cluster of exigencies that rhetoricians refer to as *kairos*--than by a 'logical' progression of propositions." For digital rhetoric, arrangement is also a productive art—not just a method for carrying forth a logical, cohesive argument. A theory of digital arrangement must include the practices of manipulating digital media as well as selecting ready-made works and reconstituting them into new works. As Lawrence Lessig (2005) points out, culture is made through the process of re-mixing, which is a confluence of invention and arrangement. Thus, unlike Aristotle's formulation, where arrangement appears less important than invention, for a theory of digital rhetoric, the two are intimately tied together—and, as Lessig's work on

appropriation and re-mix as the progenitors of culture shows, circulation again plays a crucial role in the availability of resources.

Style

Style takes on new importance for digital rhetoric, particularly in terms of visual style: for a digital rhetoric, style is equivalent to "design"; thus, digital rhetoric must be concerned with understanding all the available elements of document design, including color, font choice, layout, as well as multimedia design possibilities including motion, interactivity, and appropriate use of media. These choices can affect the distribution or publication of a given rhetorical object, and, by extension, the scope of its circulation within or through particular ecologies (contexts). Style in this sense is also an important quality in terms of a given texts use and usability. The economies of circulation are driven in part by the use-value of texts; in this context, a rhetorical approach to style can have a significant impact on circulation.

Memory

In classical rhetoric, memory is a faculty of the individual orator; digital technologies have moved the faculty of memory out of the individual and into the network, providing external means of storing, tagging, and sorting information. As Julia Romberger notes (2007), "memory in many instances has been externalized to the technology, and rhetors must take into consideration not only

how they navigate and use technologies as their memory for the purposes of invention but also how others who are using the information being communicated might also be developing their own memory" (online). Circulation plays an important role both in the communal development of memory via technological interaction and for the establishment of (digital) archives (Yates, 1966; Ong, 1982; Romberger, 2007). Memory, in fact, plays a critical role in my use of circulation because it mediates the temporality usually associated with descriptions of flow and movement. Much like ice trapped in glaciers may eventually reenter the global circulation of oceanic water currents, so too have texts entered into archives only to be retrieved and re-circulated later. (Consider, for instance, the case of Ward Churchill, whose writings about the World Trade Center bombings were re-discovered years later, with significant political consequences.)

Foucault's notion of the archive is also useful here, not just as a form of memory but as a system that interacts with the statement: statements are a dynamic part of communication and will change the archive - both physically, with new requests changing the substance of the rhetorical objects in the archive, but also by changing the conceptual frames through which we can interpret the archive (Foucault, 1972, p. 135). This interaction is a core principle of a digital rhetoric of circulation.

Delivery

Delivery and circulation are interconnected: the rhetorical choices affecting delivery also affect circulation. Delivery, like style and memory, takes on a new importance when considered as an element of digital composition. Digital rhetoric needs to provide methods for understanding and using systems of distribution and publication (including the technical frameworks that support varying protocols and networks), but this must be coupled with a broader theory of circulation. James Porter (2005a) has also delineated several important facets digital delivery, including access, interaction, and economics; he argues that a theory of digital delivery must include both productive practices and a method of developing ethical *phronêsis*. Digital delivery also needs to take into account the performative aspects of digital composition (particularly with regard to multimedia work). However, he notes that the individual elements of his theory "don't have very much generative or productive power unless you put them into dynamic interaction with each other and with other rhetorical topics. In other words, you connect up questions of delivery with rhetorical invention, with audience, with design of a web site, and so on" (Porter, 2005a). I would add that circulation informs delivery and these other rhetorical topics, but it also supersedes them once the work has been distributed and/or published via digital networks. Thus, any theory of digital rhetoric must account for circulation as well as engaging the traditional canons of classical rhetoric.

Developing Methods for Tracing Circulation

In order to apply my theories of circulation and operationalize the effect of circulation on the traditional canons of rhetoric, it is first necessary to examine and articulate circulation as it occurs in practice; thus, in chapters four, five, and six I provide my initial attempts to develop a method of circulation analysis and apply the results to the theoretical model outlined above (and detailed in chapter two).

As a test case, I selected the first peer-reviewed article that I had published online, "Hypertext And/As Collaboration in the Computer-Facilitated Writing Classroom" (published in *Kairos* 1.2, 1996) and began to apply the methods that I thought would produce the most complete picture of circulation available, including citation analysis, cybermetrics (tracing the links that point to this work), and keyword analysis (tracing works that use similar phrases and ideas but that might not have provided a link or citation). I provide a more detailed explanation of these methods in chapter four.

As I performed the analyses, I was immediately able to see connections that I wouldn't have otherwise been aware of, including the ways that the use of particular theorists in my work (Bakhtin and Kristeva) led to circulation in specific knowledge domains related to the work of those theorists; the global nature of digital circulation, and the outcomes of automated circulation processes driven by the capitalization of information in the knowledge economy.

Because the work in question is a hypertext, the link analyses had to be performed on each page of the article separately. As I checked the links to each

page, I found that the circulation patterns were not related to the work as a whole, but to the individual parts that were represented on each page. In other words, digital works have a tendency to be cited and used in a decontextualized manner, which complicates traditional methods of citation analysis. For instance, different parts of my article connect hypertext and Bakhtinian theories and make distinctions between hypertextuality and intertextuality as invoked by Juila Kristeva; each of these parts are cited and circulate distinct from each other – each has been found and used within the particular knowledge domains of Bakhtin scholars and Kristeva scholars, but no connections or relationships between these domains occur with respect to this single article.

I was also surprised to find the extent of the circulation, both geographically and quantitatively. In the first case, I found references to my article appearing in several different languages (including Icelandic, Bulgarian, and Spanish) and locations (including Brazil, Canada, Spain, and France). Circulation analysis, then, surfaces the global nature of digital networks. But I also found a related phenomena that is tied both to the globalized network structure and to the role of information in knowledge economies: I found 170 identical instances of a particular reference to my work repeated across a wide variety of sites, many of which appeared to have no relation to each other or to any topic addressed in my work. Closer inspection revealed that these sites were all using the content of a single database (the DMOZ Open Directory Project) so that anyone searching for particular keywords would be directed to the

information resource on these sites. In each case, the same three links to Bakhtin related sites would appear (the entry for the link to my work included the following annotation each time: "Notes by writing teacher Douglas Eyman, on the pertinence of Bakhtin's analyses of discourse to the hypertext situation."). Thus, the economies of circulation may be complicated by the nonhuman actors that work to provide data to sites regardless of relationship to the information needs of the audiences of the sites that choose to manipulate search engine traffic in this way.

Chapter four details the specific methods I am using to perform a circulation analysis; chapters five and six provide two case studies of circulation analysis in practice. The three case studies engage the form of professional writing with which I have the most familiarity and facility: academic writing. Each case engages the (digital) writing of academics that circulates in successively wider ecological contexts.

The first case study applies circulation analysis to a micro-ecology of one individual's electronic portfolio of academic work – in this case, my own work. This has the advantage of familiarity, as well as an established baseline of relationships and citations against which I can compare the results of the analysis. This case also shows how the methods I have deployed might be applied as a component to any electronic portfolio, extending the functionality of the portfolio in order to provide evidence of how one's work is received, cited, and used.

The second case study, addressing the much larger ecologies of scholarship in the disciplines of rhetoric/composition and communication studies, applies circulation analysis to a selection of published texts from the peer-reviewed electronic journals *Computers and Composition Online,* the *Journal of Computer-Mediated Communication*, and *Kairos.*

Chapter Outline

In each of the following chapters I describe in greater detail the theories, methods, and research of circulation analysis as applied to a series of sequentially larger ecological frameworks; in each chapter I also return to the overarching theme of digital rhetoric as the foundation for both the project and as the beneficiary of the project's results.

The second chapter, "Ecologies and Economies of Digital Circulation," develops a two-part theoretical framework that may be used to understand the activities of circulation, using circulation "ecologies" to represent the places, spaces, movements, and complex interactions of digital texts as they are produced, reproduced, exchanged, or used. The exchanges and uses that take place within those specific ecological circumstances are governed by an "economics" of circulation (which in turn is subject to the constraints and affordances offered by the situated ecologies in which the texts circulate). The theorization of economies of digital production is heavily indebted to Bourdieu's notions of cultural and social capital; actor-network theory also plays into the

theoretical construct by providing a theory of agency for rhetorical objects (thus allowing them to become actors within digital economies).

The third chapter, "Methods and Methodologies: Investigating Digital Rhetorics," examines current and proposed methods for investigating digital rhetorics and provides assessments of these methods with a focus on digital circulation. Key methods discussed and critiqued in this chapter come from usability, social network mapping, and cybermetrics.

Chapter four, "Circulation Analysis Methods" provides details and documentation of the three methods used for circulation analysis: reference tracking (formal and informal citation), backlink tracing, and full-text searches aimed at uncovering quotation or appropriation. In addition to a detailed description of methods deployment, this chapter considers the challenges and obstacles presented by the ways in which networked information is (intentionally or unintentionally) rendered inaccessible.

Chapter five, "Circulation Analysis and the Electronic Portfolio Ecosystem" applies circulation analysis to an individual electronic portfolio in order to show how an ecological view of even a small sample of texts can yield productive results. In chapter six, "Circulation Analysis and Online Scholarship," a corpus of published electronic works from *Kairos, Computers and Composition Online*, and the *Journal of Computer-Mediated Communication* is evaluated for both degree of remediation and paths of circulation, thus moving the analysis from an individual, local ecosystem to the larger ecosystems of peer-reviewed online

publication of scholarship in a particular field.

The concluding chapter suggests how the overall methodology fits into various disciplines' structures and needs, making explicit arguments about the value of this work for composition/rhetoric, digital rhetoric, and professional/technical writing. Because the dissertation represents the initial theoretical and methodological development necessary to carry out a large-scale study, the final chapter also outlines the trajectory of future research and development of digital rhetoric methods and tools.

Chapter 2: Ecologies and Economies of Digital Circulation

I became interested in the metaphor of ecology for the investigation of knowledge circulation because, at its core, ecology is the study of the relationship among organisms and the environments in which they live, including all living and nonliving components (in the science of ecology, these components are classified as biotic and abiotic, respectively). For rhetoric, the audience – the living components in what might be considered a communication ecology – have always been assumed to have greater agency (and are therefore of greater concern to the rhetor) than the nonliving components such as the medium of delivery and the immediate context of the rhetorical act (although these elements do play an important role; rhetoric derives a great deal of its power from the fact that it engages medium, mode, *and* context). Ecology struck me as a particularly appropriate method for the consideration of digital contexts because it places equal emphasis on those living and nonliving components: I take a Latourian view of the systems and networks that comprise the context of this study in that I see these systems (networks, routers, software agents) as having a "post-rhetorical agency" that influences the movement and circulation of digital discourse. The method that I have developed in this dissertation aims to reveal the ways that the interaction between living and nonliving agents of digital rhetoric influence the circulation of digital texts (I discuss the role of Actor-Network Theory in terms of methodological development in chapter 4).

Appropriation, Remix, Circulation

Before addressing the question of ecologies and economies, I want to first provide a few examples of new and emerging genres that are currently in circulation on the Internet. What these examples have in common is a focus on remediation, appropriation, and remix as practices of rhetorical production. Consider the following examples of:

Textual appropriation and re-mix

- At http://www.spam-poetry.com, Kristin Thomas produced poetry from the subject lines of spam email, a practice she began in 2003. On her site, she notes that she sees her work as "a little bit Found Art, a little bit Whimsy, and mostly, just to find a way for me to find a peaceful intersection between digital communication and my life" (Thomas, 2007).
- Jonathan Lethem, author of *You Don't Love Me Yet*, is offering several stories on his website (http://jonathanlethem.com/promiscuous_materials.html) for others to appropriate, remix, and adapt (but not copy in their entirety). On his site, he ëxplains that he likes "art that comes from other art," and likes to see his stories adapted into other forms: "My writing has always been strongly sourced in other voices, and I'm a fan of adaptations, apropriations, collage, and sampling."
- Michael Ian White's "Propaganda Remix Project"

(http://homepage.mac.com/leperous/PhotoAlbum1.html) presents classic wartime propaganda posters with new, anit-war slogans replacing the originals. In this case, the remix happens at the littoral zone of contact between text and image.

Audio remix and mashups

- A blogger who goes by the handle "Canis Lupus" has created a parody remix (http://www.aaronsw.com/2002/valentiRemix) of Jack Valenti's "Moral Imperative" speech, given at Duke University February 24, 2003; this remix converts Valenti's anti-piracy message into a pro-fair-use rights message.
- Peter Gabriel has created a site that promotes the remixing of his and other artists' work; at Real World Remixed (http://www.realworldremixed.com/), users are encouraged to "to download our 'sample packs' - multitrack recordings from Real World Records and Peter Gabriel" and use them to create remixes which are then uploaded to the site and voted upon by other site users.
- An anonymous artist has created a mashup of rapper 50 cent's "In Da Club" and "Yakkety Sax" (better known as the theme song from the Benny Hill show); this is considered a mashup rather than a remix because neither song was edited for content, they were simply layered one atop the other (although the 50 cent song was sped up just a bit). The mashup, accompanied by the original video for "In Da Club" is available on

YouTube. (http://youtube.com/watch?v=jkyc1dxL3N0).

- In 2006, Luis Hernandez and Paul Holcomb (http://www.boldheaded.com/podcast/) created a techno-dance track that featured and edited and remixed version of Senator Ted Stevens's commentary on net neutrality (they later created an even more pointed parody remix using more of Stevens's words to create another techno-dance song called "The Internet Must Die").

Video appropriation and editing (re-mix)

- Working in both audio and (music) video Alanis Morisette has produced a parody video of the Black Eyed Peas song "My Humps." Although she does not change the lyrics, her ballad-like rendition certainly provides pointed commentary on those lyrics, and the video itself has many elements of the original video for the song, thus qualifying as remix. This example is also available on YouTube (http://youtube.com/watch?v=W91sqAs-_-g)
- Johan Söderberg created a parody that synchronizes several different video clips of George Bush and Tony Blair in a way that appears to show them singing Diana Ross and Lionel Richie's "Endless Love" to each other (http://politicalhumor.about.com/od/bushvideos/youtube/bushblairlove.htm)
- A popular form of video remix for anime fans is the creation of music videos: clips from anime cartoon serials or films are edited together to

create a video that thematically represents (or even lipsynchs to) whatever song the remix producer has chosen.

So what does this mean for rhetoric and writing? First, composition is no longer restricted only to alphabetic text – in the examples above, writers are using a wide range of media to create commentary on cultural and political issues. Second, digital composition practices are changing the traditional emphases of classical rhetoric: as I have argued elsewhere, digital rhetoric "shifts the productive technē of the rhetorical process (as typically instantiated in composition and other writing courses) from primarily invention-driven to a broader rhetorical approach that privileges arrangement as a focal activity and reclaims the importance of delivery and memory as key areas of rhetorical practice" (DigiRhet.Net, 2006, pp. 242-243). Finally, once a digital text has been placed on the Internet, the media of delivery and the rhetorical context itself may change as the work is appropriated and/or re-mixed, or via the circulation activities of software agents whose programs decouple a text from its original rhetorical situation. And perhaps most importantly, the always-in-circulation nature of digital texts help to make explicit the fact that rhetorical activity is always situated within an economics of production (although a clear picture of the ecosystems in which those economics are at play is not always immediately available).

Following the work of James Porter, I see the rhetorical process as

intrinsically (if not explicitly) engaging an economics of production that is at play for any given rhetorical context (Porter, 2003; Porter, 2005a; Porter, 2005b); as Porter (2007a) notes, "rhetorical contexts themselves rely on an economic system of exchange. The exchange is not always a commercial one, but there is an exchange of value that serves as the motivation for the production and circulation of rhetorical objects." Acknowledging the economic systems engaged in the process of rhetorical production is particularly important for the development of a theory of digital rhetoric because the rhetorical activity that takes place in internetworked digital systems does so as part of a larger ecosystem that serves as the backdrop for both digital and material production; this larger, global ecosystem is currently expressed by economists as "the knowledge economy."

Economist Paul Romer (1986; 1990) has argued that knowledge is now the basic form of capital and that economic growth is driven by the accumulation of knowledge; similarly, Paul Shrivastava (1998) suggests that the knowledge economy "both enables and requires organizations to continually learn new knowledge and systematically deploy it for value creation."

Both economics and rhetoric provide powerful mechanisms for understanding the development, discovery, and use of knowledge: whereas rhetoric can function as both analytic and heuristic (helping people to find the best ways to be persuasive as well as providing methods for determining how persuasion is being used), economics is purely analytic (as Levitt and Dubner

(2005) define it, economics is concerned with "explaining how people get what they want," [p. x]). Economics and rhetoric, in other words, approach the same questions, but with different methods.

In a report prepared for the New Zealand Minister for Information Technology's IT Advisory Group addressing the question of defining the knowledge economy, Ernst and Young (1999) posits that there are qualitatively different forms of knowledge:

> *Know-what*, or knowledge about facts, is nowadays diminishing in relevance. *Know-why* is knowledge about the natural world, society, and the human mind. *Know-who* refers to the world of social relations and is knowledge of who knows what and who can do what. Knowing key people is sometimes more important to innovation than knowing scientific principles. *Know-where* and *know-when* are becoming increasingly important in a flexible and dynamic economy. (emphasis in original)

While rhetoric has traditionally been quite good at helping people think about *know-why* and *know-who*, economics offers a complementary framework for investigating *know-where* and *know-when* – both of which are key elements of a rhetorical theory of circulation.

In the remainder of this chapter, I provide a two-part theoretical framework that may be used to understand the activities of circulation, but that also situates and delineates the methodology I am employing to investigate those activities. And while I address two distinct means of talking about circulation, I should note

that these are not clear or clean divisions: while circulation ecologies represent the places, spaces, movements, and complex interactions of digital texts as they are produced, reproduced, exchanged, or used, the exchanges and uses that take place within those specific ecological circumstances are governed by the economics of circulation (which in turn are subject to the constraints and affordances offered by the situated ecologies in which the texts circulate).

Ecologies of Circulation

In one of his last works, Walter Ong suggested that

> The age in which humans existence is now framed, the age in which human life and technology so massively and intimately interact, can well be styled not only the information age and the age of interpretation, but, perhaps, even more inclusively, the ecological age, in principle an age of total interconnectedness, where everything on the earth, and even the universe, is interconnected with everything else, no only in itself but, ideally, in human understanding and activity. (qtd. in Walter, 2006, n.p.)

A scientific term originally applied to research on interactions in specific natural environments[1], "ecology" as a metaphor for complex, interconnected relationships has a rich history of use in writing studies (Cooper, 1986; Syverson, 1999; Nardi & O'Day, 1999; Spinuzzi & Zachry, 2000; Spinuzzi, 2003; Blythe, 2007). The basic scientific definition of ecology is "the study of the relationships

[1] In 1866, zoologist Enrst Haeckel coined the term "ecology" to define an area of biology that aimed to study of interrelationships between organisms and the environment (Bramwell, 1989).

of organisms to their environment and to one another. The key word is 'relationships.' Ecology is a study of interactions" (Brewer, 1988, p. 1). Another key aspect of the science of ecology is the study of the ecosystem: ecology can be applied as the "ecology of the individual organism [or] the ecology of groups of individuals or populations," when taking the latter approach, it is important to acknowledge that "populations live together in communities – the community along with its physical setting or habitat is a single, interacting unit, the ecosystem" (p. 11). Thus, the key elements of ecological study: relationships, interaction, complexity, and community easily map onto qualitative studies of writing and rhetoric in both epistemological and ontological terms.

Ecology is also a useful framework for circulation analysis because it provides a systems-based view of both the environments and relationships that take place through digital circulation mechanisms. Systems are characterized by their compositions, environments, and structures (Bunge, 1979); in *Applied Systems Ecology*, Friedrich Recknagel (1989) explicates these systemic elements:

> The *composition* denotes the set of system components, the *environment* denotes the set of environment components which influence the system components. The definition of the composition and environment in turn implies the marking of the system boundary. The *structure* denotes the set of relations between composition and environment as well as within composition. (pp. 13-14)

Networks, particularly the digital networks in which the texts in this study circulate, are also systems, and in this way they can be similarly seen as elements in a digitally networked ecology of overlapping (and networked) ecosystems. Zan, Zambon, and Pettigrew (1993) argue that a "network is a system and not only a nexus of relations. Due to its systemic nature, a network is a working entity, which continuously reproduces its relationships and changes forms and contents over time. Therefore, networks are evolutionary systems, living organizations"; in other words, networks are ecological entities. The science of ecology uses this sense of system architecture to articulate its key unit of analysis: the ecosystem.

Ecologies and Ecosystems

Ecology as a field of study looks at both ecologies and ecosystems. Ecologies are internetworked and interacting systems made up of discrete ecosystems. An ecosystem can be "any size so long as organisms, physical environment, and interactions can exist within it" (Pickett & Cadenasso, 2002); thus replicating the systems approach outlined above. As I use the terms, "ecology" is the super-structure and the theoretical lens; "ecosystem" is the specific system that a digital work originally belongs to when it is first distributed or published, but it is also the interconnected composition and environment that can be mapped and articulated through its circulation (and, indeed, that is one aim of circulation analysis).

Ecosystems represent specific, bounded locales where circulation takes place; and although circulation occurs across and through multiple ecosystems, the effects are best observed within particular localized systems; thus, ecologies represent the scales at which research on circulation may be most profitably undertaken.

Energy Flow and Material Cycling

Two important properties of ecosystems are that they have *energy flows* and they *cycle materials* (Kling, 2006); these two ecological properties can also be articulated as economic properties when applied to digital environments such as the Internet (indeed, Stephen Adler [1998] describes the Internet itself as an "information ecosystem"). In material ecosystems, such as ponds, forests, or oceans, the cycle of materials is enacted through the uptake, use, respiration, reformation, and reuse of the basic ecological components (e.g. plants, animals, water, carbon, nitrogen); the energy flows provide the engine for these material cycles though input and consumption (of solar/heat energy). These same essential processes can also be seen at work in digital production. The circulation of materials occurs in the use, re-use, re-mix, and appropriation of digital texts and the energy that drives this circulation comes from the rhetorical activity of digital bricoleurs, often operating within particular social networks (in ecological terms, these are communities that inhabit specific ecosystems). In other words, the rhetorical activity of writers and the material labor of production

is analogous to the input of energy per se into a natural system; once that energy (and the digital object that results from the deployment of that energy) is added to any given digital ecosystem, the interaction of environment (network) and other inhabitants (other digital texts) in that ecosystem generates relational links and instances of material cycling (aka re-mix in terms of digital practice).

For example, YouTube (http://www.youtube.com), a digital video file-sharing service, allows users to post and circulate digital videos they have found or created. But a common practice in the YouTube community is to appropriate and re-use the materials that have been posted there. In some instances, the re-mix is not complex: simply adding subtitles to videos (as translations, or to add information, or providing a parody of the original content). Other videos represent more complex interactions: players of massively multiplayer online role playing games (MMORPGs) such as World of Warcraft and Guild Wars have created a number of music videos that feature choreographed in-game activity set to songs such as the Village People's "YMCA" or MC Hammer's "U Can't Touch This." For a particularly involved example, see YouTube user GraveD1gger's "Guild Wars vs. World of Warcraft," http://youtube.com/watch?v=YcWXL8jpFGs, which pits in-game choreography from two different MMORPGs as a dance contest set to Hammer's "U Can't Touch This" (which in turn samples Rick James's 1981 hit "Super Freak").

Cross-community *and* cross-media appropriation and circulation is fairly common in digital environments: in January of 2007, Clemens Kogler, Karo

Szmit, and Andre Tschinder posted "Le Grand Content" (http://www.youtube.com/watch?v=lWWKBY7gx_0) to YouTube, describing it as an examination of

> the omnipresent Powerpoint-culture in search for its philosophical potential. Intersections and diagrams are assembled to form a grand 'association-chain-massacre'. which challenges itself to answer all questions of the universe and some more. Of course, it totally fails this assignment, but in its failure it still manages to produce some magical nuance and shades between the great topics death, cable tv, emotions and hamsters.

The graphs and Venn diagrams that provide the content for "Le Grand Content" were originally published in Jessica Hagy's blog, *Indexed* (http://indexed.blogspot.com), which features scans of diagrams that she draws on index cards.

But material cycling is certainly not limited to video production. Consider the case of Fark.com, whose users collect and aggregate headlines from newspapers and other online news sources, annotating them with amusing headlines; unlike the other examples, however, there is also an editorial mechanism that allows some headlines to be promoted to the main site while rejecting others—in ecological terms, this process may be understood as a "limiting factor"; that is, an environmental factor that influences the maximum population of plants or animals in a given ecosystem.

Applying Ecology as Metaphor in Writing Studies Research

In *The Wealth of Reality: An Ecology of Composition*, Peg Syverson (1999) provides a richly-detailed articulation of ecology as a theoretical and methodological framework for composition studies. Syverson argues that an ecological system is "composed of numerous interrelated complex systems" (p. 2), and, in an echo of the heterogeneous networks of Actor Network Theory, she posits that "in a complex system, a network of independent agents—people, atoms, neurons, or molecules, for instance – act and interact in parallel with each other, simultaneously reacting to and co-constructing their own environment" (p. 3). She applies the ecological framework to writing studies by arguing that "writers, readers, and texts form ... a complex system of self-organizing, adaptive, and dynamic interactions. But even beyond this level of complexity, they are actually situated in an ecology, a larger system that includes environmental structures, such as pens, paper, computers, books, telephones, fax machines, photocopiers, printing presses, and other natural and human-constructed features, as well as other complex systems operating at various levels of scale, such as families, global economies, publishing systems, theoretical frames, academic disciplines, and language itself" (p. 5). Syverson elaborates four attributes of ecological systems: distribution, emergence, embodiment, and enaction. Of these four attributes distribution and enaction are most immediately relevant to the theory I am building for a digital circulation

methodology.

Syverson uses "distribution" as a key element of ecological systems; however, she generalizes distribution to include all of the activities that I delineate below as discrete processes of circulation. She explains that "in complex systems, processes...are distributed, that is, both divided and shared among agents and structures in the environment. ... Complex systems are also distributed across space and time in an ensemble of interrelated activities" (p. 7). Enaction, in Syverson's framework, is "the principle that knowledge is the result of an ongoing interpretation that emerges through activities and experiences situated in specific environments" (p. 13); she goes on to note that "our activities and practices as readers and writers generate effects in the environment, which includes other people; and, at the same time, the same environment is affecting our activities and practices" (p. 17) – in other words, the environment is itself an actor in the ecological network.

Drawing on Syverson's work, Edbauer (2005) sees distribution, emergence, embodiment, and enaction as key mechanisms for engaging writing-as-process:

> Syverson thus points to the ways that writing is more than a matter of discrete elements (audience, a writer, text, tools, ideas) in static relation to one another (a writer types her ideas into a computer for an audience who reads the text). Rather, writing is distributed across a range of processes and encounters: the event of using a keyboard, the encounter of writing

> body within a space of dis/comfort, the events of writing in an apathetic/energetic/distant/close/etc. group. The importance of discussing "distribution" lies in the ways that it points us to how those elements are enacted and lived, how they are put into use, and what change comes from the in-processes-ness itself. (pp. 96-97)

The methodology I am articulating in this dissertation, however, is focused on the post-process/post-distribution (in Syverson's terms) circulation of texts within and between the ecosystems that comprise information, genre, and disciplinary ecologies. I believe that Syverson and Edbauer's works are complementary to the methodology that I am proposing here, but that their focus is on the activities that *precede* the initiation of circulation, whereas my focus is on the activities that follow that initiative moment.

Another, more recent, ecological framework has been proposed by Julia Romberger (2007). She argues that "a rhetorical ecology, in keeping with ecofeminist principles, is capable of seeing language and ideological relationships similar to those of the physical sciences. Such an ecology must accomplish tracing these relationships without losing sight of the human beings involved in the rhetorical construction of environment and in the use of electronic environments" (n.p. - in press). She uses ecology as a metaphor that "operates as an analytical tool to map influences, exchanges, and evolutions of relationships, and, further, to analyze ideologies and discourse communities embedded in writing technologies"; for Romberger, "ecologies are systems of

resource exchanges between environment and inhabitants, mapped over time" (n.p. - in press). Romberger's framework has much promise, but it focuses on the ecological context itself and does not engage circulation as such (her initial application of this method is a critique of interface design, thus focusing on a particular location of interaction, not a whole system of development, deployment, and distribution).

Syverson's (1999) work focuses on the writer as the central figure in ecologically-based writing research: "by privileging the individual writer composing in isolation, we have slighted or ignored compelling evidence that writing, like other cognitive processes, occurs in ecological systems involving not only social but also environmental structures that both powerfully constrain and also enable what writers are able to think, feel, and write" (p. 9). While I find her use of ecologies of writing useful at the metaphorical level, my approach places the text (the inscription) as the focus of circulation methodology; Syverson's approach works well for examining what happens prior to distribution; however, my focus here is on what happens after distribution. Similarly, Romberger (2007) engages the ecological primarily as location-specific interaction between people and interfaces; I am interested in the movement of texts (which engages these interactions, but it is the text and its movement that is the object of analysis rather than individual human-interface interactions).

In describing circulatory activity as taking place within an ecological context, I draw on two approaches that also use the ecological metaphor, but that

do so in ways that support my focus on text and movement: Nardi and O'Day's (1999) "information ecologies" and Spinuzzi and Zachary's (2000) "genre ecologies." Each of these formations plays a role in the structure of circulation ecologies, as both "information" and "genre" influence and are influenced by circulation, but I would suggest that information is too broad and genre is too narrow to effectively describe the interaction, movement, and exchange that occurs with the digital circulation of rhetorical objects. Information implies an object but does not incorporate use as an intrinsic component of that object's character. Genres shift and change not only over time, but through the processes of circulation. What is useful here, however, is the articulation of how both information and genres function within complex networks of interaction: how they interact within specific ecosystems.

Nardi and O'Day (1999) define an information ecology as "a system of people, practices, values, and technologies in a particular local environment. In information ecologies, the spotlight is not on technology, but on human activities that are served by technology" (p. 49). This notion of information ecologies does two things particularly well: it shifts focus from technology as tool to technology-in-use (that is, activity can be seen as a synergistic relationship between digital media/technologies and human actors) and it focuses the lens of inquiry on a finite context (which is useful for the development of research methods). And I agree with Nardi and O'Day (1999) when they posit that "the ecology metaphor provides a distinctive, powerful set of organizing properties around which to have

conversations. The ecological metaphor suggests several key properties of many environments in which technology is used. An information ecology is a complex system of parts and relationships" (p. 50). They go on to provide an extended metaphor, taking into account habitations, niches, speciation, and other biological components of an ecological framework, but for my purposes, the two most important elements of the ecological metaphor are that "an information ecology is marked by strong interrelationships and dependencies among its different parts," (p. 51) and that "locality is a particularly important attribute of information ecologies" (p. 55).

Strictly speaking, what Nardi and O'Day (and later Spinuzzi and Zachary) term "ecologies" are actually ecosystems: ecologies are the larger contexts in which these individual ecosystems reside and interact. And while Nardi and O'Day have established perhaps the most well-known use of an ecological lens for rhetorical practice, their insistence on locating "ecologies" in specific material locations (such as libraries, schools, and hospitals) actually places artificial boundaries on an ecological perspective, thus robbing it of a fully-realized vision of interconnectedness and the interrelationships that can occur across both local and global environments. The other drawback to Nardi and O'Day's approach to applying an ecological metaphor is that they disassociate the ecological view from the systems-level view (despite the fact that ecology is essentially a study of biological systems); if "the technological system is the water we swim in, and it has become life-sustaining and almost invisible to us" then occupying a position

within a particular ecosystem (or, more accurately, multiple ecosystems) and larger ecological structures is no less an invisible framework – until it is articulated and applied. So while I am indebted to Nardi and O'Day for applying the metaphor of ecologies to information use, I do not follow through with their metaphorical approach because it ultimately limits the scope of the analytic methods I aim to develop.

Spinuzzi and Zachary (2000) begin with the information ecology metaphor and extend it to their own work with what they call "genre ecologies." As they define it, a "genre ecology includes an interrelated group of genres (artifact types and the interpretive habits that have developed around them) used to jointly mediate the activities that allow people to accomplish complex objectives. In genre ecologies, multiple genres and constituent subtasks co-exist in a lively interplay as people grapple with information technologies" (p. 172), and they argue that genres "are not static forms; they are dynamic, organic, and messy. To account for variations across instantiations of a given genre, a more robust, ecological perspective is required, one that accounts for the dynamism and interconnectedness of genres" (p. 173). It is in this same vein that I therefore argue for an ecological perspective with respect to circulation in order to account for the dynamism and interconnectedness of rhetorical processes and the economics of production and circulation of digital work.

Whereas Nardi and O'Day's notion of information ecologies helps to frame the overall interaction between people, texts, and digital networks, Spinuzzi and

Zachary's work on genre ecologies provides a description of how genres interact within specific ecosystems.

Circulation takes place both within and across specific, situated ecosystems; as I have noted, these ecosystems can be described in terms of the specific interactions between people, texts, and technologies. Thus, any method for examining or researching circulation must take into account not only the actors, networks, and interactions, but also the specific articulation of media and technology within those networks. Ecosystems, then, have rhetorical, technical, and social dimensions that influence the possible routes of (and interactions made possible by) circulation; these ecosystems can be framed as networks within specific and situated institutions (such as a department within a university or workplace) but they can also be framed in terms of digital spaces that are bounded by genre and activity. For example, Ebay represents a particular ecosystem that engages a specific form of trade that is framed by Ebay's interface, user communities, and system of ratings. Similarly, communities of users form networks within Flickr's social networking and image-sharing system that do not correspond to networks outside of the Flickr ecosystem (although there are connections across and through other networked ecologies). Some digital systems are also tied to specific user networks, such as posting links to del.icio.us that serve a particular course at a specific institution; in these cases, there is a connection between local (physical) communities and public digital networks; the intersection of local use and public digital spaces represents an

important area of inquiry for the study of circulation.

Ecological systems as I engage them in this study can also be articulated in terms of scale (that is, the methodological lens can be focused narrowly or widely): digital ecologies can be identified as micro-ecologies (as in the work/portfolio of a single individual), midrange ecologies (which contextualize the work of collaborators, departments, research groups), or macro-ecologies (institutions, fields, disciplines, nations). The two case studies that appear in chapters 5 and 6 apply circulation analysis methods at the micro- and macro-ecological levels, respectively.

Economies of Circulation

If "ecologies" represent the contexts of circulation, "economies" represent the mechanisms that motivate circulation, primarily through the process of production, distribution, and exchange (using Marx's terminology). The key to how and where a given text will circulate is based upon the value of that text, which can be assessed in terms of either use-value or exchange-value. Because Marx's work is concerned with material production, his framework includes consumption as an integral (and cyclical) component of the production process (which is also required for the establishment of value). Consumption, however, becomes useful only at a metaphorical level when the object of the exchange is digital: exact reproductions can be made that do not consume the original products. Consumption can be described in terms of external resources (such as

the living expenses of the scholar(s) who develop digital texts), but it not longer plays a direct role in the economies of circulation (although one might substitute "use" for consumption in order to fulfill all of the requirements of production in Marx's theory). This is not to say that digital objects are immaterial – they have material value by virtue of use and exchange. But it is useful here to depart from a strictly Marxist interpretation of capital and consider the role of what Bourdieu calls "cultural" and "social" capital in the economies of circulation.

It is important to note at the outset that I am *not* using Marx's notion of circulation here, because his use of circulation is both limited in scope and is divorced from production (which is the opposite of my contention that, rhetorically speaking, circulation plays an important role in all of the classical rhetoric processes, from invention to delivery). In his "Introduction to a Contribution to the Critique of Political Economy," Marx states both that "circulation is merely a particular phase of exchange or of exchange regarded in its totality," and that "exchange is simply an intermediate phase between production and distribution." This view of circulation is particularly limited as well since Marx asserts that "circulation time and production time are mutually exclusive. During its circulation time, capital does not function as productive capital, and therefore produces neither commodities nor surplus-value" (*Capital*, p. II:203)[2].

Marx's view of capital itself is closer to my use of circulation, as he describes capital as "a movement, a circulatory process though different stages,

[2] This makes sense insofar as Marx would say that circulation adds no use-value, and thus no surplus value; the limitation that I see here is the insistence on separating the *processes* of production and circulation (the "time" part of the equation).

which itself in turn includes three different forms of the circulatory process. Hence it can only be grasped as a movement, and not as a static thing" (*Capital*, p. II:185). Patrick Murray (1998) argues that capital is indeed "not a thing, and not a historical constant, but a bizarre and astoundingly powerful (asocial) social form of wealth turned 'automatic subject'" (p. 37). Murray's odd turn of phrase in declaring capital an "(asocial) social form of wealth" seems particularly apropos when applied to circulation—it invokes both the human activity that motivates circulation as well as the independent work of both human and non-human actors that facilitates the paths and mechanisms of circulation. Murray goes on to say that "the circulation of capital involves not simply a flow of materials but metamorphoses, a *flow of forms"* (p. 37, emphasis in original); substitute "digital texts" for "capital" and this neatly describes my description of the process of circulation in digital communication networks.

Marx does recognize that circulation "is just as necessary for commodity production as is production itself, and thus agents of circulation are just as necessary as agents of production" (*Capital*, p. II:205), but again, his theory is grounded in material production; thus requiring a kind of translation into a form that might be useful for understanding economies of circulation. Marx notes that transportation adds value (and surplus value) because it affects the use-value of commodities: "the use-value of things is realized only in their consumption, and their consumption may make a change of location necessary, and thus also the additional production process of the transport industry" (*Captial* pp. II:266-267).

One might reframe this for digital networks: circulation (transportation) adds value because digital texts can be appropriated (although not consumed); this kind of use increases use-value, although the real change wrought by digital circulation is always better expressed as exchange-value (which is possible without having to include consumption as a necessary component of production or necessary outcome of distribution). And this reframing shows where I must most sharply disagree with a Marxist interpretation of circulation. As Murray explains, "no value and, *a fortiori*, no surplus value is created in the restricted sphere of circulation for a simple reason: in this sphere no use-value is (preserved or) added to the commodity, and if no *use-value* is (preserved or) added, no *value* is added. For, while a use-value need not be a value, value depends on use-value" (p. 46, emphasis in original). I would contend that circulation is the principle mechanism not only for enabling exchange-value but also for adding use-value to the rhetorical object via its reproduction, appropriation, and use within a particular circulation ecology or through interactions across multiple circulation ecologies.

Circulation makes the rhetorical object available for appropriation, thus increasing the use value. Consider the case of the MA thesis that is bound and sent to a university library--the thesis is in circulation (except in the event that it is checked out, at which time it would be in circulation albeit in very limited scope). That same thesis, made available on the web, is much more likely to be read, quoted, and cited; that is, to garner increased use-value. The rhetorical object

itself is in essence a "flow of forms."

The production of digital objects endows them with use-value, but the motivation for production is grounded in the subjective exchange-value that is garnered through the distribution and publication (and ultimately circulation) of the texts. Because digital circulation does not function in the same way as material production, it is better to approach the question of exchange-value not through Marxist theory, but via Bourdieu's theory of cultural capital. Particularly in terms of scholarly work and knowledge management ecologies, digital objects are not typically traded for material or monetary gain; instead, the exchange-value of the work comes from the accrual of cultural or social capital.

Bourdieu's (1977) project began as an attempt "to extend economic calculation to all the goods, material and symbolic, without distinction, that present themselves as rare and worthy of being sought after in a particular formation—which may be 'fair words' or smiles, handshakes or shrugs, compliments or attention, challenges or insults, honour or honours, powers or pleasures, gossip or scientific information, distinction or distinctions, etc." (p. 178); my own interest in developing an economics of circulation would fall in with the latter categories of symbolic goods, as I am particularly interested in the kinds of formation (genres) that occur in academic settings. In a sense, the Marxist perspective can be used to consider the circulation of digital texts as capital that requires labor, production, and distribution, while the Bourdieu-ian perspective is concerned less with the object of circulation and more with the

composers and appropriators of those texts.

In "The Forms of Capital," (1986), Bourdieu extends Marx's notion of capital beyond material production in order to develop an economic theory that more ably explains "immaterial" products and that can describe the tight relationship between the social and the economic in terms of distribution of capital. Bourdieu posits two new forms of capital: cultural capital and social capital. Cultural capital can take the form of cultural goods (the expression of accrued cultural capital) or it can be institutionalized, in the forms of educational credentials. In this second form, cultural capital represents a "certificate of cultural competence which confers on its holder a conventional, constant, legally guaranteed value with respect to power" (p. 248). While the collection of cultural capital is at its core an individual undertaking, Bourdieu describes "social capital" as residing in the relationships that develop in and around social networks: social capital is "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (p. 248). Social capital can take the form of group membership and identity—it is possible, therefore, to delineate various types of social capital based on their fields of production. In considering the circulation of scholarly texts, for instance, one might describe the textual networks embodied in citation and reference interconnections as academic capital. This kind of capital may come from the connections between an author and her advisor, or her institution.

For example, the work that I am currently doing is being reviewed and influenced by my dissertation committee members and other mentors with whom I share an intellectual and disciplinary history. This shared background provides not only a common understanding of what rhetoric is and what methods and questions rhetoricians should be engaging, but it also forms the background of a citation network because I cite the relevant work of my mentors and advisors. This puts my published work into circulation as a member of those works that draw on the same background, and searches on scholar.google.com, for instance, will describe my work as related to the work of the people I cite and work with. Because those people already have a great deal of academic capital garnered from their experience, their publications, and their presence in the field, my work also accrues residual capital simply by being in circulation in the same citation networks.

The exchange-value of scholarly work then is the acquisition of academic (social) capital. James F. English (2005) calls this process of exchange the economy of symbolic cultural production, which might also be considered the economy of prestige (p. 75). Social and cultural capital operate at the level of activity: although it is possible to exchange social and cultural capital for material capital (such as faculty salaries, promotions, and raises), gaining social capital is not as simple as purchasing material goods. Social capital – academic capital in particular – is, like material capital, a product of labor. The difference here is that the labor is intellectual and self-motivated, rather than manual. The circulation of

rhetorical objects is part of the process of production that leads to greater or lesser degrees of social capital for the composer (as well as for others who appropriate and use the compositions as the basis for further production).

Economies of circulation, then, must account for both the use-value and exchange-value acquired by rhetorical objects as they circulate through digital networks as well as the social capital these works are exchanged for by their authors and appropriators. As with circulation ecologies, these processes are complex and interdependent, relying on the relationships between human and non-human actors who are connected via digital networks.

Circulation economies also take place within larger economic systems, systems that articulate information in terms of material value (e.g. "intellectual capital," which is an extension of the idea of intellectual property); the texts that circulate (and are objects of study in a methodology of circulation analysis) may have actual value associated with them as information products. IBM researchers Kephart, Hanson, and Greenwald (2000) provide one vision of the future as built upon information economies:

> Today, we are witnessing the first steps in the evolution of the Internet towards an open, free-market information economy of software agents buying and selling a rich variety of information goods and services. We envision the Internet some years hence as a seething milieu in which billions of economically-motivated software agents find and process information and disseminate it to humans and, increasingly, to other

> agents. Agents will naturally evolve from facilitators into decision-makers, and their degree of autonomy and responsibility will continue to increase with time. Ultimately, transactions among economic software agents will constitute an essential and perhaps even dominant portion of the world economy. (p. 731)

James Hanson (2001) notes that it is "likely that a new type of agent-human hybrid firm will take over the marketplace. Such a thing would combine the strengths of each of its parts. The human, for example, could concentrate on setting long-term policy or strategy, while the agent carried out the day-to-day operations of the business" (p. 149).

In many ways, the notion of the information agent is a fitting synechdoche for the interconnections of ecologies and economies of circulation: the agent functions both within the boundaries of particular ecosystems (but with the opportunity to cross into and affect other ecosystems) and serves as an economic force in terms of the activities of circulation themselves. The work that I take on here, in this dissertation, is aimed at seeing how particular texts are themselves agents (or, at least agentive) within specific ecosystems and digital economies.

In this chapter, I have presented theories of digital ecologies and digital economies; having considered both the motivation and the location of circulatory activity, I next turn to the methods currently available to the researcher interested in tracing digital circulation as an object of inquiry as well as a survey of research

methods for digital ecologies more generally, and then articulate a specific circulation analysis methodology that can be used to engage circulation ecosystems and economic functions as I have addressed them in this chapter.

Chapter 3: Methods and Methodologies: Investigating Digital Rhetorics

Daniel J. Murphy (2002) argues that "sound research is grounded upon theory insofar as it is part of the 'inductive/deductive cycle': individuals observe the world around them and generalize as to its substance and order (induction) and then, based on these observations, try to state the nature of the relationships hypothesized to exist among the various phenomena in ways that can be tested" (p. 94). In the previous chapter, I presented a theoretical framework for investigating circulation as an element of digital rhetoric; in this chapter I will consider the methods that are currently available for digital writing research, focusing in particular on those methods that would are the best fit for testing the framework of ecologies and economies of digital circulation. Before looking at individual methods, however, I think it is important to first situate digital rhetoric in terms of disciplinary location: the methods available to any given research question are dictated by the disciplinary discourses and the shared epistemological foundations that related fields and disciplines engage.

I see digital rhetoric as an emergent area of study whose theoretical foundations and methodologies are synthesized at the intersections of the three main fields of writing studies: composition/rhetoric, professional and technical writing, and computers and writing. Additionally, however, digital rhetoric also draws on the relatively newer field of Internet studies, which is itself an interdisciplinary approach that draws (primarily) on communication studies,

information science, cognitive psychology and applied linguistics. Each of the contributing fields provide an array of methods that are useful for examining the processes and products of digital rhetoric, but no one field has developed what might be considered a "digital-native" methodology that is both rhetorical and that takes advantage of the digital-network-as-medium. Rhetoric itself, which is the core of all writing studies (as I articulate that discipline) provides powerful methods to be sure – but the current instantiations of rhetorical analyses have not yet shifted from the long tradition of print culture that it has engaged for the past twenty-five centuries. The reason for this is that many rhetoricians (and teachers of rhetoric/composition, and authors of textbooks and scholarly works in the broader field of writing studies) have not yet fully accepted the most basic premise of digital rhetoric: that digital texts are not print texts. That is, the affordances and contexts of digital communication are sufficiently different from the affordances and contexts of print communication that a new approach to understanding the function of rhetoric for digital media is actually necessary.

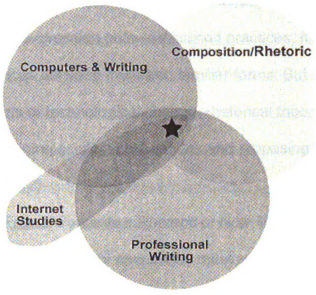


Figure 1. Intersecting Fields Synthesized by Digital Rhetoric.

Stuart Moulthrop (1991) provides a compelling description of the responsibility of the rhetorician to engage new symbolic modes and the actions they make possible:

> We might consider rhetoric as an interface between techne and logos: a way of reconciling actual media of communication with the social practices that shape discourse. During major cultural transitions — from orality to writing, from scribal to print literacy, lately from print to electronic hypermedia — rhetoricians are called upon to make sense of changes in media, a task which requires them both to integrate and to innovate. Theorists of a new medium must look both ways across the interface, on the one hand pursuing continuity with existing literary and cultural institutions, and on the other hand exploring the differences that set new

> technologies apart from old. Rhetoricians integrate by mapping new possibilities for expression onto established practices, finding correspondences between fresh and familiar forms. But in acknowledging the implications of technological change, rhetorical theorists must also innovate, redefining existing conventions and proposing new structures for discourse (p. 292)

Similarly, in *Lingua Fracta: Towards a Rhetoric of New Media*, Collin Brooke (2007) argues that "Any rhetoric of new media must account for both the productive capacity of rhetoric, and its intrinsically technological dimension" (n.p. - in press). Like Moulthrop and Brooke, I argue that rhetoric must "integrate and innovate" in order to address communicative activity that takes place in and through digital networks: I do not advocate abandoning classical rhetoric in favor of new rhetorics because it is still the foundation of the most powerful methods available for understanding how writing works. I also believe that contemporary definitions of rhetoric can accommodate this shift with relative ease, but that that methods that rhetoric engages require a more significant revisioning.

In addition to addressing the roles and activities of the speaker/writer, communication/text, and audience/reader, definitions of rhetoric that address digital communication need to also account for context, interactivity, and circulation (via internetworked systems). Lloyd Bitzer's (1968) articulation of rhetoric as "a mode of altering reality, not by the direct application of energy to objects, but by the creation of discourse which changes reality through the

mediation of thought and action" (p. 4) provides a useful starting point for digital rhetoric by virtue of being an abstraction that does not explicitly address or evoke specific practices or media associated with rhetorical production while simultaneously acknowledging to power of rhetoric as a meaning-making activity. Hauser (1986) provides a more streamlined general definition of modern rhetoric as "the management of symbols in order to coordinate social action" (p. 3); for both Bitzer and Hauser, rhetoric is an activity and not just an analytic framework (which is how it is often invoked in composition instruction). Additionally, Hauser's definition also evokes Kenneth Burke's (1969) notion of rhetoric as "symbolic action," that is "symbolic means of inducing cooperation in beings that by nature respond to symbols" (p. 43); however, whereas Burke focuses explicitly on words, stating that the function of rhetoric is "the use of words by human agents to form attitudes or to induce actions in other human agents" (p. 41), Hauser asserts that "symbolic modes other than the verbal, such as music or dance" (p. 3) can also be described in terms of rhetorical activity.

In the case of the definitions I draw on above, which I see as particularly useful foundational points, none of the theorists address the complications of digital circulation, or the possibilities of non-human agents becoming rhetorical actors. And while Hauser acknowledges that symbolic modes need not be constrained to the verbal, he does not address these other modes in his work (moreover, it is important to understand how multimedia and multimodality function at the intersection of multiple symbolic modes, and how this might

complicate the "management of symbols"). Digital rhetoric, then, should take into account the complications of the affordances of digital practices, including circulation, interaction, and the engagement of multiple symbol systems within rhetorical objects, and its methods need to explicitly engage those complications and affordances.

Because I situate my own professional identity at the same nexus as the point of origin for digital rhetoric as a field of study, I see composition/rhetoric, computers and writing, and professional writing as the fields that best understand how to research rhetoric and writing, and by extension, that provide the most effective starting points for assembling digital rhetoric methods. In this chapter then, I will first address methods from these fields of writing studies and then go on to examine methods from fields that do not take rhetoric as their theoretical or methodological foundations.

Research Methods in Writing Studies

Qualitative methodologies have been at the forefront of composition studies for the past decade, foregrounding the situated, contextual practices of composing that take place through various genres and locations and engage multiple means of production. Denzin and Lincoln (2003) define qualitative research as "a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of

representations, including field notes, interviews, conversations, photographs, recordings, and memos to the self ... qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them" (pp. 4-5). Qualitative research is particularly apropos for composition research because it acknowledges the sociocultural location of writing activity and because of its concern for ethical issues and responsibilities of researchers in terms of researcher-participant relationships, which echo the care that compositionists take when developing student-teacher relationships (and given the prevalence of teacher-research methodologies, student-teacher and participant-researcher roles are often inseparable). Qualitative research also pays close attention to the intertwined nature of theory and research design—the lack of which was criticized in the discipline's early reliance on scientific experimental methods. Contemporary research methods in composition also have a close relationship with rhetorical theory: as Sullivan and Porter note, "[t]he asking of the research question itself and the design of a way to address the question (i.e. the inquiry procedures) constitute a rhetorical activity: a rhetorical interaction with research participants. ... Methodology is not merely a means to something else, it is itself an intervening social action and a participation in human events" (pp. 12-13).

Composition as a discipline is currently undergoing a significant shift in its overall focus: as composition continues to engage multiple modes and media as acceptable forms of composition (beyond the tradition of print-based writing), the

practices and processes of composing that composition takes as its object of inquiry are undergoing radical changes – changes that necessitate concomitant changes in research methods. These changes amount to what is essentially an epistemological shift from a view of the solitary writer who has available only limited material means of production and often no recourse to distribution or circulation of the work to a view of composition as a collaborative activity that engages multiple means of production and that occurs within digital networks that provide broad opportunities for publication and circulation.

As Margaret Syverson (1999) argues in *The Wealth of Reality: An Ecology of Composition*,

> New technologies, while they have expanded the horizons for discourse, have also made manifest the inadequacy of our present approaches to composition. ... Since our present analytical approaches are inadequate to the task of understanding new technologies for composing and communication and their transformational impact on cognition and culture, our best hope of developing new analytical approaches lies in careful observation and interpretation of the discourse as people are presently using it in a wide range of applications, in classrooms and corporations, in campuses and laboratories, in government agencies, and in commercial information services. We need to discover who and what are the agents interacting in an ecology of composition.... (p. 26)

The research methods in professional writing and technical communication tend to lend themselves more readily to the discovery of agents interacting in writing ecologies; Laura Gurak and Mary Lay's *Research in Technical Communication* (2002) contends that the foundational research methods in professional writing are "ethnography, textual analysis, historical research, survey and questionnaire research, and experimental work" (p. vii). Professional writing methods, like composition/rhetoric and computers and writing research, tend toward the qualitative, although the field is much more accepting of quantitative methods and experimentation. Historically, professional writing research has paid more attention to context (particularly in terms of organizations and workplaces) than other writing studies research traditions.

Two of the key research traditions from professional writing that are particularly appropriate for digital rhetoric or genre studies and usability.

Genre studies, as elaborated in professional writing research, focus on investigations of "an individual's repertoire of situationally appropriate responses to recurrent situations" through examinations of the "situated actions of writers and the communication systems in which those ... actors participate" Berkencotter and Huckin, 1995, p. ix). In methodological terms, genre studies privileges a multi-layered approach that engages both micro- and macro-level interactions. As Berkenkotter and Huckin (1995) explain,

> ...what microlevel studies of actors' situated actions frequently depict as individual processes, can also be interpreted (from the macrolevel) as

> communicative acts within a discursive network or system. Genre is the concept that enables us to envision the interpretation of process and system in disciplinary communication. (pp. ix-x)

This approach to the study of writing processes and practices as theorized and practiced in professional writing research is particularly useful when applied to digital environments, which engage individual and collaborative practices that take place within both digital and discursive networks. Focusing the lens on the activity of the writer or the context (and its conditional affordances for composing) allows a view that collapses system-centric and user-centric activity.

A methodology that is especially well-suited to the study of digital composition is usability. Usability is not well understood as a rhetorically-based qualitative research methodology outside of the field of professional and technical communication; more often than not, it is equated with observing users performing tests of pre-set activities under controlled conditions. However, if usability is rearticulated as a method of investigating actual use in specific contexts and cultures, it is clear that it can be a powerful method for understanding rhetorical knowledge-making activity within a broad range of contexts and uses. As I've written elsewhere (Eyman, in press):

> In order to engage usability as a suitable methodology for studying writing processes and pedagogies, it's important to first acknowledge that writing is a technology, and, consequently, that teaching writing is part of a technological system; a system with which our students interact as users.

> Constructing students as users allows us to see them not as subordinate to the learning process, but as engaged participants in the technological system that is bounded by the institutions, departments, and physical spaces in which learning activities take place. Students have particular needs and goals, but we don't always have a clear understanding of what those needs and goals are from the perspective of the user; curricular design is all too often enacted through a systems-design framework, rather than a user-centered framework. We know what skills and rhetorical tools we want students to take with them from our classes, but we often ascribe these outcomes from our own understandings of usefulness and appropriate function; as such, we are the designers of the pedagogical systems that our students use.

Usability, in other words, provides a methodology for studying both writing practices and writing pedagogies – and because it takes both system and user into consideration, it provides appropriate methods for studying digital writing practices and digital pedagogies. In the methodology that I am constructing for circulation analysis, genre-studies approaches help inform the development of research questions that investigate the degree to which circulation is affected by how digital texts take up or work against particular genres. Usability will also play a role in later work on the methodology, but it also helps to ensure that the focus of the study (of circulation analysis) is not too narrowly construed (usability comes into play in particular when considering both human and non-human

actors as engaged in or profiting from the ways in which digital texts are rendered more or less usable).

Digital Writing Research

While many traditional research methods in composition/rhetoric and professional writing – particularly qualitative research practices – will continue to function well regardless of the material conditions of production, new methods need to be developed (or appropriated from other fields) to help us better understand how composing practices change from traditional print production activities to multimodal, multimedia productions that can now be delivered, distributed, published, and circulated in and through digital networks.

The general trend of research in composition/rhetoric and professional writing toward qualitative methodologies works well for the study of digital compositions because it takes into account situation, context, and media. Case studies, textual inquiry, and rhetorical analysis are particularly useful for investigations of rhetorical activity in digital environments, although in each case there is room for enhanced methods that can be adapted for use in digital networks. While the methods currently available cover quite a bit of ground in terms of researching digital writing practices, there are a few areas for which appropriate methodologies have not yet been developed, as well as a series of emerging methods that show a great deal of promise.

Rhetorical analysis, in particular, can take advantage of technological

methods to better situate our understanding of the use of ethos, pathos, and logos in digital texts. Seeing these digital compositions as functioning within larger intertextual networks – in specific relation to the material systems of production and circulation that make them possible adds additional dimensionality to the analytic framework.

Other new methods include systems of visualizing discrete elements in the writing process as it takes place between and among multiple composers/authors. Hart-Davidson, Carter, and Sun (2006) suggest that producing different views (visual representations) of particular compositional and communicative activities can support different frames of analysis. This methodology is tied to a re-vision of the nature of composition as a rhetorical practice:

> Our view of writing, on the other hand, assumes that writing is a medium, and that people are more often users of texts (as opposed to participants in a conversation); writing is not the focus of the action, but a powerful context for action. (p. 20)

Shifting the research paradigm from a study of writing-as-action to writing-as-context allows for the development of new methods that might help us better see how this approach to the use of writing may be investigated. Bill Hart-Davidson's (2005) work on establishing a rhetoric of objects, relationships, and views is an example of how context, system, and user might work well as the focus of inquiry for writing-as-context.

Of course, I am not the only person to argue that we need to develop research methods that can help us understand digital contexts – and that take advantage of the affordances of digital texts themselves. When I began the work that would eventually lead to this dissertation in 2003, there were very few works that addressed digital, networked writing in terms of research methods – many articles and book chapters explored the way that literacy changes when it takes place in digital contexts; how teaching must change to be successful for online courses; and examples of new media practices – but the general consensus seemed to be that we could apply our rhetorical, genre, or discourse analysis methods regardless of medium or context. Now, as I complete this work, there are two edited collections that explicitly address methods for digital writing research. The first is *Digital Writing Research: Technologies, Methodologies, and Ethical Issues*, edited by Heidi McKee and Dànielle DeVoss, published in April of 2007; the second, *Digital Contexts: Studies of Online Research and Citation* (Walker, Purdy, Eyman, & Reilly, eds.) is on track to be published in 2008.

> McKee and DeVoss (2007) define "digital writing research" as research that focuses: (1) on computer-generated, computer-based, and/or computer-delivered documents; (2) on computer-based text-production practices (and we deploy *text* broadly here, to include multimedia artifacts); and/or (3) on the interactions of people who use digital technologies to communicate (McKee & Porter, 2006). Because of the increasing digitization of writing in educational, institutional, and social

> contexts, all composition researchers, not just computer and writing specialists, need to consider methodological and ethical approaches to digital writing research. Further, the term digital writing research—rather than the more commonly used term *Internet research*—acknowledges that not all digital writing and related communicative acts and interactions occur on the Internet (n.p. - in press).

Digital Writing Research is an important collection for a number of reasons (not least of which is the support it provides to my own arguments about the development of digital methods): it represents and acknowledgment of and engagement with the broadening scope of what counts as writing activities (that is, what kinds of interactions can be claimed by writing studies, both in terms of research and teaching) – as James Porter notes in the.foreword, "the chapters in *Digital Writing Research* show us, either implicitly or explicitly, that the definition of "writing" has changed in the digital age and that, consequently, our approaches to doing research need to change; we need a parallel and equally dramatic change in our notions of methodology" (Porter, 2007b). But the collection also represents a starting point for a disciplinary engagement with digital research methods for writing studies that has the potential to bring into sharp relief the kinds of theoretical and methodological shifts that that must happen when writing moves from purely analog (print) to digital in nature. As Porter argues in the foreword:

> Likewise, digital writing research should not be viewed merely as research

about writing with technology. It should be viewed, rather, as changing the fundamental assumptions about methodology, particularly the humanist assumption that divides the human from the technological. Digital writing research takes a cyborgian view and a networked view of human communications. It is not simply old methods applied to new events or practices. It represents a new way of looking altogether—an approach that emphasizes the role of production, delivery, and technology in human communication, but even beyond that, acknowledges the hybrid, symbiotic relationship between humans and machines. (n.p. - in press)

Whereas *Digital Writing Research* signals the beginning of a disciplinary conversation about research methods, *Digital Contexts* explicitly seeks to provide a nexus for interdisciplinary conversations about research in digital environments: "the authors collaborating on the Digital Contexts project are ... responding to the need for research that crosses boundaries the boundaries between academic disciplines, the boundaries between nations, and the boundaries between search and research behaviors in academic and non□ academic settings. Studies that focus on these issues are often framed very differently by researchers in different fields, and people doing research in these different disciplines are often not reading research across disciplines" (Walker, Purdy, Eyman, & Reilly, 2007, p. 2).

I see several of the chapters in each collection as particularly useful examples of methods that might contribute to a methodology based on the

importance of circulation for digital rhetoric; while many of these approaches contribute to a rhetorical reconfiguration of the specific methods I examine below (and will thus be addressed within the contexts of those methods), the works by Kevin DePew and Julia Romberger in *Digital Writing Research* together provide a framework within which all of the following methods may be employed.

DePew (2007) argues for the importance of triangulation—of looking not just at texts, but at contexts and users. He suggests that, "as rhetoricians, we should be examining more features of the communicative situation rather than merely an artifact it produces. What else can we learn about digital rhetoric when we also study the rhetor's intentions? The audiences' response to the text? How local contexts shape this interaction? .... In essence, I am advocating that digital rhetoric researchers adopt strategies framed by the communicative triangle—the rhetor, the audience, the digital text or discourse, and the contexts. By designing such methodological strategies, researchers insert communicative participants into the process, which gives researchers the opportunity to see both the complex nature of the research site and apertures in the field's tropes" (n.p. - in press). I would add that the communicative participants need not be solely human audiences, but may be elements of the networked digital systems themselves. Romberger's (2007) work similarly focuses on context, but addresses it within an ecological metaphor, much as I have done in the previous chapter: "An ecofeminist methodology, in short, must be aware of context and its complexity – the ecology of the situation. It is this emphasis on the influence of

environment upon subjects in an ecological ebb and flow and how these relationships are articulated that separates it from other feminist methodologies. It takes into account histories of the larger social milieu and remains aware of the context of the researcher and the system of values brought in by framing an inquiry in a specific theory and discipline" (n.p. - in press). While DePew and Romberger's general arguments are certainly not new to writing studies, the way in which they articulate and further strategies for employing triangulation and ecofeminist theory specifically to digital writing has helped me to better understand how to engage those positions in the circulation analysis methodology that I am proposing.

Taken together, these two positions – engaging context and expanding the scope of research methods to include the textual, the social, and the rhetorical situation – provide a platform for digital rhetoric research. But before such a platform can be fully articulated and deployed, the methods that work within it must be identified and, in some cases, developed. In the remainder of this chapter I review research methods from a broad range of fields and disciplines that have been, are in the process of, or could be profitably appropriated for digital rhetoric research and that would work within the theoretical framework of ecologies, economies, and circulation as rhetorical meta-canon that I presented in chapter 2. I'll return to the question of triangulation and the development of an ecofeminist research platform in chapter 6.

Digital Rhetoric Methods Addressing Ecologies, Economies, and Circulation

While the following methods are, for the most part, already being used to greater or lesser extents by digital writing researchers, it is often the case that only the parts that are not overly complex or quantitative are appropriated, and it is for this reason that I think it necessary to review the methods as they are used in the fields in which they originated – and then determine to what extend they may be applied to the development of a circulation analysis methodology.

C.O.D.E and Network Administration Tools

If rhetoricians are to develop methods that are "digital-native" – that is, methods that actively and explicitly engage the digital environments and systems of digital circulation themselves, then looking to the tools and metrics that run these digital environments, such as network and routing tools and the protocols upon which the Internet was built, would be a logical first step. Even though digital texts are themselves immaterial, the networks in which they reside are made of very real data conduits and routing devices. When I worked as a webmaster and systems administrator for a community college, I learned about a variety of tools that were designed to monitor the health and productivity of these networks: I could keep track of how many hackers were attempting to infiltrate my servers or how robust the network link between two buildings was on a moment-by-moment basis. Although I know of several technorhetoricians whose backgrounds include experience in systems administration or programming, the

first to articulate a coherent method for using these network tools for digital writing research is Jim Ridolfo (2006), who developed a webtext evaluation suite that he called "C.O.D.E. – Comprehensive Online Document Evaluation." Ridolfo presents this suite of tools as a pedagogical application that students can use to "not only cite online documents, but also critically research the questions of the who, what, when, where and why of digital texts." However, he also sees it as a useful tool for political action:

> From reflecting on my various jobs I can now see a connection between digital delivery and physicality: the Internet exists through physical things - cables that must be thrown over walls, snaked under desks and stretched across institutional and political borders. Correspondingly as an an activist I've come to see the physical geography of digital networks as politically important. ... It is my hope that this system helps students, activists, and teachers to create a more comprehensive picture of how a digital document 'works': from finding the identities of the author(s) to searching out past revisions of the document, to situating the document in time, place, and determining the physical and geographic locations of documents.

I would add that these tools are certainly useful for scholars who are developing digital writing research methods as well.

Ridolfo (2006) provides instruction on using three network analysis tools to uncover both geographies and owners of digitally networked systems, along with

two additional web-based tools for examining the changes over time that a given website experiences. The "geography and ownership" tools that Ridolfo discusses include whois, traceroute, and ARIN. When I first learned to use tools like ping (that shows if a network server is running and responding to request) or traceroute, the only way to do so was via the command line (usually on another server, although these tools are available on all personal computers as well). Currently, however, web-based interfaces for these tools have been developed – making the tools themselves more accessible to students and researchers alike. The first tool that Ridolfo covers in C.O.D.E. is called "whois." Whois (http://www.betterwhois.com/) allows the user to retrieve information about who has registered a domain name, including the date of registration, administrative contacts, and billing addresses. Traceroute, the second tool in C.O.D.E., traces the route that an Internet request must travel in order to reach its destination. For instance, when you use a web browser to view a page such as http://www.msu.edu, your browser sends a request from wherever you are to the server that hosts that site; this request travels through the various hubs and routers that lay between your computer and the server at Michigan State University. Traceroute reinforces the geographic nature of interconnected networks and generally shows the overall distance between two networked points. The output of traceroute also shows the names of the routers and systems it encounters, so you can learn which Internet Service Provider hosts the server at the end of the trace. Ridolfo (2006) argues that "these two utilities

allow us to ... contextualize the website based on its geographic origins, 'publisher' (ISP), time, and new authorial information." The final network tool in the C.O.D.E. suite is ARIN - The American Registry for Internet Numbers (http://www.arin.net), which allows users to look up the registration information of Internet addresses. So, for instance, ARIN reports that the IP address 35.8.10.26 belongs to Michigan State University (in fact, MSU may use any IP address that falls between 35.8.0.0 and 35.10.255.255), and that MSU's ISP is Merit Network Inc. (which handles all of the IP addresses that begin with 35).

The other techniques covered in C.O.D.E help the user to find out more about the *web-based* (as opposed to the physical network-based) context of a given site. Using the Web Archive (at http://archive.org) allows the researcher to access previous versions and edits of many websites. The original website for the online journal *Kairos: A Journal for Teachers of Writing in Webbed Environments*, is available by searching for the original web address (http://english.ttu.edu/kairos/) in the Web Archive (the web archive's earliest version is from December of 1996); the archive also provides links to all of the versions and updates that have taken places since then. The final activity in C.O.D.E. is a Google search of the URL for the site under consideration. Searching for the URL (as opposed to the site name or content) provides a quick view of the role this site has in the larger discourse of online communities (however, it is not as powerful a tool as cataloging the links to that site from other sources, a technique that is discussed in the section on bibliometrics and

cybermetrics, below).

Because digital communication can be deceptively ethereal, these tools help to recover the underlying material structures of the digital networks we study; additionally, these methods also reveal the activities of the non-human actors in the system, such as the routers that carry and promote the network's communication signals and the servers that respond to the queries initiated by people or other servers. The three network analysis tools are particularly useful for circulation analysis for instances where the links to the digital-native text being studied are generated by autonomous software agents rather than people:

Studying Web Usage via Server Log Analysis

A great deal of information about users of digital genres (such as blogs, wikis, or websites) can be found in the log files automatically generated by the servers upon which digital texts are stored. The most obviously useful in terms of circulation include records of how a user's search strategy leads to a particular text, and the records of how many individuals (and, to a certain extent, who those individuals are and where they reside) have accessed a given text. Server log analysis can show which pages are entry points for users and which are exit points, how many times a given page is viewed, how many "unique users" have visited a site, and some basic information about where those users come from. It is possible to combine server log analysis with the use of cookies or content-management system supported sites to track how long users spend on a given

page and what paths a user takes when moving through a site (server logs can also record what link or search engine result lead a user to a site's entry point, although it typically does not have access to the search query).

Server log analysis yields very basic quantitative data that can show how a specific site's traffic has changed over time as well as some characteristics of a site's audience. Examining the server logs from the online journal *Kairos*, for instance, provides a picture of a steadily growing number of accesses over the past decade, as well as an increase in international audiences:

> In addition to the steady increase in overall readership, we've seen a shift from a primarily US audience to a much more international audience. A little over 80% of our readers come from the US, which means that about 20% come from elsewhere – the logs have recorded visitors who hail from 190 different country codes, from Belize, Belarus, Botswana and Brazil; from Vietnam, Venezuela, and the Ukraine. And that 20% is now over 9,000 readers – so I'd say it would be safe to consider Kairos an "international" scholarly publication venue. (Eyman, 2006)

Although server log analysis is very limited, it can serve as a starting point for understanding the relationship between a given site/digital text and its audiences. Additionally, server log analysis provides data that can be used to help triangulate findings from other quantitative (and qualitative) methods. Server log analysis is tied to circulation analysis because it can provide a general picture of the number of individuals accessing a digital-native text and also provide some

information about where those individuals are from. However, this kind of overview should be considered secondary information because it does not directly connect the digital texts to its users and uses, much like searches of social bookmarking sites that can show how many people acknowledge having copies of or bookmarks linking to specific digital texts provide an indirect measure of circulation and use. One significant drawback of server log analysis, however, is that the researcher needs to have access to the server logs themselves—and this kind of information resource is rarely made public.

Social Network Analysis (SNA)

Because of its focus on networked relationships and their support of the circulation of social capital, Social Network Analysis (SNA), a research approach from sociology and communication science, provides a powerful set of tools for digital writing research. Social network analysis focuses on patterns of relations among people, organizations, states; in other words, human relationships – but rarely human/non-human interactions or relationships (Wellman & Berkowitz, 1988; Knoke, 1990; Scott, 1991; Burt, 1992; Wasserman & Faust, 1992; Castells, 1996; Lin, 2001) . Social network analysis takes a mixed-method approach: SNA makes use of qualitative data gathered via interviews, surveys, observation, and artifacts (Rogers, 1987; Garton et al., 1997), but it uses quantitative analyses to interpret that data. As Lin Freeman notes,

From the outset, the network approach to the study of behavior has

involved two commitments: (1) it is guided by formal theory organized in mathematical terms, and (2) it is grounded in the systematic analysis of empirical data. It was not until the 1970s, therefore – when modern discrete combinatorics (particularly graph theory) experienced rapid development and relatively powerful computers became readily available – that the study of social networks really began to take off as an interdisciplinary specialty.

The basic premise of social network analysis is that relationships cannot be discretely quantified as units of measurement; that is, the relationship between two individuals must always be seen within the context of all the other relationships those individuals engage in (either shared or separately). This approach presents a high level of complexity that is handled by statistical analysis, and the mathematical formulas that describe networks in terms of nodes and ties; as J. Barnes (1972), credited with being the first researcher to study social networks (cf. Barnes, 1954) explains, "to discover how A, who is in touch with B and C, is affected by the relation between B and C . . . demands the use of the network concept" (p. 3).

In social network analysis, nodes represent the individual actors within networks; ties represent the relationships shared by those actors – these relationships (also called "strands") can be described in terms of content (the resource that is exchanged), direction and strength. Some network analysts have applied social network methods to electronic texts, using SNA tools to surface

patterns of relations between words and phrases; however, unlike the kind of mapping that similar work in applied linguistics produces, SNA textual analysis is used to "reveal cognitive maps and identifies people who hold similar conceptual orientations" (Garton et al., 1997).

The complex relationships examined through social network analyses can be displayed via the construction of sociograms, which are network diagrams that display nodes (individual actors or groups) as points and ties as lines. As Garton, Haythornewaite, and Wellman (1997) describe them,

> sociograms provide snapshots of organizational interaction structures which can indicate how static or dynamic these structures are over time. From these types of diagrams we can visually identify emergent positrons and clusters of interaction. ... Visual depictions of whole networks can highlight both linkages and non-linkages, revealing 'structural holes' (Burt, 1992). By examining these patterns of mediated and unmediated interaction we gain an added perspective on communication structures that underpin explicit work processes as well as those that support affective, less instrumental behaviors.

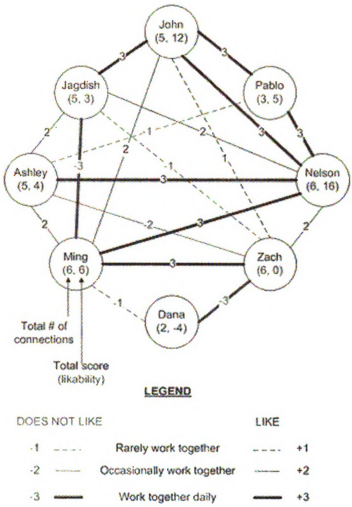


Figure 2. Example Sociogram showing strength of relationships between co-workers (Magis, 2005).

Social networking analysis methods have been used to trace the circulation of social capital (Ooka & Wellman, 2006; Huysman & Wulf, 2004; Quan-Haase & Wellman, 2004), and thus are particularly well-suited to questions of digital economies and circulation: as Barry Wellman (2003) notes, "Networks

are a major source of social capital mobilizable in themselves and from their contents" (n.p.). The work that social analysts do focuses on tracking and tracing the movement of resources between people; they "seek to describe networks of relations as fully as possible, tease out the prominent patterns in such networks, trace the flow of information (and other resources) through them, and discover what effects these relations and networks have on people and organizations" (Garton et al., 1997). Social networking analysis also fits well into an ecological model, as the networks they diagram can be seen as ecosytems themselves—and they can also have interactions with other ecosystems as well: the concept of networks is scalable on a whole network level to a " network of networks" (Craven & Wellman, 1973), networks can be connected to other networks by actors who are members of more than one network.

Indeed, some researchers in rhetoric and writing have begun adapting social network analysis methods for studies of online interaction that are based on writing practices; these methods, however, are event based rather than relationship based (Hart-Davidson, 2007). In the circulation analysis methodology I describe in the next chapter, I also appropriate elements of social network analysis for digital writing research, but my use is more closely aligned with the way that SNA research approaches questions of tracing the circulation of social capital. The coding of data into matrices and subsequent rendering as sociograms are an important component of circulation analysis methods, particularly for the evaluation of the data collected using other methods described

in this chapter. But because the main objects of inquiry are texts and the rhetorical relationships between them, it is important to also examine a slightly more appropriate articulation of this kind of analysis called Hypertexts Network Analysis.

Hypertext Network Analysis (HNA)

Hypertext Network Analysis (HNA) is, in a sense, a form of social network analysis, but it moves the question of relationships away from people and organizations and instead looks at the nodes and ties of digital texts as instantiated in websites and web links. The key distinction between social network analysis and hypertext network analysis is that the websites themselves are considered actors within the the networks being investigated: "In particular, through a hyperlink, an individual website plays the role of an actor who could influence other website's trust, prestige, authority, or credibility" (Park, 2003, p. 53).

Park and Thelwall (2003) argue that "compared to other Web methods such as a content-based analysis, the relative advantage of hyperlink analysis is that it is able to examine the way in which Web sites form a certain kind of relations with others via hyperlinks" (n.p.) – so for hyperlink analysis, it is the hypertext link qua link that is of the most importance and that serves as the focal point of the investigation. Hypertext link analysis also tends to be applied to very large-scale data sets. Broder et al. (2000), for instance, examined 200 million

pages and 1.5 billion hyperlinks in a study that showed that the probability of a hyperlink path between two randomly chosen Web pages was about 24 percent. When a path was present, there were an average of approximately 16 hyperlinks in the path between pages. These kind of topological investigations take advantage of network analyses in ways that are similar to those of Ridolfo's C.O.D.E. suite of networking tools, but they use only the explicit links among and between websites to uncover the connections between them.

Hyperlink analysis has also been applied as part of the methods available to cybermetrics, drawing on Rousseau's (1997) analogy between citations and hyperlinks (coining the term "sitation" to foreground the similarities). As Park and Thelwall (2003) note, "the analogy between hyperlinks and citations has continued to generate interest within information science, including speculations about the kind of information that they could reveal in different contexts" (n.p.). This connection of citation and hyperlink also evokes the circulation of social capital, as both hyperlinks and citations can be indicators of (and can be mapped as) social/academic capital forms of resource exchange.

Bibliometrics and Cybermetrics

The most obvious (and traditional) method of tracing the use and value of texts is through citation analysis, although its use is limited when considering the overall circulation of a text. Still, as Kaplan and Nelson (2000) point out, "in the absence of a more compelling metric, citation analysis remains the best

commonly available indicator of usage" (p. 324).

Citation analysis as a process and a field of study provides numerous means and methodologies for use in quantifying a record and history of citation for authors, articles, and journals. The simplest method of citation analysis is to select a time frame and a body of citation data and determine how many times an author, article, or journal has been cited by the publications indexed in the dataset within that time frame. In most cases, citation data for this sort of bibliometric analysis is drawn from citation databases, such as Social Sciences Citation Index (SSCI), Science Citation Index (SCI), and Arts and Humanities Citation Index (AHCI), which are all accessible online from Thomson's Institute for Scientific Information (ISI) database, also known as the Web of Science.

Scholars also employ citation analysis methods called co-citation and author co-citation in order to map disciplines (Small, 1999; White & McCain, 1998), determine sub-fields within major areas of study (Bayer, Smart, & McLaughlin, 1990), and locate cross-disciplinary influences (Small, 1999). The raw data included in co-citation analyses of articles, journals, and authors includes the number of times that pairs of articles, journals, and/or authors are co-present in the works cited or footnotes of articles located through citation databases. As Bayer, Smart, and McLaughlin (1990) explain, co-citation assumes "that the more frequently two scientists are cited together, and the more similar their patterns of cocitations with others, the closer the relationship between them" (p. 444). This kind of relationship can be viewed as an instance of circulation

activity that can be directly tracked. The problem for utilizing bibliometric methods for examining circulation, however, is that the databases are not complete – they are selectively populated both in terms of the work and citations they track and by a calculation of value (in terms of academic capital) that is applied to those works based on the citations it receives from other work that already has an established value. Thus the scope is very limited in terms of an overall picture of knowledge production and circulation.

Of course, qualitative methods of citation analysis are also employed in order to determine how authors incorporate citations and the ideas of the texts they cite within their scholarship. Such analyses require examining the use of citations within scholarly texts to determine the rhetorical functions of those citations (Budd, 1999; Hyland, 1999). Budd's (1999) study of internal citations in 70 sociology articles from 1990-1995 reveals that authors use of most of their citations quantitatively, also called procedurally in Budd's terminology, in order to prove to readers that they thoroughly researched their respective topics and are aware of disciplinary contexts (p. 271). As Budd (1999) notes, procedural citations, those not integral to knowledge claims made by the authors, outnumber epistemic citations by a ration of more than 3 to 1 (p. 271). Authors' use of citation in largely procedural ways supports our assertion above that the citation of particular materials reflects and reinforces the significance of those items as important texts in the field that must be taken into account and acknowledged by authors as a condition for the perceived credibility of their new assertions and

arguments, even if the references cited are not integral to their arguments. On the other hand, items that are not cited can be viewed as having less credibility and may be judged as largely irrelevant.

A more promising method for circulation research can be located in new informetric methodologies – based in part upon the principles and statistical formulas developed for bibliometric analyses – that are being developed by researchers in the field of information science. Several terms for these new methodologies have been suggested, but the field currently appears to favor "cybermetrics" as the designation for the study of online scholarship. Cybermetrics studies the network of links between electronic scholarly works, revealing how widely a specific electronic source is linked to other online texts, what types of texts link to specific sources, and how the source is used. Aguillo (2003) locates cybermetrics at the intersections of "cybergeograpy" and "cyberdemography" across Internet genres (such as email, the World Wide Web, and online databases). Methods include adaptations of bibliometrics, user studies, calculations of "cyberindicators" (website hits, search engine rankings), assessment of web data architecture and hyperlink topologies, and comparative search engine analyses.

Initial research on web linking began with bibliometric approaches, but it soon became apparent that new methodologies would need to be developed in order to study the web from an informetrics perspective: Larson (1996) used linking as an analogous method of citation analysis to devise a map of the

intellectual structure of cyberspace; Kleinberg (1999) demonstrated that useful information about individual web pages and websites can be extracted directly from link structures; and Broder et al. (2000) asserted that hyperlinks themselves can be studied as objects of interest in their own right.

Clearly, the range of available texts and evaluative mechanisms of is much greater than citation analysis alone can provide; cybermetrics, then, is one starting point for the development of a more comprehensive methodology for circulation studies. These methods, however, provide only a mechanism for tracing a limited portion of a given circulation ecology and need to be combined with other methods in order to fully investigate digital circulation.

Content Analysis

Content analysis is the systematic, quantitative analysis of communication content (including verbal, visual, print, and electronic communication.) According to C. W. Roberts in the *International Encyclopedia of the Social and Behavioral Sciences* (2001), "content analysis is a class of techniques for mapping symbolic data into a data matrix suitable for statistical analysis." (p. 2697); in this regard, content analysis is similar to social network analysis, except that it focuses on the representations in and across individual texts rather than the relationships between them. List (2005) makes clear that content analysis, "though it often analyses written words, is a quantitative method. The results of content analysis are numbers and percentages. After doing a content analysis, you might make a

statement such as "27% of programs on Radio Lukole in April 2003 mentioned at least one aspect of peacebuilding, compared with only 3% of the programs in 2001" (kya16a.html).

Content analysis is typically applied in one of two general modes: conceptual analysis or relational analysis. Conceptual analysis establishes the existence and frequency of concepts – most often represented by words of phrases – in a text; in contrast, relational analysis examines the relationships among concepts in a text (Busch et al., 2005).

Busch et al.'s (2005) description of relational analysis echoes the call for understanding relation complexities that occur in social network analysis, where the individual ties have no meaningful relationship except within the context of the larger network:

> Relational analysis, like conceptual analysis, begins with the act of identifying concepts present in a given text or set of texts. However, relational analysis seeks to go beyond presence by exploring the relationships between the concepts identified. ... In other words, the focus of relational analysis is to look for semantic, or meaningful, relationships. Individual concepts, in and of themselves, are viewed as having no inherent meaning. Rather, meaning is a product of the relationships among concepts in a text.

There are two forms of relational analysis that hold promise for digital writing research: proximity analysis and cognitive mapping. Proximity analysis,

like co-citation analyses in bibliometrics, looks for the co-occurrence of concepts in the texts being studied. In text-based proximity analysis, the concept takes the form of a string of words that can be searched for. Cognitive mapping uses the results of a proximity analysis and displays them as a visual map that represents the relationships between concepts (this is, indeed, very similar to the sociograms of social network analysis, which provide maps of relationships between people or groups). Busch et al. (2005) enumerate the theoretical assumptions that support this kind of mapping: "mental models are representations of interrelated concepts that reflect conscious or subconscious perceptions of reality; language is the key to understanding these models; and these models can be represented as networks." These kinds of maps are difficult to create by hand; like the mathematical approaches employed in social network analysis, the development of concept mapping for content analysis has been greatly aided by advances in computing – in other words, the digital environment itself is necessary to support these methods. Early proponents of concept mapping describe it as "a computerized multidimensional scaling technique that generates maps of content themes based on the frequency and co-occurrence of key words" (Miller & Riechert, 1994); which seems like a fine description of another visualization technique rapidly becoming common for digital texts known as tag clouds (which will be discussed in greater detail in the following section).

One example of content analysis applied to digital writing research is Herring, Kouper, Scheidt, & Wright's (2004) "Women and Children Last: The

Discursive Construction of Weblogs," in which they examine an apparent paradox – "quantitative studies report as many (or more, depending on what one counts as a blog) female as male blog authors, and as many (or more) young people as adults (Henning, 2003; Orlowski, 2003), suggesting a diverse population of bloggers as regards gender and age representation. At the same time, as will be shown, contemporary discourses about weblogs, such as those propagated through the mainstream media, in scholarly communication, and in weblogs themselves, tend to disproportionately feature adult, male bloggers."

Herring et al. (2004) use content analysis techniques to assess the age and gender of weblog authors:

> Gender of blog authors was determined by names, graphical representations (if present), and the content of the blog entries (e.g., reference to "my husband" resulted in a "female" gender classification, assuming other indicators were consistent). Age of blog authors was determined by information explicitly provided by the authors (e.g., in profiles) or inferred from the content of the blog entries (e.g., reference to attending high school resulted in a "teen" age classification).

They also used a content analysis rubric to develop type categories for the weblogs themselves, dividing them into "filters," which primarily feature links to world events, online happenings, and other non-author-centered issues, "personal journals" which primarily contain the blogger's thoughts and internal workings, and "k(nowledge)-logs," which are "repositories of information and

observations with a typically technological focus." This second move is a rhetorically-informed variation on traditional content analysis techniques, which often do not take into account the the context of the texts under consideration.

In our chapter in *Digital Writing Research*, Colleen Reilly and I utilized a similar form of content analysis to develop a heuristic for evaluating digital texts in terms of their structure, the digital environments in which they reside, and the degree to which they violate traditional print-based genre norms. Drawing on Bolter and Grusin's (1999) theories of remediation, we examined the content of electronic scholarly publications to determine their degree of departure from the conventions of print texts and the extent to which they exploit and even highlight the affordances, structure, and multimedia nature of texts native to digital environments. We established a continuum that includes four designations for electronic texts: highly transparent, moderately transparent, moderately hypermediated, and highly hypermediated (Reilly & Eyman, 2007). In order to code the websites that we examined as falling into these categories, it was necessary for us to consider not only textual content, but also paratextual content (links, document structures) and the kinds of visual and interactive content that can be published on the web. Thus, our work is also an example of how content analysis techniques can be applied to both textual and visual elements in digital texts.

Data Visualization

Composition/rhetoric as a field is experiencing a renewed interest in the role of the visual, particularly as it is used in multimedia and multimodal compositions; professional and technical writing has long understood the importance of visual rhetoric for effective communication. The "turn to the visual" also plays a prominent role in digital research methods, particularly in the form of data visualization.

Visualization is not simply a tool for displaying the results of analytic methods; it is itself a method that can be used to structure data in ways that reveal patterns—in other words, it is an analytic technique in its own right. Lengler and Eppler (2007) define visualization methods as "systematic, rule-based, external, permanent, and graphic representations that depict information in a way that is conducive to acquiring insights, developing an elaborate understanding, or communicating experiences. In their "Periodic Table of Visualization Methods for Management," Lengler and Eppler divide visualization methods into six distinct groups: data visualizations (visual representations of quantitative data in schematic form); information visualization (interactive visual representations of data designed to amplify cognition by transforming the into an image that is mapped to screen space); concept visualization (2-D graphical displays where concepts are connected by directed arcs encoding brief relationships between pairs of concepts; metaphor visualization (which first positions information graphically to organize and structure it and second convey

an insight about the represented information through the key characteristics of the metaphor that is employed); strategy visualization (which uses complementary visual representations to improve the analysis, development, formulation, communication, and implementation of strategies in organizations; and compound visualization (a mix of any of the foregoing visualization types).

An example of data visualization used methodologically is Kichiyoshi et al.'s (1999) "Data visualization for supporting query-based data mining," which describes how visualization can help users test hypotheses about the structures and contents of databases with which they are interacting. In their method, "an instance in a database which has several attributes with numerical or nominal values is visualized as a color bar with several color parts which correspond to attribute values. Values of a function which evaluates the utility of a hypothesis are also visualized by using colors. This visualization technique helps users find an initial hypothesis and modify the hypothesis in order to increase the usefulness of it interactively" (p. 888). Like this and other examples, most applications of data visualization as research method come from quantitatively-oriented disciplines, such as the use of sociograms in social network analysis and hypertext network maps in hypertext network analysis.

Data visualization is very useful for making accessible large-scale systems that might not otherwise be comprehensible. As Roger Brown (1965) explains,

> Social structure becomes actually visible in an anthill; the movements and contacts one sees are not random but patterned. We should also be able

> to see structure in the life of an American community if we had a sufficiently remote vantage point, a point from which persons would appear to be small moving dots. ... We should see that these dots do not randomly approach one another, that some are usually together, some meet often, some never. ... If one could get far enough away from it human life would become pure pattern (p. 47)

This notion of perspective also maps onto Franco Moretti's (2000) notion of "distant reading ... where distance... *is a condition of knowledge*: it allows you to focus on units that are much smaller or much larger than the text: devices, themes, tropes—or genres and systems" (p. 57, emphasis in original).

Applying the functionality of a concept map coupled with a frequency analysis of terms that appear in the journal *College Composition and Communication*, Derek Mueller (2007) has implemented a system that visually represents the main themes of each issue in the form of a "tag cloud."

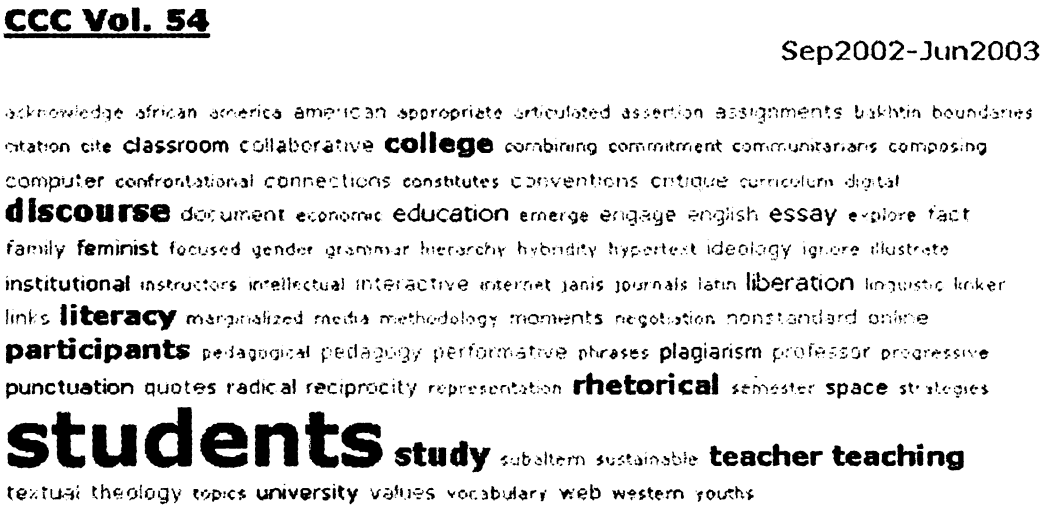


Figure 3. Tag cloud from *College Composition and Communication*. http://tagline.earthwidemoth.com/cccexp/volumes.html

Tag clouds can be generated automatically by extracting the most common phrases from a given corpus (as with the example above), or they can represent the tags that individuals apply to content in folksonomic systems. In either case, this form of data visualization has clear potential as a digital rhetoric method.

Complicating Factors for Digital Research Methods

Although each of the preceding methods can, I believe, be adapted, appropriated, and synthesized for use in digital rhetoric research (after infusing them with a rhetorical foundation and vision), there are several complicating factors that will effect any method used for digital writing research. The main factor (and the one from which the others derive) is access. Accessibility can be impeded by intellectual-property gatekeeping (restricted access to networks and texts that circulate in and through those restricted systems, as well as cost-prohibitive access fees on certain content), but it is also an issue when considering the format of the rhetorical objects themselves. Digital texts can be made up of, in part, proprietary formats; they may also engage media or genres for which we currently have few (or no) tools that would allow us to fully understand how they work or their relationship to their digital environments. Finally, the problem of ephemerality is also endemic to digital texts: websites are not stable entities that are fixed (they are un-fixed by their very nature), and

many become inaccessible by ceasing to exist. As noted above, some sites are still recoverable via the Web Archive, but this is not always the case. Thus, any digital-native methodology must be aware of how these issues of access constrain the methods that are used.

In the methodology that I am proposing in this dissertation, I draw upon and synthesize elements from the methods discussed in this chapter. In the following chapter, I describe the methodology and the methods it employs, as well as continuing the discussion of the complicating factors I briefly outlined above.

Chapter 4: A Digital-Native Methodology: Circulation Analysis

In the first chapter, I noted that one of the primary goals of this dissertation is the articulation of a methodology supported by a theoretical foundation based upon circulation as a rhetorical activity that takes place within and across multiple ecologies and that is driven by economic functions particular to digital production. The theories elaborated in the second chapter serve two functions – they provide both the foundation for the methodology and the parameters that guide deployment of the digital methods I am using to investigate the role of circulation for digital rhetoric. In the third chapter, I presented a review of the methods from which I will draw and synthesize a digital-native method for digital rhetoric research: circulation analysis.

Circulation analysis is intended as a method for investigating digital texts using digital methods; that is, the focus is on the creation and dissemination of digital-native work. While there are some ecosystem interactions that cross the print-digital boundary, the main goal of this methodology is not to examine or mediate that boundary, but to engage digital-native texts on their own terms and within the ecologies in which they circulate.

Because I am arguing for the development of digital methodologies, it is important to make clear the distinction between methodology and method. Spinuzzi (2003), drawing on the work of Sullivan and Porter (1997), provides a brief summary of the distinctions: "A *method* is a way of investigating

phenomena; a *methodology* is the theory, philosophy, heuristics, aims, and values that underlie, motivate, and guide the method" (p. 7). In constructing the theoretical foundations for a methodology of circulation analysis, I also find it useful to begin with the distinctions articulated by Sullivan and Porter's *Opening Spaces: Writing Technologies and Critical Research Practices* (1997). Sullivan and Porter's "revision of methodology is intended to call particular attention to its rhetorical nature: all methodology is rhetorical, an explicit or implicit theory of human relations which guides the operation of methods" (p. 11); they see methodology as invention, as the construction of a rhetorical design that contributes to an understanding to that also effects some kind of positive action through a rhetorical practice" (pp. 12-13). Quoting Stanley and Wise (1993), Sullivan and Porter argue that "method" should be identified as "techniques or specific sets of research practices" whereas "methodology" describes how particular methods are engaged through "broad, theoretically-informed frameworks" (Stanley & Wise, p. 26). Articulating a rhetoric of methodology, Sullivan and Porter construct a three-part framework that can serve as a heuristic when applied to any given methodological model: they argue that any methodology can be articulated and assessed via its ideology (assumptions about how people should relate to one another via symbol systems), its practices (symbolic actions that serve as rules for discourse), and its methods (procedures, heuristics or tools for investigations) (p. 11).

While Sullivan and Porter's work is explicitly aimed at foregrounding

ethical research practices as they are instantiated in particular methodologies, specifically focusing on human interactions in the activities of situated practice (p. 12), my work here seeks to extend the application of their heuristic to the methodology I am developing by engaging both human and non-human actors at each of the levels of their rhetorical framework: ideology, practice, and method.

The methodology I am designing is heavily indebted to Actor Network Theory (ANT), in particular for the way that it allows the researcher to see non-human agents as rhetorical actors within the activity systems under study (Latour, 1987, 2005; Callon, 1987; Law, 1992; Bowker & Star, 1996). At the ideological level of the rhetoric of methodology—the "assumptions about what human relations should be and about how people should use symbol systems" (Sullivan & Porter, p. 10)—Actor Network Theory adds assumptions about what both human-human and human-nonhuman agent relations should be. Thus, ANT provides a mechanism for examining what I will call post-rhetor agency; that is, the factors (both human and nonhuman) that motivate circulation once a digital text has been completed and made available to the networks on which it resides (and circulates); these networks include human and non-human agents, and can be seen as the "heterogeneous networks" described in actor-network theory (Law, 1992). Latour (2004) clarifies the use of "network" in terms that resonate with my use of ANT as a significant foundational theory for a digital circulation-based methodology, arguing that "being connected, being interconnected, being heterogeneous, is not enough. It all depends on the sort of action that is flowing

from one to the other, hence the words 'net' and 'work'. Really, we should say 'worknet' instead of 'network'. It's the work, and the movement, and the flow, and the changes that should be stressed" (p. 64). Actor-Network Theory at the ideological level also works well in terms of viewing networks as ecological entities; as Jay Lemke (2000) notes, ANT invokes

> a relational epistemology which rejects the naive positivist view of objects or actors as existing in themselves prior to any participation in ecosocial and semiotic networks of interactions (including the interactions by which they are observed, named, etc.). .... ANT has much in common with Ecosocial Dynamics, but adds one crucial observation: that the usual view of dynamical systems assumes that they have a local topology, and so events nearby in space and time are more relevant than those at a distance, leading to neat separation of scales of processes. ANT notes that the topology of networks is in general non-local, and further that semiotic artifacts are often the 'boundary objects' that mediate non-local, scale-breaking interconnections. (theories.htm#AT)

At the level of practice, what Sullivan and Porter (1997) describe as the "symbolic actions that constitute the conventions that govern or guide discursive relations...and the construction of knowledge" (p. 10), relationships described via circulation are formed through the development, movement, and uptake of "inscriptions": the texts "central to knowledge work....that make action at a distance possible by stabilizing work in such a way that it can travel across space

and time and be combined with other work. Texts are also central to the process of gaining credibility. They carry work to other people and institutions. They attempt to present work in such a way that its meaning and significance are irrefutable" (Van House, 2001, n.p.).

These inscriptions include images, animation, video, databases, and new media work, not just alphabetically encoded documents. Inscriptions (in the case of circulation methods, the digital texts that are in a state of circulation), interact within both specific and multiple ecologies; these ecologies constitute both boundaries that delineate the scope of circulation-investigation methods (which may address micro- or macro-ecologies, depending on the scale of the investigation) and contextual frameworks that become themselves actors that co-constitute networks of circulation (in the terminology of ANT, the ecologies themselves are enrolled and translated as constituent members of the actor-network).

At the level of method, the procedures and tools available to a given methodology for its investigative activity, circulation analysis requires digital methods for the study of digital environments, texts, and networks; I argue that traditional methods that were developed for the analysis of print texts that circulate in analog forms can only provide a limited view of circulation activities and thus have much less explanatory power than methods that are designed from the start as an engagement of digital ecologies. As Jenny Edbauer (2005) suggests

> Indeed, circulation is always specific: the ecologies of production, distribution, consumption, and linkages are thoroughly embedded (and embodied) in historical, temporal, spatialized, and affective channels. Although rhetorical analysis methodologies might indeed draw out unique elements of texts and situations,
>
> the analytic vocabularies flatten out the context of rhetoric as an ongoing process (p. 117).

Because others (notably Edbauer [2005] and Syverson [1999]) have used ecological frameworks to examine the interplay of rhetorical activity and cultural production, I should make clear that while my focus on digital ecologies cannot be separated from the larger cultural contexts in which they are embedded, the methods that I am devising at this stage of methodological development focus primarily on the contexts and activities revealed by investigations of the digital networks themselves, and not, at this time, on the larger (non-digital) sociocultural systems that interact with and engage these digital networks.

Circulation Analysis Methods

The basic process of circulation analysis is to first determine what scale of ecosystem is to be addressed and set the boundaries of the study accordingly. Second, the researcher must choose which text(s) will serve as the starting point(s) and collect information (metadata) about those texts, including what

genre or form the texts take, where they link to, the works they cite or use, and where they reside or have been published. Once the texts have been selected, digital tools are used to discover three main facets of circulation: references to the text (formal and informal citation); links that point to the text; and quotation or appropriation of any part of the text. The data retrieved by these three methods are then subject to a series of analyses: content and genre analyses of the works that cite, link to, or quote from the original text and a network analysis that produces a map of relationships similar to the sociograms produced by social network analysis.

Circulation analysis is designed to reveal patterns that arise from the use, appropriation, and circulation of specific texts; the selection of those initial texts depends upon the kinds of questions the researcher is interested in and also upon the boundaries set by the ecosystems and networks in which this circulation takes place. As the editor of a peer-reviewed online scholarly journal, I am most interested in seeing where and how the work we publish circulates (and what effects derive from whether these texts are more like print texts or more like new media work). For these questions, I would select works from the journal and set the boundaries as wide as the scholarly fields engaged by the work we publish. This kind of approach (at the macro-ecological level) would also work well for journalistic works published in online newspapers, or for blogs (although blogs have some built-in mechanisms that make them easier to work with than other kinds of online texts, a point I will return to at the end of this

chapter). If the ecosystem to be studied is a microecology, such as all of the works produced by one individual or produced by a particular collaboration, questions about how these works related to each other rhetorically can be addressed with this analysis technique; similarly, digital circulation can be addressed with in specific institutional or organizational contexts.

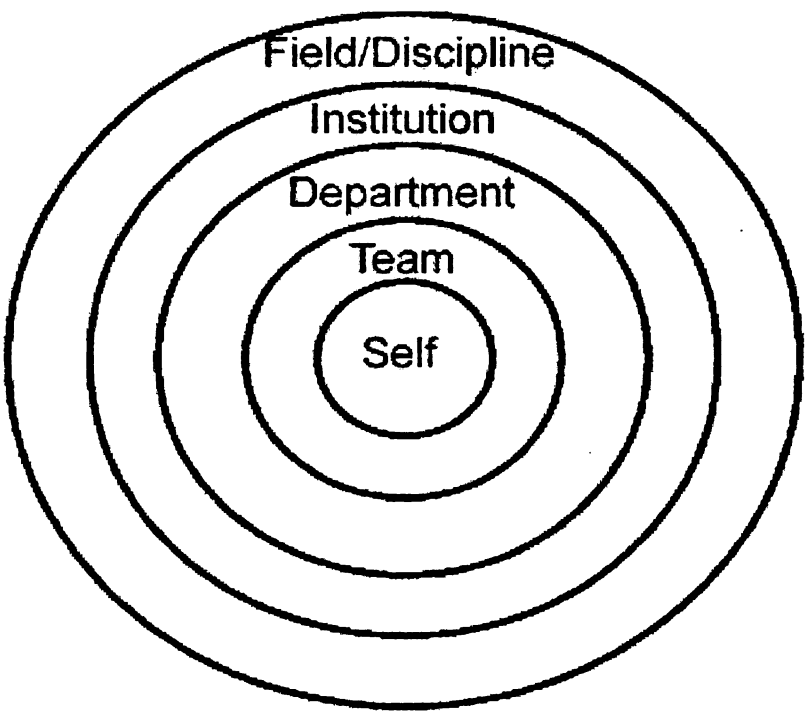


Figure 4. Ecosystem boundaries for digital circulation analysis.

Once the primary research question (and the concomitant ecosystem boundaries) have been established and the text or texts whose circulation is to be investigated have been chosen, the first task is to collect data about those texts and their immediate contexts. The metadata collected about each initial text includes standard bibliographic elements (author, publication venue, year of

publication, date of last modification) as well as some information about its status (distributed, published, peer-reviewed), and some more detailed information about the format and content, including the number of words (for text-based documents), the numbers of internal and external links (and a catalog of what the external links are), how many formal references appear in the text (divided into print or electronic), and the document type definition (DTD) if available.

Author	Eyman, Douglas
Year	1996
Status	Published - Online Peer-Reviewed Journal
Venue	*Kairos: Rhetoric, Technology, Pedagogy* 1.2
URL	http://english.ttu.edu/kairos/1.2/features/eyman
Format	Webtext; moderately transparent
DTD	HTML 4.0 Transitional
Modified	February 05, 1999
Pages	19
Words	9110 (excluding references and navigation)
OutLinks	3
References	26 print

Table 1. Example Metadata Collection.

A more qualitative assessment of the content is then undertaken, using two primary methods: an analysis of the genre, if identifiable (e.g. a government website, an online journal, or an online archive of a print newspaper) and an evaluation of the degree of transparency or hypermediacy exhibited by the text.

The first method draws on a catalog of digital genres generated by an earlier citation study conducted by Eyman and Reilly (in-press); the second uses an evaluative rubric based on Bolter and Grusin's (1999) categories of remediation:

> We defined four degrees of hypermediacy for electronic texts: "highly transparent," "moderately transparent," "moderately hypermediated," or "highly hypermediated." The key elements for determining where on the continuum a given online source would be located are its relationship to print genres, document design and layout, use of links, color, and images; and use of interactive programming, animation, digital video, and hypertext. (Eyman & Reilly, in-press).

The evaluative rubric and catalog of digital genres are provided in Appendix A and B, respectively.

Once the research question has been established and data collection completed for the texts that will serve as starting points in the circulation analysis, the researcher engages three procedures that are both time and labor intensive, but relatively straightforward in their application. The three procedures examine formal and informal citations of the initial texts, links from external sources to the initial texts, and full-text quotation or appropriation of all or part of each of the initial texts. Prior to analysis, the data returned from each of the following search techniques is placed in a database that associates the results with the initial texts (this is necessary because the following techniques generate a large amount of data).

For each of the three approaches, it is important to engage more than one tool—each tool that is available has one or more flaws, so triangulation (via using multiple tools) is necessary in order to collect the most complete set of data about how the initial texts are used and circulated.

Formal and Informal Citation

The first method I use is a series of standard and specialized searches that aim to uncover formal citations (in other electronic documents) as well as written references to the initial texts that are not links (links are covered in the next method). A basic web search (repeated in Google, AlltheWeb, and AltaVista) on the author and title of the initial work provides the first data set. Any explicit reference to the work is determined to be a formal citation (following a specific citation format, such as MLA or APA) or an informal citation (where the author and/or title are referenced, but no further bibliographic details are provided). Specific genres may benefit from a follow-up basic search utilizing a search application or research service specifically designed for that genre: for instance, High Beam (http://www.highbeam.com) is a search engine designed for tracking news reports in periodicals (newspapers and magazines); an analysis of the circulation of legal texts would certainly benefit from a search on WestLaw (http://www.westlaw.com).

Following the basic web search, citation-specific searches are carried out using Google Scholar (http://scholar.google.com) and the Thomson/ISI Web of

Science (which is a citation tracking database); these search tools are designed specifically for seeking out formal citation, but they may not provide many results if the initial texts are outside the scope of the databases these tools draw from. The data used for most citation analyses are drawn from standard citation databases that index a core group of journals that are selected subjectively (Corby, 2001; Funkhouser, 1996). According to the website for Thomson's Institute for Scientific Information (ISI), the database indexes a select group of 8,700 international journals (Testa, 2004), under 200 of which are open access electronic journals (Testa & McVeigh, 2004). For instance, Corby (2001) notes that *Educational* Researcher is a prestigious journal in education that is not indexed by ISI (p. 286); according to Corby, sociology and psychology both receive better coverage by ISI than education: ISI includes 35 percent of the 1,580 journals indexed by *Sociological Abstracts* and 45 percent of the 1,500 journals covered by *PsycINFO* (p. 283). Funkhouser (1996) finds a similar problem of underrepresentation of journals in communication studies, concluding that of the top 27 journals in communications, 14 of them are not indexed by ISI and, as a result, 25 percent of relevant articles are not cited. Clearly, formal citation itself is not a sufficient metric for circulation analysis, although it can contribute to the overall picture.

The same kinds of metadata and genre/content evaluation that were recorded for the initial text are recorded for each of the citing texts, along with a copy of the relevant portion of the citing text and a brief rhetorical analysis of why

that reference appears where it does and an indication of the level of formality and citation format used, if that can be determined.

Sitations: Links to Source Texts

"Sitation" (Rousseau, 1997) describes the relationship between sites on the Internet (Aguillo, 1996; McKiernan, 1996) as well as the activity of constructing the links that represent and enact those relationships. The simplest way to measure sitation is by examining the links that point from external sources back to the initial texts whose circulation is of interest; this process is referred to as a "backlink search." Currently, only three major search engines support backlink searches: AltaVista, AlltheWeb, and Google. AltaVista and AlltheWeb are consistent in their report of backlinks and are recommended for performing this type of analysis; Google only displays results that pass a certain threshold using its PageRank ™ algorithm (Brin & Page, 1998; see Reilly & Eyman, 2007 for an explanation of how this algorithm works). Additionally, both AltaVista and AlltheWeb allow the option of excluding the originating site so that links that come from within that site are not counted as backlinks (these internal links are referred to as "self-links"), whereas Google does not allow the exclusion of self-links. A quick comparison can highlight the need to triangulate with multiple search engines (and the fact that Google is not the only or best search engine for all tasks), a backlink search performed on the main page of the online *journal Kairos: Rhetoric, Technology,* Pedagogy produced 10,100 backlinks in the

AlltheWeb search engine, 10,200 backlinks in the AltaVista search engine, and 574 backlinks in the Google search engine (of which about 10% are self-links).

The question of accessibility also plays a role in terms of back linking—no search engine indexes the entire Web: Lawrence and Giles (1999) used statistical analyses to argue that search engines were indexing fewer than 50% of the extant pages on the Web. Search engines also cannot currently index "the invisible Web"—sites that are password-protected, online databases and database-driven Web sites, and sites that specifically instruct search engines not to index them through use of search-engine exclusion metadata. So while circulation analysis can provide a richly detailed picture of digital circulation across and through multiple ecologies, it is unlikely to be comprehensive.

The backlinks are recorded, along with the data about their origin (similar to the citation method above). There is a situation where an identical link is propagated across several different online domains: in this case, it is best to simply record one example of the instance and note the number of identical links (rather than including each one in the data set). These "propagated" links are typically the result of data mining systems designed to increase traffic to websites (regardless of the relevance of the link to the site), to trace the origination of these links, it is useful to use the network analysis tools whois and traceroute (as discussed in chapter 3).

Quotation or Appropriation

The final step in circulation analysis data collection is designed to discover

quotations or appropriations of work that is in the initial text. While it is certainly possible to use Google for this purpose (running searches on every ten words in a written text, for instance), the word limitation means that the labor costs of doing the search this way are significant. A better method is to use a plagiarism detection tool such as mydropbox.com or copyscape (http://copyscape.com). Mydropbox.com returns results relatively quickly and provides a color coded representation of the quotations or appropriations it finds (of course, it can't tell the difference between properly quoted material and blatant plagiarism; like all of the methods I discuss here, there could well be a technological mechanism that would help speed the process, but a careful examination of the data by a person is still certainly necessary.) Copyscape is an online service that compares distributed or published websites with other websites, so it is more limited than a fully-featured plagiarism detection tool, but it does help to provide triangulation. When using these tools, it is important to directly review the sources that are quoting or appropriating the initial text: plagiarism detection tools can only show matches, not evaluate them.

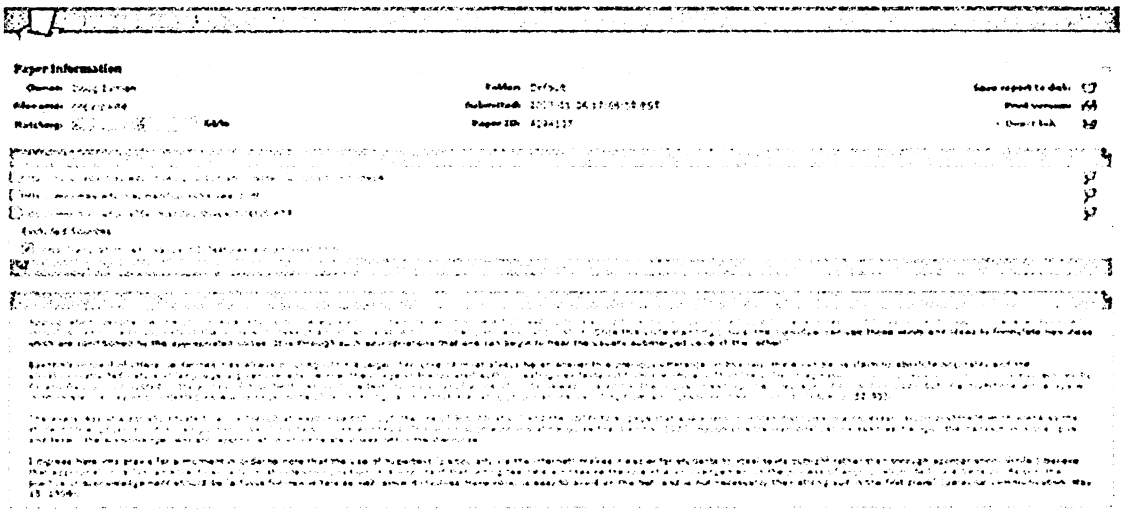


Figure 5. Mydropbox.com Search Results.

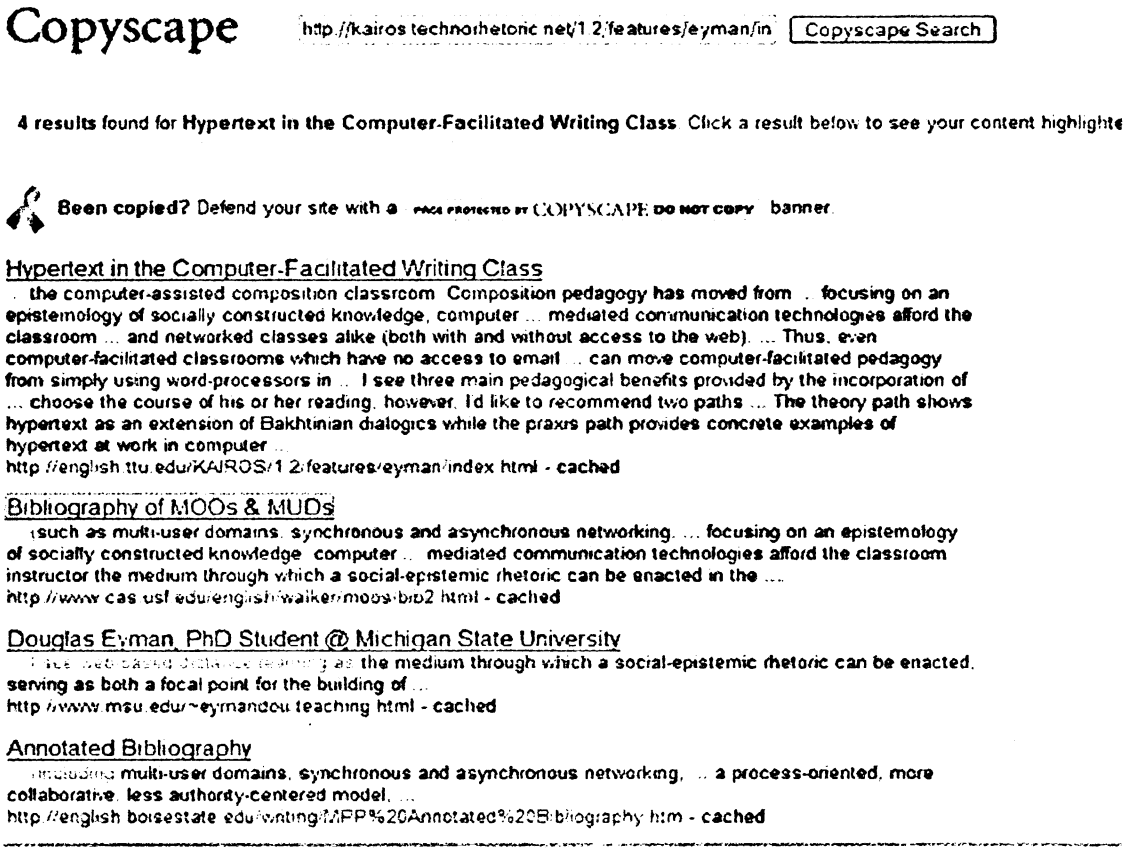
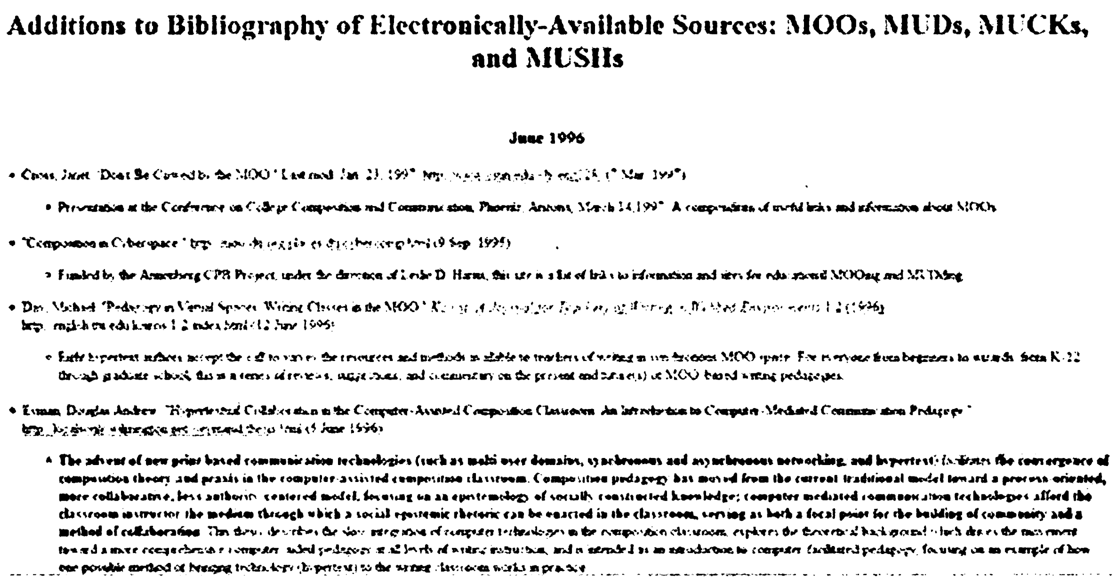


Figure 6. Copyscape.com Search Results.


Additions to Bibliography of Electronically-Available Sources: MOOs, MUDs, MUCKs, and MUSHs

June 1996

Figure 7. Copyscape.com Results - Detailed View.

Issues of accessibility for this method are primarily limited to the distinction between open and proprietary formats (the latter being inaccessible without the software needed to read it) and to non-text formats (such as PDF files that are simply images of the printed page, rather than searchable/usable PDFs).

Ownership as a Measure of Circulation

There is one additional measure that is useful for citation analysis: searching social bookmarking sites like del.icio.us (http://del.icio.us/) and social bibliographic sites such as CiteULike (http://citeulike.com). In each case, the information revealed doesn't directly address rhetorical circulation, but it does provide a picture of who has a copy of the work in question (regardless of whether it has been cited, linked to, or quoted).

Definitions and Data Coding

Because it is important to distinguish the various forms of citation and sitation, the definitions of the terms I've used in the description of the methods above (which will in turn be used when coding the data) follow:

- Formal citation: A reference (including a quotation or paraphrase) that includes bibliographic information following a citation format; the bibliographic information typically appears in a separate references section that is keyed to in-text parentheticals or footnotes.
- Informal citation: A reference that includes only limited bibliographic information (e.g. author/title; title/journal but no author).
- Simple link: A link that occurs in a list of links or is otherwise separate from other contextualizing content.
- Embedded link: A link that whose text is part of the content of the page (i.e. not explicitly displaying the URL). This may be within a paragraph (deeply embedded) or within a link list (shallowly embedded). For example, a linking document might include the text "I was searching for a good example of visual rhetoric" and the underlined portion of that text would link to, for instance, a bibliography of visual rhetoric. In this case, the actual URL is not displayed, nor is any information about the work being referenced.

- Bibliographic link: A link that is formatted as a formal reference, following a citation format. In many cases, where a formal link is present, a bibliographic link will also be present, but there are many cases (such as bibliographies that are not part of an article or essay) where *only* a bibliographic link is present (hence the distinction between formal citation and bibliographic link).
- Annotated link: A link that include a brief or extended annotation of the target source or a copy of the target's abstract.
- Propagated link: A software-agent generated link that recurs in the dataset (see the following chapter for a discussion of this type of link).
- Quotation: Attributed, quoted text that may or may not be accompanied by citation information.
- Appropriation: Unattributed quotation (plagiarism) or full copy of the original text, with or without identifying information about the authorship of the original.
- Invisible: The HTML code for a link to the source is included without any link text (thus, the link does not appear in the referring document. In this case, the author of the referring document has considered using the source but ultimately not done so.
- Inaccessible: The use of the target is indeterminable because the link is inaccessible (e.g. requiring a password or fee).

After identifying what *kind* of link or reference is pointing back to the source document, the next step is to determine the degree of interaction with the source as expressed in how those references are formed. The references are coded in the dataset with one of the following:

- P – The reference is in parenthetical notation but not connected to a quote or paraphrase. This is typical of scientific styles; an example from the paragraph below is my use of (Connors, 1999; Hyland, 1999; Robillard, 2006; Thelwall, 2003) to point to works that use a particular approach without drawing on any one of them specifically. A variant on this construction is coded as [P], indicating that the actual reference appears in a note rather than in a direct parenthetical (so, for the above example, instead of the parenthetical with names and dates, I might have put [1] and then in the notes section following each chapter I would list the same information that would have been in the parenthetical. I don't make a distinction between these two forms because the use is essentially the same, the actual reference information is simply deferred to a later portion of the text in order to minimize breaking the flow of the narrative it is supporting.
- S – Marks a single quote or paraphrase. When examining both the connections (circulation) and the motivations (rhetorical analysis of the actions of the citers) this can be delineated as SQ for single quote and SP for single paraphrase.

- M – Indicates multiple quotes or paraphrases and is followed by the number (i.e. M3). As with S, M can be divided into MQn and MPn (where n is the number of quotes or paraphrases).
- D – I use this to code cases where the referring text is "in dialogue" with the content of the source article: the referring text is arguing against the source or is using the source to further an argument based on interactions with the source itself (as is common in debates or online discussions).
- U – Unknown (because the referring text is inaccessible due to password protection, imposition of a fee for access, or it is in a language I am unable to translate. Given enough resources, this last category can be converted through translation. For this kind of assessment, though, language is really only a barrier when it is presented in non-alphabetic script.
- N – None. No interaction per se is engaged beyond the link itself. This is most often the case for informal, simple, embedded, bibliographic, annotated, and invisible links.

Both kind and degree of link or reference can provide an implicit account of the rhetorical use of these references; circulation analysis can be used in conjunction with a rhetorical analysis of the use of these links (see Connors, 1999; Hyland, 1999; Robillard, 2006; Thelwall, 2003) in order to better understand the motivations of the citers, but this aspect changes the kinds of research questions addressed by circulation analysis by shifting the emphasis from the post-rhetorical agency of the digital text itself to the actions of those

interacting with the text; thus, I see this as a useful research method, but one that is not required for the carrying out the kinds of circulation analysis described in chapters 5 and 6.

Analysis

Once the data has been collected, the information is placed into matrices that code the relationships of the initial text to those found during the research in terms of content, genre, and use (that is, formal and informal citation, linking, quotation or appropriation). These matrices are used to produced rhetorical relationship maps using visualization tools such as GraphVis (http://www.graphviz.org) or Pajek (http://vlado.fmf.uni-lj.si/pub/networks/pajek/). Because the level of detail collected is exceptionally rich, any interesting patterns that are revealed through the data visualization can easily be further investigated and theorized. In addition to the network analysis maps, descriptive statistics, such as number of cites over time, geographic regions and languages represented in the data set are compiled and output as tables and graphs; an example of a "cites over time" graph appears below as Table 2.

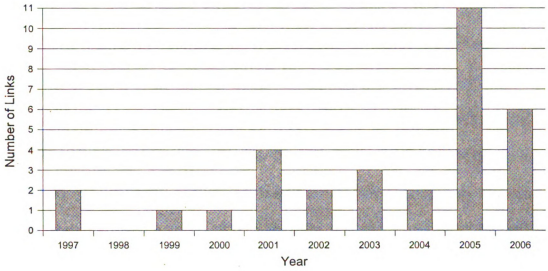


Figure 8. Sitations over time for Eyman, 1996.

Blogs and "Digital Fingerprints"

Before presenting the case studies that show the application of this method, I want to consider how this methodology may be developed using new digital research tools by looking at the case of blogs. Blogs represent an excellent example of how circulation tracking mechanisms are being built into evolving digital genres. Current blogging systems typically include options for enabling syndication of content, tracking of readers, and tracking of comments (which may progress across several disparate blogs). Feeds (syndication), pingbacks (tracking of readers), and trackbacks (tracking of comments) are active systems that must be initiated by the blog's composer(s). Additional data about circulation can be gleaned from circulation analysis (described above) or through server log analysis (both of which are passive methods, in the sense that

no action must be taken by the composer to generate the data).

Dave Shea's (2004) description of syndication is one of the most accessible currently available. He explains that "RSS/XML/Atom are technologies, but syndication is a process. RSS [Really Simple Syndication] and Atom are two flavors of what is more or less the same thing: a 'feed' which is a wrapper for pieces of regularly and sequentially-updated content, be they news articles, weblog posts, a series of photographs, and more" (online). The activity of syndication then, is process of using RSS/Atom for automated updates from either the perspective of the supplier (the composer of the digital text) or the subscriber (the reader). It's important to note the use of the term subscriber here – it is no accident that syndication is explicitly aligned with practices of publication—and this is one way to track circulation (as the supplier can view the subscriber list and see where the texts are being sent).

Pingback, as explained in the WordPress Codex (2005), is a system that "lets you notify the author of an article if you link to his article (article on a blog, of course). If the links you include in an article you write on a blog lead to a blog which is pingback-enabled, then the author of that blog gets a notification in the form of a pingback that you linked to his article" (online). Pingback, then is a form of automated link tracking, although it relies on a system that understands the protocol (that is, not every link to a particular digital text is guaranteed to register, even on pingback-enabled systems).

Similar to pingback, the trackback function "helps you to notify another

author that you wrote something related to what he had written on his blog, even if you don't have an explicit link to his article. This improves the chances of the other author sitting up and noticing that you gave him credit for something" (WordPress, 2005). Both pingbacks and trackbacks are analogous to citation and are similar in function to cybermetric analytics (although they are limited by proximity – that is, pingbacks and trackbacks work between two digital texts and cannot trace or track appropriation or use of the text once it moves beyond the systems that use these tools).

Since these digital fingerprint mechanisms are primarily only available to blogs and not to all digital texts, I have decided to not use blogs as case studies, although a separate application of circulation analysis tailored to the exigencies and generic structure of blogs will be part of my future research.

In the next two chapters, I apply the circulation analysis methods I have outlined above to two different ecologies – an individual electronic portfolio (a tightly bounded microecology) and a series of works published in peer-reviewed online journals in the fields of computers and writing and communication studies.

Chapter 5: Circulation Analysis and the Electronic Portfolio Ecosystem

In this chapter and in the chapter that follows, I apply circulation analysis as a digital-native method for exploring and investigating digital-native genres and for mapping the ecosystems in which those genres circulate. For this demonstration of the methodology, I will be looking at the works in an individual electronic portfolio, first examining the ecological interrelationships and interdependencies that occur within the tightly bounded ecosystem of one individual's work and then working outward to the larger ecologies engaged by the works in the individual e-portfolio. In the next chapter I'll be looking at circulation on a much larger scale, examining trends in the publication of online scholarship in the humanities. In each case, the goal of the chapter is not to produce a fully-fleshed out research project; rather, my aim is to demonstrate why we need digital methods for digital texts and show how such methods might be deployed. Because I am not concerned with a definitive outcome as a result of these cases, I can instead focus on methodological implications and applications tangential to the cases themselves.

An ecological framework for understanding interaction does not require a large ecosystem to work, although most ecosystems are relatively large (such as ponds and forests). However, in the Amazonian rainforests, giant epiphytic plants called bromeliads grow upon the trees; within the bromeliad exists a micro-ecosystem that can be studied in much the same way as the entire rainforest.

The point here is that complex interactions and inter-relationships don't happen only within larger social and cultural economies—in a knowledge ecology, an given text (particular multimedia works like those described in chapter 2) can be an instantiation of an ecosystem; similarly, the corpus of one individual's output can be viewed and analyzed as both an ecosystem in its own right and as connected to larger ecosystems as well as an ecological superstructure (e.g. a discipline or institution), much as the bromeliad both houses an ecosystem and plays a role in the larger ecosystem of the rainforest, which in turn is part of a biome (a large geographical area of distinctive plant and animal groups adapted to a particular environment).

Analysis of the smaller or micro-ecosystem (particularly at the individual level) will not show the same kinds of interactions as those in larger ecosystems, but it is nonetheless useful to consider the rhetorical and network relationships embedded in these more focused and tightly bounded ecosystems. Once the individual portfolio has been analyzed, a second step (although not one carried out in this dissertation) would be to analyze the individual's work as it relates to the immediate local environment, to the larger departmental and institutional ecosystems, and to the disciplinary ecology (a form of this last approach is taken up in the following chapter). Thus I begin with a circulation analysis of an individual electronic portfolio as an example of a micro-ecosystem.

Genre Ecologies and Electronic Portfolios

Portfolios have long been used in some disciplines—particularly in the arts and humanities—to organize and present work; to provide a context for discussion, review and feedback from instructors, mentors, colleagues and friends; and to demonstrate progress and accomplishments over time (Greenberg & Jafari, 2003). Because the production of texts has become increasingly digital, (even texts designed for print circulation are crafted with digital tools), it has consequently become easier to develop personal, pedagogical, and institutionally-driven *electronic* portfolios – and the area of electronic portfolio development and research has seen enormous growth over the last five years (Batson, 2002; Cohn & Hibbits, 2004; Lorenzo & Ittleson, 2005).

My own interest in electronic portfolio research stems from two observations: there is (or could be) a relationship between electronic portfolios and personal digital archives, and the electronic portfolio infrastructures currently available are either monolithic-institutionally situated systems (what Helen Barrett [qtd. In Barrett & Wilkerson, 2004] calls "assessment management systems" – not really electronic portfolios at all), or simple template-driven static websites (Batson [2002] differentiates between these static systems and dynamic, database-driven systems, where the former are "webfolios" and the latter "ePortfolios"). There are currently very few systems that are available for the individual user; and none of the current systems provide adequate mechanisms

for making explicit the relationships between the elements selected for representation in any given electronic portfolio. While institutional systems can be relatively adept at showing progress toward goals and providing mechanisms for assessment, and some proposed systems are linking in to social networking systems to expand the electronic portfolio from a primarily personal/institutional undertaking to a socially-connected identity kit (see, for instance, the innovative work of Werdmuller and Tosh's ELGG project at http://elgg.org, also reported on in Tosh & Werdmuller [2004]), there is still a gap between the personally useful and portable electronic portfolio and the institutional assessment-driven platforms that are dominating the higher-education market.

But if the electronic portfolio is viewed through an ecological lens, the function of the portfolio shifts from a mechanism to an environment. In the portfolio environment, it is possible to show the energy inputs (where the digital texts within the portfolio originated and how they were developed through the rhetorical production of the author, articulated through reflection statements or blog entries), the various forms of material cycling (via drafts and explicit acknowledgment of re-use and adaptation of earlier works), and both internal and external relationships (the latter would include both integration with social networks and interaction within communities of scholarly practice ranging from classes to institutions to fields or disciplines). The processes of reflection, assessment, or shaping a coherent research agenda take place within the portfolio ecosystem, but these become instances of rhetorical action within the

ecological structure rather than the sole motivator and delineator of the portfolio's boundaries. Circulation analysis provides methods for uncovering each of these ecological processes; the application of circulation analysis also helps to frame the portfolio itself as an ecological system rather than simply a collection of documents produced for a single rhetorical purpose.

It was during the process of developing an electronic portfolio system that included tools for visually representing the connections between the selections in a given portfolio (Eyman & Bernhardt, 2006) that I began to seriously consider the need to develop methods that could help identify those relationships (in other words, the methods that I have incorporated into my circulation analysis methodology in this dissertation). And while the system for automatically generating and visualizing those relationships within the electronic portfolio is not yet complete, the methods outlined in chapter four can nonetheless be applied to an individual electronic portfolio (by hand, as it were) in order to tease out some of the relationships that would not otherwise be explicitly represented in the construction of the portfolio.

An example of an implicit or even hidden relationship that can be uncovered via circulation analysis is the relationship between texts that are the product of distinct exegeses (such as course assignments) that have an underlying connection to each other based on the interests, position, or composing processes of the texts' producer. For the portfolio of an advanced academic, this may be (for the most part) obvious, but an undergraduate portfolio

that could make the connections between texts explicit and represent them visually, if developed over the course of the student's curriculum, could begin to show the coherence of the curriculum and also encourage students to view the relationships not only between the texts they produce but the courses in which they participate (and this scenario is also one of the motivations for developing the visual portfolio system).

While it is unavailable for adoption and use in electronic portfolios and has some significant limitations in terms of how relationships are visualized, there is a new network visualization tool available from TouchGraph.com. I've included a screen capture of TouchGraph's representation of the network formed by examining texts related to "digital rhetoric" available on Amazon.com in order to show the kind of visual mapping that could be included in a visual portfolio.

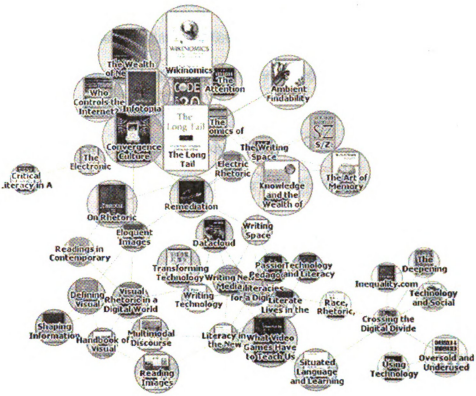


Figure 9. TouchGraph map of texts on "digital rhetoric" available at Amazon.com.

A key assumption that drives this approach to revealing connections within an individual corpus of work is that most portfolios are instantiations of what Spinuzzi and Zachary (2000) call genre ecologies: " an interrelated group of genres (artifact types and the interpretive habits that have developed around them) used to jointly mediate the activities that allow people to accomplish complex objectives" (p. 172). An individual electronic portfolio can focus on one knowledge ecosystem (which is the case when students turn in a portfolio of drafts of one essay or research project) or it may be made up of a series of

intersecting genre ecologies (exemplified by academic research and teaching portfolios). In my academic online portfolio, for instance, I provide access to copies of journal articles and book chapters I've published (or links to those that are available online), seminar papers written for courses that I've taken, my MA thesis, institutional documentation of my progress as a doctoral student, syllabi and teaching materials, and written reflections on the portfolio itself.

A good example of a genre ecology occurs in the teaching portfolio. The genres that typically show up in a teaching portfolio include the syllabus, the course assignment, the teaching philosophy statement, and often documentation of teaching effectiveness as well (e.g. peer-review reports or letters, student evaluations of teaching, etc.). These genres work together to provide a picture of both the theoretical approaches and pedagogical practices engaged in by a given teacher, and this portfolio may serve the needs of multiple audiences: the teacher herself can draw on the portfolio when developing new courses, the institution in which the teacher works can use the portfolio as a means of assessment, and external institutions can use the portfolio when evaluating the teacher's work during job search or award nomination procedures. In teaching portfolios, the connections between genres is often explicit – the syllabi reference the course materials; the teaching philosophy and reflections reference the syllabi and course materials; and the evaluations may reference statements of teaching philosophy, syllabi, *and* course materials. Because of this explicit marking of the interconnectedness of the texts that make up the portfolio, it would seem that

applying circulation analysis methods to uncover these relationships would be unnecessary; thus, while the teaching portfolio is a good example of a genre ecology, it is not the focus of my investigation for this chapter.

Mapping Relationships Between Documents and Tracing Re-Assembly

To test the usefulness of circulation analysis methods for uncovering complex (and possibly unobserved) relationships within the electronic portfolio, I have applied two main methods to my own professional/academic portfolio: content analysis via keyword distribution and full-text searches using plagiarism detection software. I have chosen to use my own portfolio for this exercise because my familiarity with the work in the portfolio provides a triangulation mechanism by which I can judge the utility of the methods I am deploying. I can also evaluate the degree to which these methods show me a picture of my own work that I might not otherwise have seen.

Before applying the search tools, I first identified and mapped the genres in the portfolio so that I could see relationships that worked both within and between the genre ecologies present in my work.

Basic Genre		Number
Coursework		
	Short Assignments/Modules	19
	Reading Responses	18
	Seminar Papers	11
	Project proposals	6
Annotated Bibliography		3
Conference Proposals		9

Table 2. Genres present in a PhD student electronic portfolio.

Book Chapters	8
Websites	5
Syllabi	5
Book Reviews	4
Teaching: Assignments & Rubrics	3
Journal Articles	2

Table 2 (con't). Genres present in a PhD student electronic portfolio.

The kinds of genres in my portfolio are, I think, typical of those found in PhD portfolios of rhetoric and writing students, although a survey of such portfolios shows a range of production which includes more multimedia work in some portfolios and a focus on print products in others (this is usually indicative of whether the PhD program sees digital rhetoric as a central or ancillary part of the curriculum). It's clear from Table 2 that the majority of work in this portfolio comes from course assignments; many of the other genres are also derived from or extensions of those course assignments as well.

For examples of applying digital methods to the digital texts in my portfolio, I am going to focus first on three particular genres: seminar papers, conference proposals, and book chapters. The exigency for each of these genres arises from the ecologies they engage – seminar papers are part of the program of coursework (and are individually part of each course ecosystem); conference proposals are one of the key mechanisms through students engage their fields and become professionalized as members of the discipline (and each conference has its own focus and thus serves as a kind of specific ecosystem as well); book chapters (and journal articles, which I will address below) are part of the archival

specific elements within each book's thematic ecosystem). Each genre engages successively larger disciplinary ecologies while simultaneously remaining grounded within the specific ecosystems for which they were created.

Seminar Papers

The seminar papers in my electronic portfolio come from a range of courses, including the history of rhetoric, contemporary rhetorical theory, advanced technical communication, theories of professional writing, methods in rhetoric and writing, composition studies, and a research colloquium. In order to see how the seminar papers from these various courses constituted a specific genre ecology, I first extracted the keywords from each paper and then compiled an aggregate keyword list; this list was then transformed into a "text cloud" as a means to visually represent the major themes and ideas circulating within this specific corpus[3]. Examining word frequency does have some drawbacks, for instance, infrequently appearing words aren't necessarily unimportant; and some concepts might not appear explicitly (like "education" or "writing"); thus it is important to pair word-frequency counts and visualizations with full-text searches as well[4].

The first 25 words with the highest frequency appearing in all of the

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[3] I used http://www.tagcrowd.com/ to generate the text clouds; although I have php code to do it myself, it was far simpler for this iteration of this project to use the freely available web-based tool instead.

[4] Because I am using my own portfolio, I can also see when these cases occur – for example, in many of the word frequency lists the word rhetoric (or a variant of it) appeared lower in the list than I had expected, most likely because the works address the idea of rhetoric implicitly rather than explicitly. This is an instance where familiarity can provide a mechanism for triangulation and help me to gauge the effectiveness of the methods I am using.

seminar papers (excluding articles, conjunctions, and prepositions) are:

information, documentation, design, research, digital
rhetoric, system, usability, online, architecture
media, practices, project, users, communication
students, composition, writing, context, scholarship
technical, narrative, rhetorical, print, cultural

and the text cloud visualization (using 75 keywords) looks like this:

Figure 10. Seminar Paper Text Cloud.

Despite the relatively disparate courses, there appears to be a general cohesion to the seminar papers – the visualization shows a strong emphasis on documentation, research, rhetoric, and design. This generally matches my expectations, although I was surprised to see "composition" and "students" less visible than I thought they might be, given that much of my work focuses on teaching with technology.

Conference Proposals

I currently have 9 conference proposals (eight of which were accepted) in my electronic portfolio. The proposals cover 7 different conferences: two proposals for the annual Computers and Writing Conference (C&W), two for the Conference on College Composition and Communication (CCCC), and one each for the American Educational Research Association (AERA), the Association of Internet Researchers conference (AoIR), the National Council of Teachers of English conference (NCTE), the Georgia Information Literacy Conference (GIL), and the Sweetland Writing Center conference on Originality, Imitation, and Plagiarism.

The first 25 words with the highest frequency appearing in all of the conference proposals (excluding articles, conjunctions, and prepositions) are:

digital, students, sources, electronic, practices
literacy, analysis, research, citation, online
writing, presentation, study, course, methods
teaching, technologies, rhetoric, teachers, communities
information, pedagogical, print, traditional, address

and here is the text cloud visualization (also using 75 keywords):

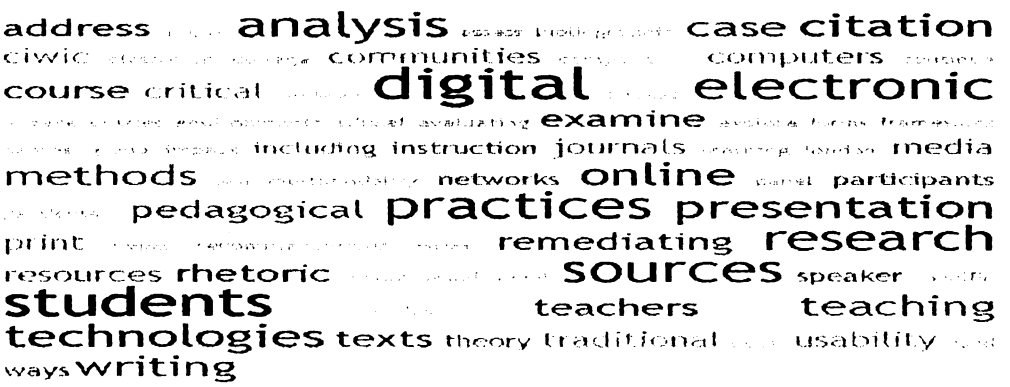

Figure 11. Conference Paper Text Cloud.

It is immediately apparent that there is a sharp distinction between my coursework and the work that I planned to present at conferences. The conference proposals certainly were more pedagogically oriented, with students, practices, electronic, sources and digital much more visible than they were in the seminar paper text cloud. The next data set, book chapters, takes yet another step away from the classroom and into the more formal arena of disciplinary communication.

Book Chapters

The eight chapters in my portfolio (seven are published; one is in-press) appear to cover a much broader range of subjects and themes than the conference proposals or seminar papers examined above. The chapters deal with how one engages in the field of computers and writing; the importance of developing research networks for work in digital rhetoric; how usability might be reconfigured as a research method in rhetoric and writing; teaching writing with technology; the role of technology in the practices of revision; a case study on the digital literacies of advanced undergraduates; researching the virtual workplace; and developing new methods for assessing the value and authority of digital texts. Each one addresses a facet of digital rhetoric, but the specific arenas engaged are fairly wide ranging.

The first 25 words with the highest frequency appearing in all of the book

chapters (excluding articles, conjunctions, and prepositions) are:

students, writing, research, digital, computer
texts, technology, electronic,literacy, community
course, practices, journal, print, process
online, social, citation, hypertext, revision

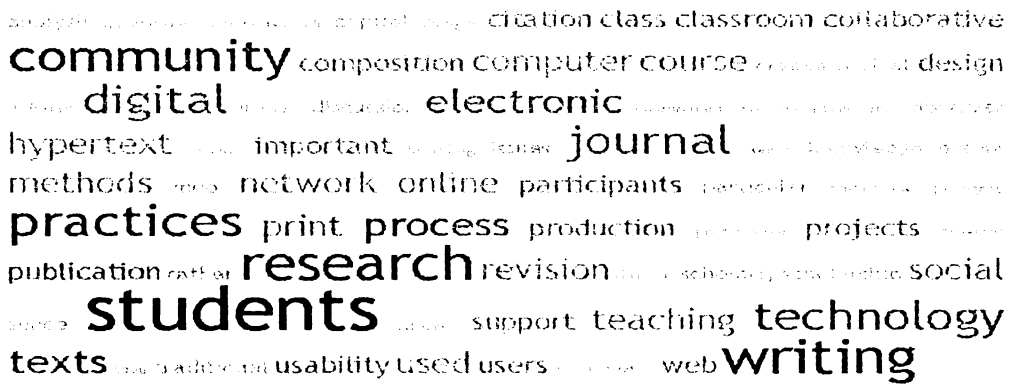

Figure 12. Book chapter text cloud.

The connections between the book chapters show yet another series of main topics, although in this case, like the conference proposals, "students" is again a central term, as are research and practices, with community and writing adding further dimensions that are not as apparent in the previous two genre ecologies.

Of course, considering each of these genres separately yields an incomplete picture of the connections that can be drawn – many of the seminar papers were the first drafts of book chapters or served as topics that were developed into conference proposals (and in some cases, the work presented in the proposals was designed to report on and promote the book chapters as well). In order to see cross-genre connections, I created a text cloud that was derived

from the combined text of all of the works used for the preceding three examples:

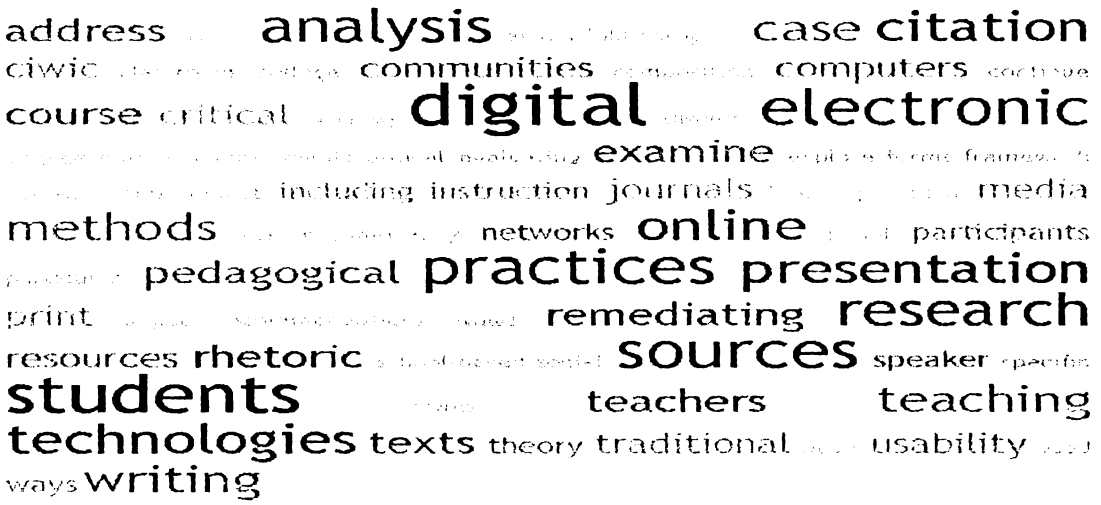

Figure 13. Text cloud of seminar papers, proposals, and book chapters.

In this case, the different areas combine to provide a more complete (and arguably more coherent) view of my research and scholarship to date. Interestingly, this view most closely reflects the text cloud of the conference proposals (despite the fact that the proposals are considerably shorter and carry fewer keywords than do the other genres). Again, students and pedagogy are foregrounded, as is an interest in the digital, focusing on practices, research methods, electronic sources and their analysis, and citation. It is clear from this view, however, that although I consider myself a rhetorician, I am not explicitly engaging rhetoric to the degree that perhaps I should (it figures less prominently than "technologies" even though most of my work is not interested in

technologies as instrumental, but rather as tools for engaging and applying rhetoric).

While this application of keyword analysis can help make explicit the thematic connections evident within the overall collection of work, the full-text search tools appear to be the most useful for looking at connections across genres in ways that highlight re-use, re-mix, and re-assembly. As an example, if I select my master's thesis as a starting point and compare not just keywords but the full texts of the works in the portfolio, I can see the ways in which the earlier work that I have done has filtered through and influenced my later work (sometimes through self-citation and other times through self-appropriation):

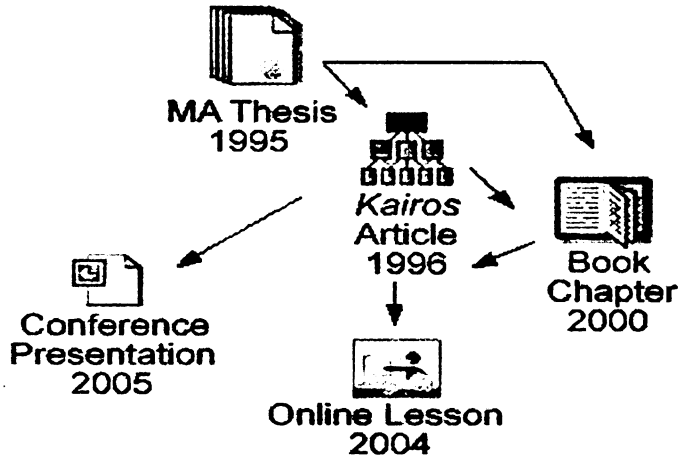

Figure 14. Circulation over time through re-use and self-appropriation.

Using full-text analysis tools, I can see that the theory I built upon in my MA thesis (1995) found its way into my first peer-reviewed journal article (1996) and that both that articulation of theory (as reconfigured in the article) and the

pedagogical applications I discussed in my thesis recombined as the core of my first contribution to an edited collection (2000). Both the journal article and book chapter informed an online course assignment I developed in a "Teaching with Technology" course that I took my first semester as a graduate student (Fall, 2004). These three examples of works derived from my thesis all cover the same general theoretical and pedagogical ground; however, I found that I had also appropriated a few key theoretical elements from the 1996 journal article to support arguments I made about student authorship and plagiarism at the Sweetland Writing Center conference on Originality, Imitation, and Plagiarism in 2005 (but this appropriation did not filter into the conference proposal, which is one of the proposals in my electronic portfolio.)

Moving from Local to Global Connections

In the previous section, I outlined the methods that could be used to help uncover and map the relationships between digital texts within an electronic portfolio. However, the portfolio is also itself part of a larger ecosystem, and it is as a smaller part of a larger system that the methods of circulation analysis can help to show not only the internal relationships but also the connections that may be made to external sources as well. Again taking up the example of my professional/academic portfolio, I apply the general search and backlinking methods to see what connections have been made *to* the work in my electronic portfolio (as opposed to the internal connections *within* it).

Not surprisingly, there are very few links to the work in my portfolio: there are several self-promotional links (i.e. I placed the links in various profiles and directories), several links from blogs (mostly related to interactions with the blog authors at conferences), and links to three specific works within the portfolio from the EServer TC Library ("a cooperative library for tech communicators," http://tc.eserver.org/). So while the portfolio itself does have connections to a larger network, those connections are tenuous at best. However, one of the works that is part of my electronic portfolio is also the first peer-reviewed article I published; and because it was published online (in *Kairos: A Journal of Teachers of Webbed Environments* 1.2 – before I joined the editorial staff the following year) instead of including a copy in the portfolio, I simply link to it. In this case (as with other works that are available on the web and are included in my portfolio via linking), I am explicitly crossing the boundary between the individual electronic portfolio and the larger disciplinary ecologies of publication.

Using the search, backlink, and fulltext methods described in chapter 4, I discovered 33 links back to this 1996 article. Some of the connections I uncovered were somewhat surprising (I describe those in the methodological reflections below), but there are two results that are illustrative of the kinds of detail that these methods can provide: digital work is global, and digital work is always in circulation; that is, it is always current each time it is found by another reader/user.

Looking at the links and references to the article I published in *Kairos* in

1996, I was encouraged to see that it had been linked to as often as it had (I did not expect a high degree of citation for my initial foray into academic publication). But it also immediately struck me that many of those links originated in other countries (based on the country code or server location as determined through traceroute and whois) and several were in languages other than English: 27 of the pages with links back to my work are in English, 2 are in Spanish, and 1 each are in German, French, Bulgarian, and Icelandic. The English language pages, moreover, were housed not only in the US and Canada, but also in Brazil, Spain, and Belgium. While language does not correlate to locale, taken together, the multiple languages and network infrastructure locations point to a decidedly global reach for digital texts.

I also plotted the number of links over time, and found that there was not, as I had expected, an initial (relatively) high number of links that tapered off over time as the work lost its sense of immediacy. In fact, there was not a clear pattern of links or references over time, but there was certainly a steady number of links, with dips and surges apparently at random:

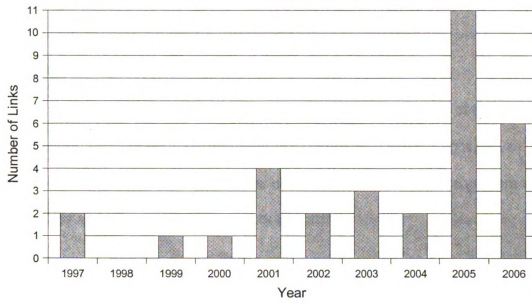

Figure 15. Links over time for Eyman, 1996.

This general lack of a pattern over time has been consistent for all of the online texts I've evaluated using circulation analysis methods, leading me to suggest that digital texts are essentially timeless for the duration of their existence within digital networks—these texts are, until they are lost or deleted, effectively always in circulation. And even after a digital text is removed from the network, traces and links often remain (and there may well be an archived copy at http://archive.org as well). The implications of this always-in-circulation characteristic of digital texts, when considered with regard to the construction of electronic portfolios, would seem to require portfolio publishers to make careful considerations of whether they want their work available indefinitely or only as, in

effect, a time-bound snapshot.

Methodological Reflections

In the final sections of this chapter, I address the outcomes of the experiment in terms of how the methods of circulation analysis might prove valuable in other contexts, based on my observations while deploying them as a way to study and situate my own electronic portfolio.

Rhetorical Value and Economic Value

One of the reference forms identified in the previous chapter as the "propagated link" first appeared when I began looking at backlinks to the *Kairos* article I linked to from within my electronic portfolio. I was at first unsure what these links were or where they were coming from – there were 174 identical links pointing back to my work, but they were coming from pages that simply listed links to many seemingly unrelated websites, along with a series of advertisements. As it turns out, this is not a particularly new phenomenon: these pages are called "scraper sites" (because they use automated bots to "scrape" the content of websites and use that content to build their own link pages) – "scraper sites" are an offshoot of link farms, which were originally part of a system of search engine optimization designed to improve a website's placement in search engine rankings. Zoltán Gyöngyi and Hector Garcia-Molina (2005) provide an overview of the different ways that website producers can "game" the

search engine ranking system; they use the term spamming or spamdexing "to refer to any deliberate human action that is meant to trigger an unjustifiably favorable relevance or importance for some web page, considering the page's true value" (p. 2). Spammers typically attempt to manipulate the page rank algorithms by creating links that that search systems believe have value, regardless of whether there is any actual use for the humans who use those search engines.

Gyöngyi and Garcia-Molina note that

> the most wide-spread method for creating a massive number of outgoing links is *directory cloning*: One can find on the World Wide Web a number of directory sites, some larger and better known (e.g., the DMOZ Open Directory, dmoz.org, or the Yahoo! Directory, dir.yahoo.com), some others smaller and less famous (e.g., the Librarian's Index to the Internet, lii.org). These directories organize web content around topics and subtopics, and list relevant sites for each. Spammers then often simply replicate some or all of the pages of a directory, and thus create massive outgoinglink structures quickly. (p. 5)

And this is precisely the case in the "propagated" links I found – the references to my work were coming from a replication of a page from the DMOZ Open directory. The activities of spammers who attempt to game the search engine algorithms has the unfortunate side effect of complicating the search and backlink methods employed for circulation analysis: in order to achieve the most

complete picture of circulation value, it's important to filter the spamdexing results.

But it also leads to an important distinction – some links and references have clear rhetorical value: they are used in particular ways to support arguments or to connect the author to a particular discourse community (for discussions of the rhetorical applications of citation, see Cozzens, 1989, Connors, 1999, and Rose, 1999; for a taxonomy of rhetorical uses of citation and reference, see Robillard, 2006). Other links, however, such as those that are created in order to drive traffic to particular websites, have an economic value that is not tied to a particular rhetorical act. The links that have economic (as opposed to rhetorical) value tend to be produced by nonhuman actors, and they are designed to ultimately provide material profit for those who deploy them (thus, there is no accrual of social value here, only an attempt to gain material capital).

Circulation Analysis as Research Tool

The other outcome of this initial application of circulation analysis is the development of an ancillary use: not only can circulation analysis help trace the movement and use of digital texts, but it can also serve as a research tool as well. Examining the connections being made to my work helped me to see how others are approaching similar theoretical questions or developing similar pedagogical applications, and following the other works that they cited or linked

to, I was able to tap into citation networks that could help me with my own research agenda. Moreover, when using the full-text search tools, I found both an instance of outright plagiarism of my work (but recontextualized as part of what appears to be a seminar paper on "Hypertext and Theological Reflection") and an instance of a scholar who drew on the work of the same theorists that I used and came to nearly identical conclusions, but who had not likely been aware of my work in the area (there was no identical text used, unlike the plagiarized case above, and the context was sufficiently different enough that I don't believe this to be a case of non-attribution); in the latter case, the reference list included many sources that I was using myself, but it also included several sources with which I was not familiar, prompting me to expand the bibliographic network associated with that facet of my scholarship.

Applying circulation analysis methods to my electronic portfolio yielded some interesting results:

- I was able to see (through the text cloud visualizations) an internal consistency to my overall corpus of work; this is particularly useful as, on the surface, my research profile does not appear to be as focused as it actually is. Using this technique helps to show the coherence of my professional work (which will certainly be useful for tenure and promotion as well).
- When organizing the relationships based on coursework, I could also see the coherence of the graduate curriculum (taken together, a circulation

analysis of all student portfolios in a given program could show the strengths and gaps that arise from the application of the program's curriculum.

- I could see the ways in which I re-used and revised texts between and among different genres, and I could also see "orphaned" works that I had not re-used as I could have. I have marked these works as areas of interest that I should return to in order to not abandon promising lines of research and scholarship.

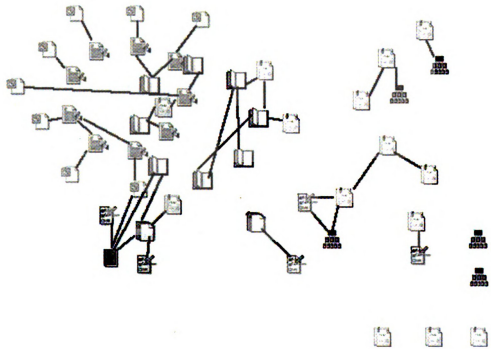

Figure 16. Explicit relationships between digital texts in an electronic portfolio. The gaps between projects are clearly visible, as are the "orphaned" works in the lower right-hand corner. This represents a different view from the generally more coherent text cloud visualization. Both forms of analysis are required in order to avoid seeing the portfolio ecosystem as either overly coherent or overly disaggregated.

- Examining the links into the portfolio, and those provided by incorporating my online publications into the portfolio ecosystem has lead me to discover both resources (texts and software tools) and people who are interested in the same areas of interest.
- Taking an ecological view helps me to see the connectedness of my work both internally and externally; if I had seen significant disconnectedness (which I might not have otherwise noticed) I could then have taken steps to correct the problem.

Using circulation analysis helps to show the ecology of work that arises from a specific curriculum, but it also helps to situate that work both institutionally and in the wider ecosystems of field and discipline by showing both internal and external relationships.

Shifting from Micro-Ecologies to Macro Ecologies

In the next chapter, I apply circulation analysis methods to examine the circulation of digital academic texts that have been published in peer-reviewed electronic journals. While the primary view of circulation examined in this chapter was one of a bounded, homogeneous ecology of textual ecosystems, the next chapter will widen the scope and scale of the works under investigation; the following chapter also provides a more detailed description of how the search and link analysis tools are used.

Chapter 6: Circulation Analysis and Online Scholarship

As in the previous chapter, the case study presented here is designed to show the kinds of information that can be uncovered through the use of circulation analysis. In short, circulation analysis provides a richer view of how texts interact than rhetorical analysis alone can provide—but it is best used in conjunction with other methods of rhetorical analysis, otherwise it risks being interpreted as a purely quantitative approach. However, if circulation is understood as important to a theory of digital rhetoric (as I argue in chapter two), then this form of analysis, while seemingly concerned with hard data (as opposed to qualitative analysis) is in fact a form of rhetorical study. Unlike traditional rhetorical analyses, which can use textual analysis to provide an assessment of a text's argument, studies of texts-in-action (such as Spinuzzi's genre tracing method) to see how texts perform in particular contexts, or studies of the impact of texts on a particular rhetorical situation, circulation analysis seeks to identify the larger contexts in which digital texts circulate and situate them within an ecological framework in order to better understand both intended and unintended effects of specific rhetorical objects' interrelationships with other texts.

The study in this chapter is not intended to be a complete research project in its own right; rather it is an example of a prototyping process that shows how circulation analysis can be used as an inductive method to help develop hypotheses about why certain kinds of texts circulate the way they do, what their

ecological positions are, how they interact with other genres and ecosystems, and what that might mean about the economics of digital circulation in these particular cases. Once effective tools have been developed to help ease the labor-intensiveness of the process, I will undertake a follow-up study that looks at a much larger sample of digital texts that can help to provide support for the hypotheses established here—and if a sufficiently large data set is analyzed, it may be possible to generalize trends and correlations from the outcome. But for this initial approach to the study, which investigates the circulation of online scholarship with a particular focus on the relationship between genre and degree of remediation to the overall circulation patterns of electronically-published scholarly texts, the circulation analysis methods described in chapter four are deployed as part of a heuristic process that aims to develop hypotheses rather than test them.

Electronic Publication and Online Scholarship

My interest in digital circulation was initiated by what I originally thought would be a fairly straightforward approach to answering a research question about the impact of online journals in the field of rhetoric/composition—or, to be more precise, the impact of the journal of which I was co-editor (*Kairos: Rhetoric, Technology, Pedagogy,* http://kairos.technorhetoric.net/). I had some anecdotal evidence that work in the journal was being cited in print journals and in conference presentations and dissertations; however, I did not have any

empirical data that I could use to assess to what degree the journal was being cited and how we might be able to situate it in ways to encourage further use. The first study that I conducted (with co-researcher Colleen Reilly) examined how often works published in online journals were being cited in the major print journals in the field (Eyman & Reilly, in-press). The results of this study were disappointing: despite the enthusiasm and interest people claimed to have for the journal, it was rarely cited – at least in terms of formal citations in print journals. Our study was expanded to look at the citation of any kind of online text, and we found that there were very few overall citations of online work of any kind (moreover, the most common use of online texts was as examples illustrating a point, rather than a citation of the arguments made by those texts).

Following our investigation of citation in print journals, we decided to examine whether the works in *Kairos* were more likely to be cited or linked to from other online texts. Unsurprisingly, we found a great deal more connection to the journal and its articles online than we saw in print. But we also noticed that works that operated farthest from established genre conventions for scholarship – new media texts – were the least cited; and when they were cited, they were more often presented as examples of new media scholarship per se rather than directly referencing any of the arguments made in them. We devised a rubric for delineating webtexts as falling along a continuum of genre accessibility: using Bolter and Grusin's (1999) theory of remediation, we determined to what degree texts were transparent (trying to appear like a traditional print-based genre) or

hypermediated (engaging the affordances of digital media as fully as possible, even if that meant a break from any immediately recognizable genre); this rubric is provided in Appendix A. We applied this rubric to the online works that were cited in the print journals and found that the farther from a known genre a work was, the less likely it was to be cited. We did not, however, continue our study to examine if the same outcome would be evident in online linking patterns – primarily because we did not have appropriate methods for such an investigation.

Applying circulation analysis provides a method for examining the linking patterns and use relationships (quotation, citation, and appropriation) of these online publications; additionally, circulation analysis is not limited to formal citations (as is the bibliometric approach to questions of value and use for publications) – these tools find *all* the connections, regardless of how formal or informal they are, thus providing a much fuller picture of how these texts are engaged (a secondary effect is that it is possible to see how previously dismissed genres, like academic blogs, are providing more rhetorically sophisticated avenues of circulation for these texts than they enjoy in more traditional genres, a point I'll return to below).

In the following examples, I apply circulation methods to four works that have been published in established, well regarded peer-reviewed online journals. Each work represents one of the main points on the remediation continuum: highly transparent, moderately transparent, moderately hypermediated, or highly hypermediated. I was originally going to select works only from journals that are

in the discipline of rhetoric/composition (specifically the subfield of computers and writing), but none of the established online journals in this field publish highly transparent digital texts (the print journals do make digital versions available, but I am specifically examining how digital-native texts work, not the mechanisms or outcomes of print-to-digital transformation). Thus the highly transparent example comes from an established, long-standing peer-reviewed online journal in communication studies; the particular article I have chosen also addresses issues that are disciplinarily close to those taken up by the field of computers and writing.

The journals from which I chose the texts for analysis are *Kairos: Rhetoric, Technology, and Pedagogy*, *Computers and Composition Online* (*CCO*), and the *Journal of Computer-Mediated Communication* (*JCMC*). These are all established, well-regarded journals in their fields: *JCMC* was started in 1995, and *Kairos* and *Computers and Composition Online* were launched in 1996 (although the *Computers and Composition Online* archive currently only goes back to 2000). Unlike *JCMC* and *Kairos*, *Computers and Composition Online* is a companion site to a print journal (which may be why the texts published in *CCO* tend to be less radically hypermediated than those published in *Kairos*).

When selecting the initial texts for the circulation analyses, I chose works that were published close to or after the mid-point of each journal's career, which landed in 2002 for two of the journals and 2004 for the third. If a selection was published too long ago, it seemed likely that there would be fewer overall

citations because the web itself is relatively new, and the weight of tradition would work against pioneering scholarship; conversely, a very-recently published work may be more accepted as multimedia and multimodal texts become more mainstream, but less time of exposure would similarly lead to fewer links and citations.

I also wanted to begin with a sense of the quality of the works (presumably, works that had been judged as high-quality or exceptional above and beyond the peer-review process would be more likely to be cited and used); thus, with the exception of the first example (highly transparent), each of the three remaining digital texts were winners of the *Kairos* Best Academic Webtext Award: Joyce Walker's "Textural Textuality" was the 2001-2002 winner, Anne Wysocki's "A Bookling Monument" was the 2002-2003 winner, and Michael J. Cripps's "Hypertext Theory and WebDev in the Composition Classroom" was the 2004-2005 winner. Although Lapadat's article in *JCMC* has not been the recipient of an award, it fits with the overall disciplinary discourses presented in the range of examples (and the number of citations and links to it is certainly high enough to indicate that the work is of sufficient quality for inclusion in this study).

For each of the following examples, I provide a brief overview of the work, followed by a discussion of how that work fits into its place on the remediation continuum. The results of the data collection are presented as a formalized table listing the features of the digital text (these features are important to the subsequent discussion, so I provide them in full rather than relegating this

information to an appendix), followed by a report on the three main areas of investigation: formal and informal citations retrieved through web searches and use of scholar.google.com; sitations (back-links); and quotation or appropriation that has neither reference nor link. After the report of the data findings I present a network analysis map that provides a visual representation of the links to each example text. Finally a discussion of the findings and possible explanatory hypotheses concludes each example application.

Example 1: Highly Transparent

Judith Lapadat's "Written Interaction: A Key Component in Online Learning" was published in the *Journal of Computer-Mediated Communication* in 2002. Lapadat's article was clearly rendered into HTML by exporting from a Microsoft Word document (although the code was subsequently cleaned up to remove most of the proprietary tags generated by Microsoft's non-standards-compliant markup). Other than the links provided for navigating the journal itself, this text features no external links and no images, audio, video, or interactive elements. The text is black on a white background, and it can be printed out and easily approached as a traditional print article (the journal in which it is published is online-only, so user-initiated printing is the only way to get a print version).

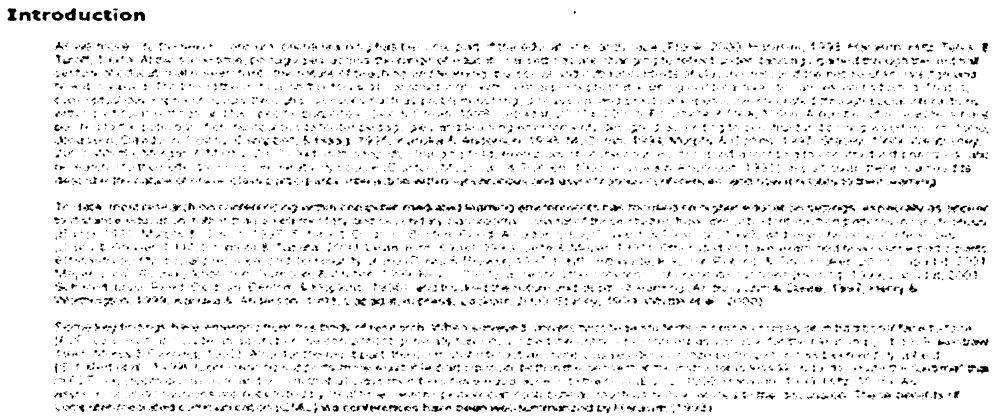

Figure 17. Screen Capture of Lapadat, 2002.

In her article, Lapadat argues that " the interactive textual environment of asynchronous online conferences is particularly facilitative of both social and cognitive construction of meaning" because "the nature of online interactive writing itself, in an appropriately designed conference, supports meaning-making" (2002). The article provides a literature review followed by a discussion of the differences between synchronous and asynchronous communication for writing in online courses, using a few brief examples contrasting a graduate students' discussion in F2F and online situations. Lapadat concludes that "online written contributions have some of the characteristics of spoken language, in that they are interactive, relatively informal, personalized, and audience-aware, with synchronous messages being more speech-like and asynchronous messages being more formal and conventional." The article is a rhetorical argument (as opposed to an empirical study), and in that respect it also fits well within the disciplinary discourses typically invoked in rhetoric/composition and computers

and writing publications.

The following table reports on the formal features of the digital text; of interest is the fact that this article includes keyword meta-data (although no other formal meta-data is provided), and that this digital text is composed of only one web page.

Title	Written Interaction: A Key Component in Online Learning
Author	Lapadat, Judith C.
Year	2002
Status	Published - Online Peer-Reviewed Journal
Venue	*Journal of Computer-Mediated Communication* 7.4
URL	http://jcmc.indiana.edu/vol7/issue4/lapadat.html
Format	Webtext; highly transparent (exported to HTML from a Microsoft Word file)
DTD	HTML 4.0 Transitional
Modified	Wednesday, December 22, 2004
Pages	1
Words	6666 (excluding references and navigation)
Internal Links	2 (to footnotes; same page)
External Links	17 (all in references; none in-text)
References	57 total: 40 print, 17 electronic
Metadata – Keywords	political communication, email, legislative email, Internet career sites, job sites, Egypt, early adopters, innovation, distance education, e-learning, mass customization, fashion, apparel, clothing

Table 3. Formal Qualities of Lapadat, 2002.

For each essay in this chapter, I use four distinct search applications to record all of the citations, sitations, and references to each article. However, I don't simply record the number of "hits" because that is not a very useful metric for two reasons: it cannot show the relationships represented by the links, and it includes false positives—such as propagated links—that need to be identified and removed. Instead, I examine each reference, and evaluate it for form of reference, degree of engagement, and genre. (See chapter four for a discussion of the methods employed in these assessments). In the process of evaluation, I can eliminate false-positives and duplicates. For this work (Lapadat, 2002), I recorded 84 distinct search results, and 43 citations from scholar.google.com, of which 11 were not already recorded via the web search. There were also 2 backlinks to the article that were not found by other search methods. The full-text search (using mydropbox.com and copyscape.com's premium search feature) yielded no results; thus indicating that while there are many sources that quote or cite "Written Interaction," there are no publicly-available instances of appropriation or plagiarism of the work.

Originally published in 2002, Lapadat's article has enjoyed a relatively high number of links from 2003-2006 (for an academic essay published in an online journal in the humanities – see Eyman and Reilly [in-press] for more on this metric). The data for the first six months of 2007 indicate a similar number of links and references will be made this year as well.

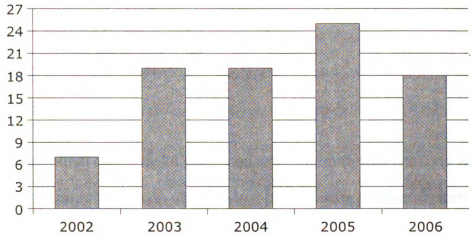

Figure 18. Links per year for Lapadat, 2002.

Lapadat's work is the only one of the four examples in this chapter that is referenced in languages other than English: 3 references are in Italian and 3 in German, 2 in Finnish, 2 in Spanish, 1 in Portuguese, and 1 in Japanese[5].

Six types of links or references occurred in the data set for this article. By far the largest number were formal citations, where the work was referenced in the text (used as an example, paraphrased, or quoted) with a separate full bibliographic entry appearing at the same source. The next most common were bibliographic links (providing full bibliographic reference but not used within the source), informal citations (providing name and title, but no other reference information), annotated links (providing a link to Lapadat's article and either a user-supplied annotation or a copy of the abstract), and a few "simple" links – simply the title or URL listed in among many others:

[5] When assessing the form of reference and degree of engagement, the Japanese reference is the only one that remained inaccessible to me because of a language barrier.

Forms of link or reference

formal citation	53
bibliographic link	15
informal citation	10
annotated	6
simple	5

Of the formal citations, 24 instances were parenthetical citations without quotation or paraphrase, using either in-text parentheses or notation format. An example of in-text parenthetical references of this type can be found in Sorensen and Murchu (2006):

> Furthermore, both email web-based conferencing interactions, which are essential to web-based learning, are not direct forms of interaction but are considered mediated transactions (Harasim, 1993; Lapadat, 2002).

And an example of the notation format appears in Stahl (2004), where note 21 points to the bibliographic record for Lapadat (2002),

> While asynchronous is considered a more thoughtful, reflective mode for knowledge building [21], synchronous communication can be much more time-efficient for intense interaction, such as brainstorming or working out details of a drawing--assuming that the participants can get together online at the same time.

Thirteen of the formal citations were single paraphrases or quotations and 9 utilized two or more paraphrases or direct quotations, while 5 of the formal references exhibited both single quotations and parenthetical references similar to those described above. Only 2 sources that formally cited "Written Interaction"

engaged in direct responses or arguments specifically with Lapadat's arguments (I code these as "dialogic" references), one is a response paper posted to the "reader's forum" attached to an online journal and the other is a blog posting.

The works citing or linking to Lapadat comprise 26 different genres, ranging from peer-reviewed print journal articles to blogs, social bookmarking sites, archived listserv email and even one conference presentation *proposal*. The top four genres using Lapadat's work are peer-reviewed print journals (16), bibliographies (14), conference proceedings (10), and peer-reviewed online journals (9). Other genres included PhD dissertations, blogs, whitepapers, and course syllabi.

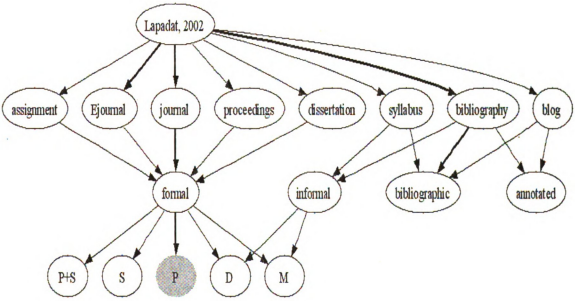

Figure 19. Genres, link types, and engagement levels for Lapadat, 2002.

As we can see from the organization of the nodes in Figure 19 (above), Lapadat's work is primarily taken up in formalized genres and attributed in very formalized ways. But in those formal genres, her work is overwhelmingly used as a background reference (often one of many) to support general arguments about the benefits of asynchronous communication rather than being drawn on directly either in support of arguments or as a counter-argument and rarely is it the focus of the work citing it. This may be attributed to the disciplinary conventions of the works that cite Lapadat, which come from education and communications (more social-science oriented fields that rely less on direct quotation or paraphrase than is common in the humanities; this would also account for the high number of formal citations within conference proceedings, which is also an uncommon genre for humanities-based fields).

While researching this text, I found some odd circulation mechanisms as well. For instance, one bibliographic site worked as an aggregator of information; thus the reference to Lapadat's work was the result of an automated search engine that collected the information from another bibliographic site (the aggregator site helpfully lists where its information comes from). A similar software-agent driven system presented an annotation of the work as part of an automatically generated profile site. According to the site (www.zoominfo.com),

> This profile was automatically generated using 5 references found on the Internet. This information has not been verified. ZoomInfo continually

> scans millions of corporate websites, press releases, electronic news services, SEC filings and other public online sources. From these websites ZoomInfo automatically compiles a person's profile, which focuses on their professional achievements and background. All of the information you see in a ZoomInfo profile was originally found on a public web document.

There were also two instances of appropriation[6] that were not discovered by the full-text search because the mechanisms were not visible to those search tools. In one case, an enterprising individual had placed a copy of the entire article into a database from which it can be selected – but the article that is returned is a text-based copy with minimal bibliographic information and no indication that the original is freely available on the web (that is, no URL is attached to the document)[7]. The other instance is one of appearance rather than possession – there is an annotated bibliography in which Lapadat's article is listed, but the link attached to that annotated entry requires a password to follow (even though it is the link to the published version in *JCMC*)[8]; this gives the impression that the work is not freely-available and that it is in possession of the institution where the bibliography resides. In each case, the ease with which online texts can be copied and appropriated may have a detrimental effect on the economics of this work's circulation, either by making it difficult to acknowledge the original publication's source or by making the information about authorship

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[6] Appropriation takes place when the original text is removed from its original context and used for purposes that specifically serve the needs of the appropriator; in most cases, appropriation also elides attribution as a secondary effect.

[7] See http://168.144.129.112/ – use "interaction" as the search term; Lapadat's work is the last one in the search results list.

[8] See http://edtech.boisestate.edu/eresearch/stash/default.asp

and publication appear to be unavailable (that is, individuals who find the appropriated version may not realize that it exists in a more authoritative form elsewhere).

By formal bibliometric standards, Lapadat's article is not cited as often as print journal articles published in peer-reviewed journals in the same field. However, in terms of both formal and informal citation, Lapadat's work enjoys a much higher degree of circulation than many other online publications in the humanities (indeed, there are far more references and links than any other article examined in this chapter). When compared to the other texts in this chapter, there are three distinct differences that may account for the higher circulation rate for this article (particularly in formal genres). The first and most obvious difference is that this work is part of a different disciplinary ecology than are the the other three examples – *JCMC* is a journal in the field of communication studies rather than rhetoric/composition. Communication studies has a longer history of accepting online publication: witness *JCMC*'s inclusion in the ISI citation databases – only about 25% of any given fields *print* journals are cataloged and included there, so there must have been strong arguments for inclusion put forth by the field itself. Webometrics researcher Han Woo Park (2004) also notes *that* JCMC "is widely referenced" and "has managed to remain exclusively online without compromising its scholarly nature" (online). The second reason that it is more often cited is likely that it follows traditional genre expectations for scholarly work – in other words, the fact that it is highly

transparent equates to a higher degree of acceptance and use (I'll return to this point when we look at all four of the examples together). The final reason is not immediately apparent until one looks "under the hood" so to speak: this is the only online scholarly publication of the four examples in this chapter that provides metadata (keywords and bibliographic information) in the html coded header of the document itself. Metadata is important because it makes online resources easier to find: search engines use this information to provide more relevant search results, and, I suspect, a higher degree of "findability" translates into a higher instance of citation and use.

Example 2: Moderately Transparent

Michael J. Cripps's webtext, "#FFFFFF, #000000, & #808080: Hypertext Theory and WebDev in the Composition Classroom" won the 2004-2005 *Kairos* Best Webtext Award. The webtext is aesthetically engaging, employing color-based markers to indicate where in the relatively complex hypertext the reader is. Despite this use of color and extensive internal linking, this article follows genre conventions of scholarly articles in the humanities and presents a series of pages that are primarily textual (and while the hypertext structure includes many lexia, it is generally hierarchical—although not linear--and thus easy to navigate). The use of color/design and the hypertext structure move this work from highly transparent to moderately transparent. The user can't print out the whole article at once, but each lexia could be printed and collated with no loss of meaning.

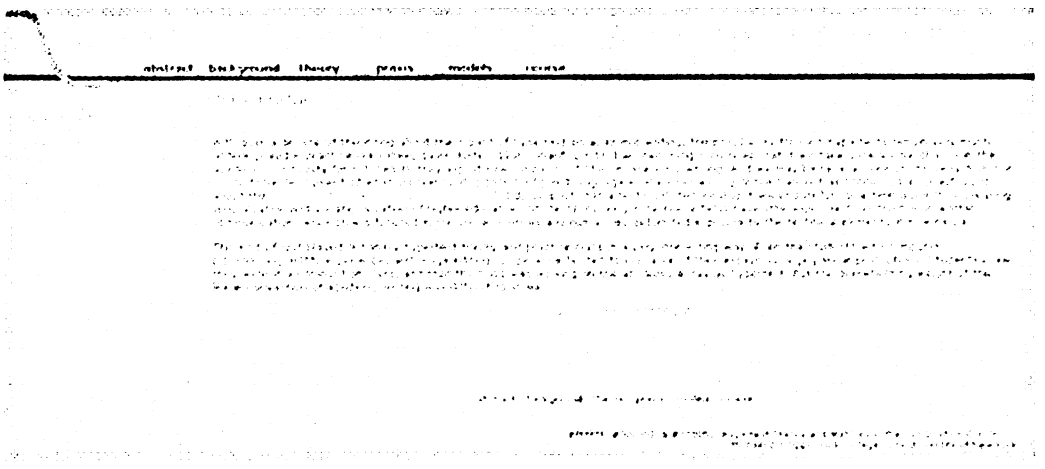

Figure 20. Screen Capture of Cripps, 2004.

This article reports on a a "Hypertext Theory and Practice" course taught at Rutgers University from 2001-2003. Students in the course "read hypertext theory, learned about web development, and attempted to build elements of theory into their academic essays" (Cripps, 2004). The main sections of the article present the background information about the development of the course, a section on hypertext and visual rhetoric theory, a discussion of the successful and unsuccessful pedagogical practices enacted in the course, a series of student models that illustrate the theory and praxis discussions, and a collection of the course materials. I would classify this work as teacher-research, which is a very common genre for work published in rhetoric/composition and computers and writing journals.

The following table details the formal features of the digital text; of note is the extensive internal linking, with 78 links across 34 pages, while there are very

few external links. Similarly, the references used in this webtext are primarily print references. No meta-data is provided with this article.

Title	#FFFFFF, #000000, & #808080: Hypertext Theory and WebDev in the Composition Classroom
Author	Cripps, Michael J.
Year	2004
Status	Published - Online Peer-Reviewed Journal
Venue	*Computers and Composition Online* Spring
URL	http://www.bgsu.edu/cconline/cripps/
Format	Webtext; moderately transparent
DTD	HTML 4.0 Transitional
Modified	Thursday, May 06, 2004
Pages	34
Words	9571 (excluding references and navigation)
Internal Links	78
External Links	4 (3 in references; 1 in-text)
References	18 total: 14 print, 4 electronic
Metadata	No metadata available

Table 4. Formal Qualities of Cripps, 2004.

Using standard web searches, I recorded 15 distinct references to this article. There were 2 citations from scholar.google.com, 1 of which was not already recorded via the web search. There were also 2 backlinks to the article that were not found by other search methods. The full-text search (using

mydropbox.com and copyscape.com's premium search feature) found one link that was not discovered using any other method, and it also uncovered one use of an identical quotation (from Jay David Bolter) and one individual whose research interests appear similar to those expressed by Cripps in this essay.

Originally published in 2004, Cripps's article has garnered few links, despite being an award-winning article; however, the number of links over time is consistent with all of the example cases in this chapter with the exception of the highly transparent article by Lapadat.

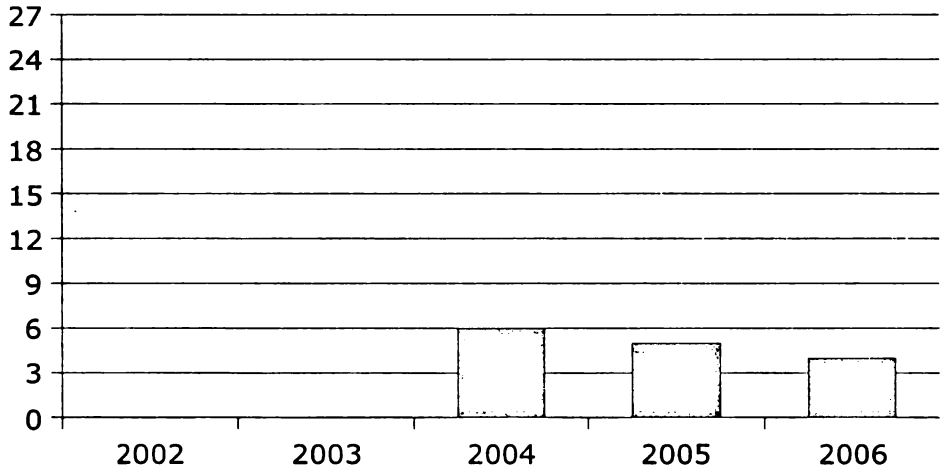

Figure 21. Links per year for Cripps, 2004.

Only four types of link or reference occurred in the data set for Cripps's essay; the largest number were informal citations, providing name and article title with the link. Four references were embedded links – that is, the actual URL is hidden behind a textual link that is either part of a sentence (deeply embedded) or in a list of links (shallowly embedded). For example, Deanya Lattimore (2004)

notes in her blog that she is "reading the new Michael J. Cripps essay at Computers and Composition Online this morning...." In this case, the URL to the actual article is hidden behind the phrase "Michael J. Cripps essay." There was also one annotated link and one formal citation for this work:

Forms of link or reference	
informal citation	10
embedded link	4
formal citation	1
annotated	1

Of these references, the one formal citation was a parenthetical citation without quotation or paraphrase, but two of the references represented in the embedded links were dialogic interactions with the arguments and functions of the text (both were in blogs).

The works citing or linking to "Hypertext Theory" are made up of 7 different genres, with the most prominent being the course syllabus (8 instances). The other genres were blogs (3), and one each of the following: unpublished essay, newsletter, bibliography, PhD dissertation proposal, and the awards list from *Kairos*.

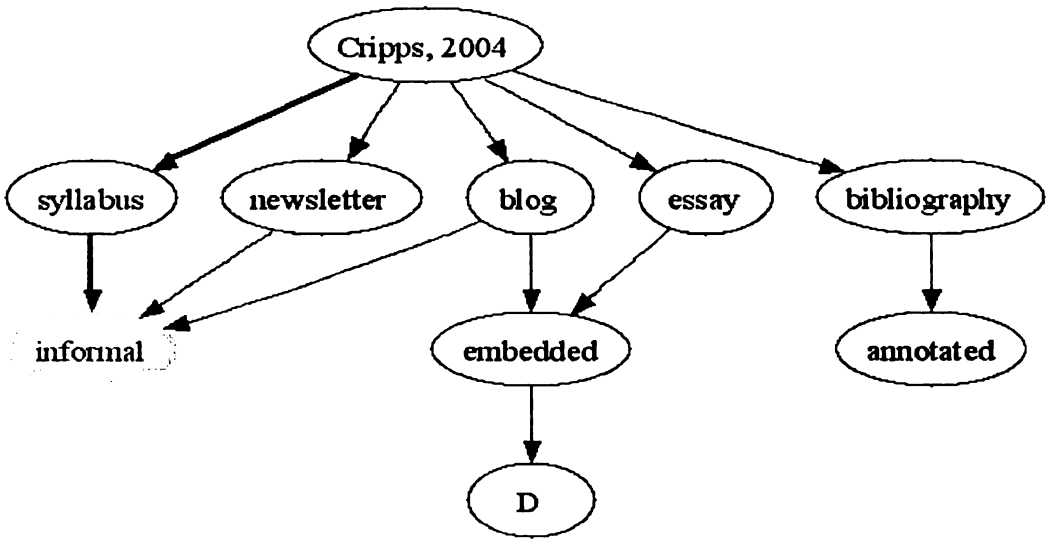

Figure 22. Genres, link types, and engagement levels for Cripps, 2004.

So why is this text, an award-winning example of hypertext scholarship, so rarely cited and referenced? First, Cripps's work, unlike Lapadat's, is not circulating in a disciplinary ecology of formalized genres; instead, most of the uses of his work are informal citations that direct students, instructors, and web designers to his article as a useful instructional document (despite the fact that it situates itself as an academic argument rather than a pedagogical text). Some of the syllabi that cite this text are actually produced by the same instructor using it over the course of several years (which suggests that despite its focus on teaching with a particular technology, the article has not become obsolete).

And also in contrast to the previous example, Cripps's work is for the most part not quoted or paraphrased—except in the cases where his work is the central text in a dialogic response from the citer (which invoke the article via

embedded links in the blog and essay genres near the center of Figure 22 above.)

I believe there are two main reasons why this work may not be a cited or used as the other examples in this chapter.[9] First, the main theme of this work is pedagogical – and while articles that deal with pedagogical issues are often used more directly (via implementation in courses) and are often widely read (based on server log analyses at *Kairos,* I've found that the most practically-oriented pedagogy articles are the most visited) they are not cited as often (particularly in formal genres) because they are seen as lacking in theoretical depth (Stephen North's [1987] attack on "lore" in composition is emblematic of the way pedagogy is generally devalued in composition studies).

The second reason is that, even though it is in a relatively transparent form as assessed by the remediation rubric, it still has a complex hypertext structure that doesn't lend itself to printing or linear reading strategies; thus, because the genre has departed from traditional print approaches to scholarship (even at the "moderately transparent" level), it is more difficult to use because it requires different reading strategies (and possibly even different literacies) in order for the reader to effectively engage it[10].

A final consideration for why this text is not as widely cited is that the

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[9] I'm somewhat surprised that there aren't more formalized citations of this work (although there may certainly be references to it in edited volumes or journals whose indexes and bibliographies are not yet accessible online); as a follow-up study, it would be interesting to see whether similar work that is published in the print literature is taken up in to greater or lesser degrees than the same topics published in online venues.

[10] Indeed, in the embedded link example above, the author who linked to the work complained about the difficulty of reading hypertext scholarship.

author has not promoted the work beyond its publication – unlike the other texts (below), there are very few self-citations (both from the author's online profile and CV). The highly-hypermediated article by Anne Wysocki (below), for instance, engages in what Jim Ridolfo (2007) calls "rhetorical valuation" – the work of the author to promote and extend the act of delivery beyond the technical delivery itself (in this case, the publication of the article).

Example 3: Moderately Hypermediated

Joyce Walker's webtext, "Textural Textuality: A Personal Exploration of Critical Race Theory" was the winner of the 2001-2002 *Kairos* Best Webtext Award. This work is classed as "moderately hypermediated" because it integrates animation, graphic design elements, and a complex and recursive hypertext structure that is not easily transformed to a printed version. The article is also multi-genre, utilizing personal narrative and contributed stories, poetry, and traditional academic argumentation and theorization. Although the work features approximately the same number of pages and internal links as the article by Cripps, the actual structure of the hypertexts is far less hierarchical or linear.

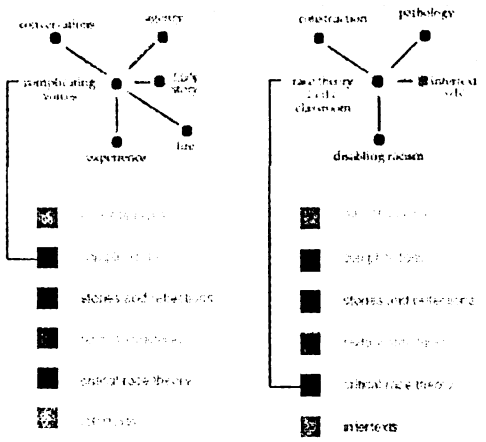

Figure 23. Examples of navigational structure in Walker, 2002.

Walker explains that "The first time I ever tried to ride the bus in a major metropolitan area, I was hopelessly lost. I didn't understand how to read the schedules, and the maps offered a frustrating lack of detail. Those of you attempting to navigate this text may find its mapping system to be similarly frustrating, at least at first" – but she provides multiple navigational aids such as the maps in Figure 23 above.

"Textural Textuality" considers self-representation, identity, and racism through a series of narratives, responses to events and texts, and rhetorical arguments that engage contemporary work in critical race theory, framed in metaphors of transportation and movement. The webtext also explicitly addresses the function and use of hypertext as a supporting medium for the kind of dialogic/reflective work that Walker is attempting (and by all accounts successfully so). For example, in one node, labeled "conversations," the author

provides a series of slides that places texts excerpted from other sections of the essay "in an effort to consider how it is we speak to one another. What does it mean to have our words placed in reference to one another? What does it mean to have a conversation?" and then points the reader to other nodes where those questions are taken up.

The following table reports on the formal features of the digital text; like the Cripps text (above), there is extensive internal linking and minimal external linking and the references used in this webtext are also primarily print references. No meta-data is provided with this article.

Title	Textural Textuality: A Personal Exploration of Critical Race Theory
Author	Walker, Joyce R.
Year	2002
Status	Published - Online Peer-Reviewed Journal
Venue	*Kairos: Rhetoric, Technology, Pedagogy* 7.1
URL	http://kairos.technorhetoric.net/7.1/binder.html?features/walker/text/index.html
Format	Webtext; moderately hypermediated (incorporates images, animation, and complex structure)
DTD	Not Available
Modified	Friday, April 12, 2002
Pages	39

Table 5. Formal Qualities of Walker, 2002.

Words	16,470 (excluding references and navigation)
Internal Links	6
External Links	4 (in-text and references)
References	23 total: 19 print, 4 electronic
Metadata – Keywords	Not available

Table 5 (con't). Formal Qualities of Walker, 2002.

For Walker's text, I recorded 12 distinct search results, and 4 backlinks; scholar.google.com reported no citations. The full-text search (using mydropbox.com and copyscape.com's premium search feature) found no instances of appropriation or plagiarism.

Originally published in 2002, Walker's article appears to have received the most attention when it was first released, although 2006 (and the data for 2007) are showing steady use as well.

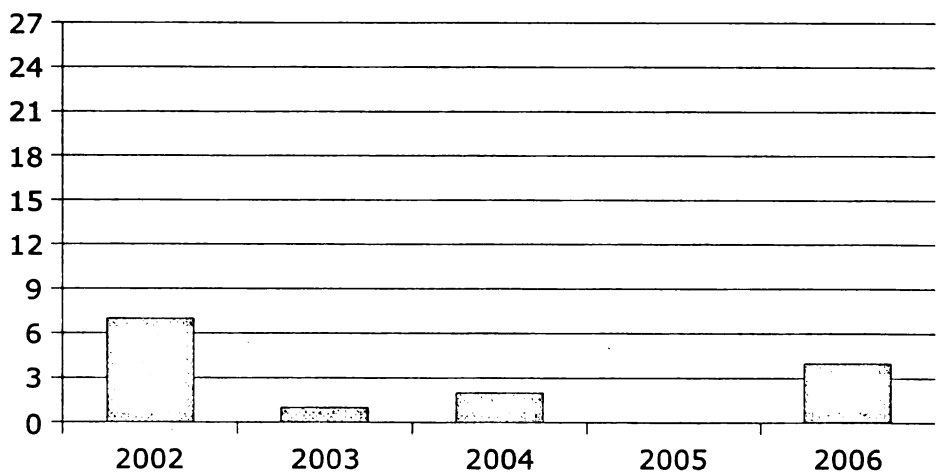

Figure 24. Links per year for Walker, 2002.

Six types of links or references occurred in the data set for this article. The largest number were informal citations (6), followed by formal citations and simple links (3 each). The remaining types (1 of each) were bibliographic, embedded, and annotated links. Two of the references did not have hypertext links and were strictly textual bibliographic entries.

Forms of link or reference

informal citation	6
formal citation	3
simple	3
bibliographic	1
embedded	1
annotated	1
no link	2

Of the formal citations, 1 instance was parenthetical, 1 was a single quotation, and 1 was a dialogic interaction.

The works citing or linking to Walker were made up of a wide range of genres, including course syllabi (the most prevalent at 6 references), two bibliographies, and one each of the following: social bookmarking site, seminar paper, blog, conference program, archived listserv email, conference program, peer-reviewed online journal, peer-reviewed print journal, and the awards list from *Kairos*.

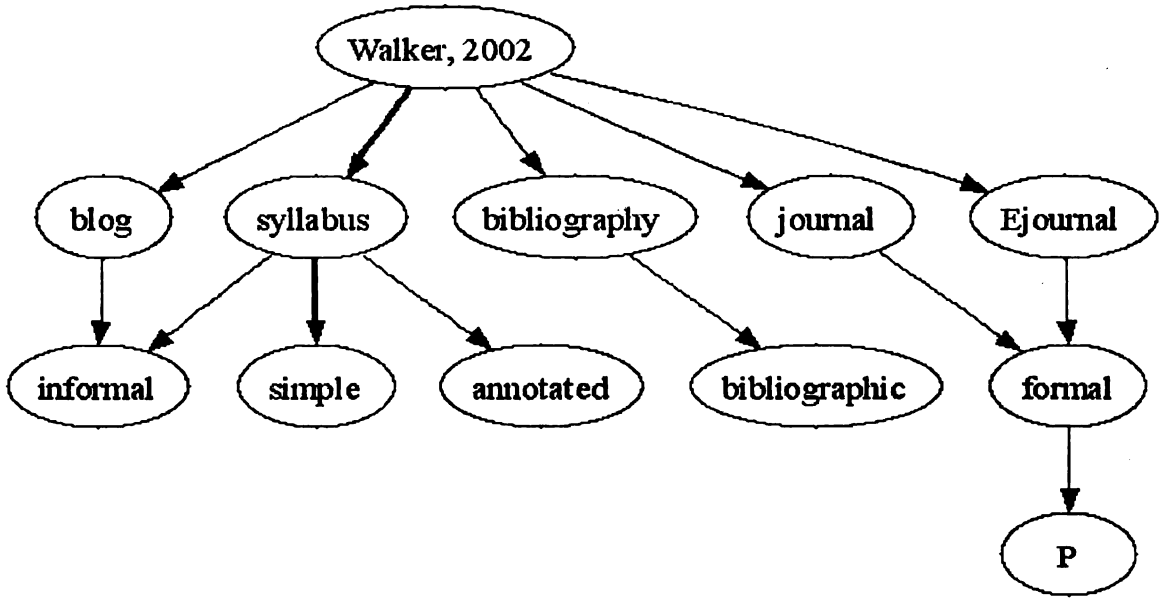

Figure 25. Genres, link types, and engagement levels for Walker, 2002.

The references to Walker's text do not appear to be situated in either formalized or informal genres; rather, there is a balance of genres of works that make reference to "Textural Textuality." From Figure 25, above, we can see that the most common use of the work as a reading on a course syllabus (and the instructors who write those syllabi find it sufficient to provide a link rather than a full bibliographic citation – possibly because the syllabi are online and thus facilitate access to the reading). When this work is cited in formalized genres, it is most often used as an example of how a hypertext argument might be structured, as opposed to engaging the narratives and arguments of critical race theory that are at the core of the text.

The lack of citation and reference in this case is most likely due to the multimodal and multigenre nature of the work: it certainly violates genre norms

for scholarship both in the way that it is constructed (engaging a very complex link structure) and the way that it mixes theory, critique, visual representation, and narrative. In a later essay (2006), Walker acknowledges that "it can seem as if the process of experimentation in new media compositions actually *opposes* the development of more traditional scholarly goals – goals of coherence, logic, and objectivity" – and this appearance of opposing those traditional goals likely contributes to the difficulty that current scholars have in both reading and using these kinds of hypermediated texts (for the next generation of scholars, however, this might not be as significant an issue, as they are enculturated to engage and use interactive multimedia texts, from YouTube to massively multiplayer online roleplaying games – and the final example comes closer that form of interactivity than any of the previous examples in this chapter).

Example 4: Highly Hypermediated

Anne Wysocki's webtext, "A Bookling Monument," originally presented at the 2001 Computers and Writing Conference at Ball State University, was the winner of the 2002-2003 *Kairos* Best Webtext Award. "A Bookling Monument" requires the Macromedia Shockwave plugin in order to be used; instead of using HTML markup to arrange text and other media elements into a webtext, Wysocki has built a richly interactive experience using Macromedia Director software. This work is highly hypermediated because it *requires* interaction for meaning to be drawn from the text and because it incorporates and integrates rich visual

imagery (both photographic and artistic), animation, and text. This work cannot be transferred to a print genre, although it does evoke other digital genres, notably interactive computer games (such as *Myst*, which is referenced within the text).

When "A Bookling Monument" first loads, the reader is presented with the image of body lying in a field (Figure 26); on the landscape of the body (only the back is shown in the initial screen) are several pieces of folded paper and a fly. Clicking on the fly shows a time-lapse video of the person whose body we are viewing getting up and walking away. Clicking the papers leads to texts, different views of the body, different animations, or other illustrations – but in order to find these other components of the essay, the user must explore and *play*: there are no navigational explanations or cues (such as those provided in Walker's text). Wysocki's work takes up several themes: books and bodies as common carriers of culture, remediation, memory and discomfort (as evidenced in part from some of the grotesque imagery deployed [Figure 27]), and the relationship between new media and books. She notes that "new media pieces show – in their modifications of the book – is how much the 'content' of the book (including our senses of 'book self') are shaped by and dependent upon and hence inseparable from the material, visible structures of the book" ... and this work, indeed, enacts this same dynamic.

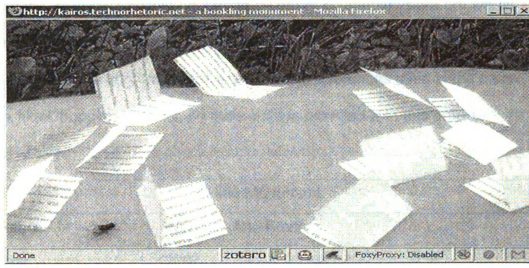

Figure 26. The initial screen of "A Bookling Monument" (Wysocki, 2002).

Figure 27. An internal screen of "A Bookling Monument" (Wysocki, 2002).

The following table reports on the formal features of the digital text. There are fewer data points in this table because there are no "pages" in the main text

nor are the words accessible enough to be easily countable (there are words however; this is not a purely visual text). There is a separately-linked bibliography page that provides very traditional access to the references used in the piece. Again, like Cripps and Walker, no meta-data is provided with this article.

Title	A Bookling Monument
Author	Wysocki, Ann Frances
Year	2002
Status	Published - Online Peer-Reviewed Journal
Venue	*Kairos: Rhetoric, Technology, Pedagogy* 7.3
URL	http://kairos.technorhetoric.net/7.3/binder2.html?coverweb/wysocki/index.html
Format	Flash/Director; highly hypermediated
DTD	HTML 4.0 Transitional
Modified	Wednesday, December 22, 2004
External Links	1 (in references)
References	21 total: 20 print, 1 electronic
Metadata	Not available

Table 6. Formal Qualities of Wysocki, 2002.

I found 21 distinct search results that referenced "A Bookling Monument", as well as 2 citations from scholar.google.com (1 of which was not already recorded), and 6 backlinks to the article that had not been found by other search

methods. The full-text search (using mydropbox.com and copyscape.com's premium search feature) yielded no results because, with the exception of the references list, the text that is in the work is embedded and not extractable.

Originally published in 2002, Wysocki's article has had few links overall (although there are already more links in 2007 than in 2006).

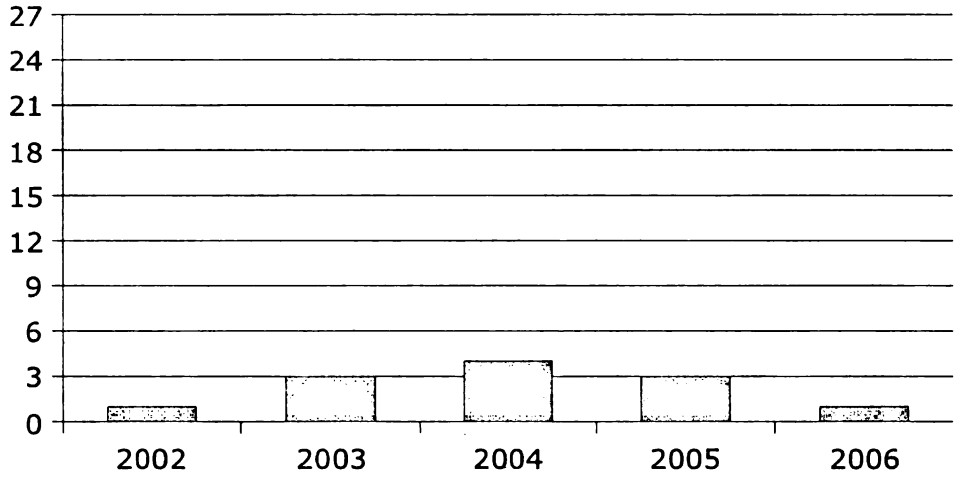

Figure 28. Links per year for Wysocki, 2002.

Seven types of links or references occurred in the data set for this work. The most numerous were embedded links, followed by formal, informal, and bibliographic citations. The remaining types were two annotated links, a single simple link, and one "invisible link" – that is, a link to the work is included in the referent, but there is no link *text* – only the html code (it's likely that it was originally included in the referring work but removed at some point through the process of revision).

Forms of link or reference

embedded	10
formal citation	5
informal citation	4
bibliographic link	4
annotated	2
simple	1
"invisible"	1

Of the formal citations, two were parenthetical citations without quotation or paraphrase, one was a single paraphrase, and one was a dialogic discussion of the main themes of Wysocki's text (two of the embedded links could also be classified as dialogic).

The works citing or linking to "A Bookling Monument" include 13 genres. The number of examples of each genre are fairly evenly represented, but the genre with the most examples is the course syllabus. Other genres included social bookmarking sites, seminar papers, blogs, conference programs, a conference presentation, peer-reviewed online journals, peer-reviewed print journals, bibliographies, a linklist, speaker announcements, and even one edited collection book prospectus.

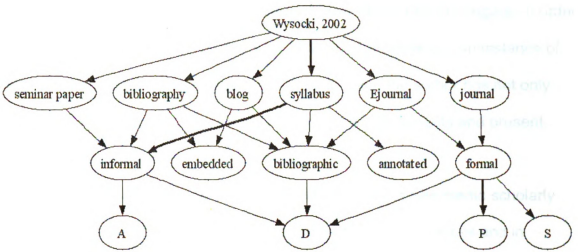

Figure 29. Genres, link types, and engagement levels for Wysocki, 2002.

Wysocki's text presents the most complex genre ecology diagram of all of the examples in this chapter. Because it is the farthest from a known or understood genre, it appears that different readers have applied it to many different situations (thus citing it in many different genres). As with Cripps's and Walker's texts, the strongest links are to course syllabi; and echoing the use of Walker's moderately-hypermediated work, the formal citations of "A Bookling Monument" primarily point to it as an example of new media scholarship, rather than engaging the arguments it presents.

The single instance of direct quotation actually comes from a citation made by the author of the preceding work: she reports that she had to "watch the text scroll across the screen" and quickly transcribe it (Walker, 2007). In fact, over

ten percent of the references recorded for this work are self-citations, which may well be one strategy that scholars producing new media need to engage in order to promote the acceptance of their work. (This self-promotion is an instance of Ridolfo's [2007] "rhetorical valuation" – in this case, the author has not only produced the text, but also actively works to explain its benefits and present ways that it may be used).

Wysocki's work is a very early attempt to create a new media scholarly argument, so while I have often heard it referred to at conferences and in workshops, it is likely that it's very cutting-edge-ness works against it in terms of formal citation. While scholars of new media continue to reinvent the scholarly argument as multimodal, it seems likely that the weight of tradition will continue to work against its recognition—at least until the time when the students who have been studying and emulating these works become the primary consumers of such scholarly work.

Conclusions

Although there are too few example texts in the sample from which to safely generalize about the effects of degree of remediation on circulation, it is possible to look across all four examples and make some observations that should be helpful for refining the research approach or directing attention to specific issues that may be valuable avenues of inquiry. The following table provides a brief review of the main data points for all four examples:

Author	Lapadat	Cripps	Walker	Wysocki
Journal	*JCMC*	*CCO*	*Kairos*	*Kairos*
Discipline	Communication	Comp/Rhet	Comp/Rhet	Comp/Rhet
Field	CMC	C & W	C & W	C & W
Genre	Scholarly jounal article	Scholarly Hypertext	Mixed-Genre	Unknown
Remediation	HT	MT	MH	HH
Total links	89	16	17	27
Formal	53	2	3	5
Informal	36	15	14	22

Table 7. Comparison of 4 Articles.

These examples provide two ways of articulating ecologies of circulation – one based on disciplinary activities and norms and the other based on predominant uses of these texts. In the first case, the highly transparent example text was clearly situated in a different disciplinary context than were the other texts[11]. Because Lapadat's text resided in a different disciplinary ecology than were the other texts, the kinds of genres that engaged the work and the ways in which it was taken up were constrained by the expectations of the environment. Lapadat's text had the most formal citations both because it was in a form that was more immediately recognizable as worthy of scholarly attribution

[11] This could be seen as a flaw of my selection criteria, but since the aim of this chapter is to evaluate the use of the methodology rather than coming to any specific conclusions about degrees of remediation, I think it is appropriate to see how the method works or breaks down for different kinds of text.

and because there are more formalized genres in the field of communication studies (e.g. conference proceedings, which are uncommon in rhetoric/composition). Cripps's text pushed beyond the traditional academic journal article, but not enough to brand it as experimental or "new media"; additionally, the work's focus on pedagogy helps to mark it as an appropriate text for use in pedagogical genres (thus, the use-driven uptake). Walker's text is certainly experimental (although not, strictly speaking, new media), but it experiments both with media and with mixing genre conventions (incorporating narrative, research, and scholarly argumentation in ways that are not typical of most scholarly work in rhetoric/composition). On the far end of the spectrum, the new media scholarship of "A Bookling Monument" (and to some degree the other three examples as well) illustrate a kind of use-driven ecology: references to these texts showed up primarily in course reading lists, syllabi, and student-produced seminar papers and essays. These works are thus becoming part of a pedagogical movement whose actions may well show up in future iterations of this research approach. But for now, disciplines work to reinforce their ecological niches, accepting those elements that "fit" in a given ecosystem and rejecting those that are seen as, essentially, invasive species.

A final comment on the four examples: although the instances of formal citation appear quite low for all but the first example, even the least-cited work has an above-average rate of citation when compared to print scholarship in the humanities. Many studies have shown that scholarship that is published in open

access online journals that engage in peer-review enjoys higher rates of formal citation than print scholarship (Hajjem et. al, 2005; Hajjem, Harnad, & Gingras, 2005; Eysenbach, 2006), so despite the relatively few citations of these online works, they are still at an advantage relative to their print counterparts.

Methodological Reflections

After examining all of the examples and the data collected about their circulatory activity, (along with a fourth highly transparent text that was used to develop the methods—examples from this text appear in chapter 4) I have discerned the work of three distinct forms of appropriation: traditional plagiarism, which is not limited to just digital texts, although it is easier to perform with more transparent texts; copying the whole work for redistribution elsewhere, which is a form of ecological appropriation – poaching – that removes the work from its proper ecosystem for the gain of the poacher; and a form of economic appropriation called propagated linking (see chapter 5 for a detailed discussion of this phenomenon). I see this as a form of appropriation because the intellectual work of that author is being used to support monetary gain for someone else without the benefit of even recognition (i.e. academic capital); there is no return value for the author.

During the course of this application, I did run into some methodological issues: in many cases, there were multiple references to the original source as well as to digital copies of that same source (the same problem arose with the

citing documents as well). In many cases, the same text might reside in multiple locations (one of the affordances of digital copies, which require no additional capital in order to be reproduced). Sometimes there were simply multiple URLs that could be used to access a given text, other times I discovered author-owned copies of works published in various other venues (e.g. print and online journals). I decided to focus on genre and use rather than replication per se, as that fits with my theoretical use of circulation ecologies (how do these texts function in particular ecosystems?); thus in most cases I collapsed the multiple examples into single instances (the exception is for propagated links, which I counted but did not include in my evaluations of the example texts above.

The preceding examples show how circulation analysis can be employed to answer research questions about how genre (or new genres) affect the ways in which digital texts are used (surfacing both formal and informal uses); I see this method as deployable and useful for this research question, although excessively labor-intensive (thus, a future project for circulation analysis as methodology is to build tools that can support these methods).

In the final chapter of this dissertation, I provide a list of other kinds of research questions that can be addressed using circulation analysis methods in conjunction with other rhetorical analysis methods, as well as a map of future work on both the development of digital-native methods and the tools that will need to be built to make these methods available to the academic marketplace of researchers and scholars in a variety of disciplines.

Chapter 7: Digital-Native Methods, Future Research and Development

The aim of this dissertation has been to argue for the development of digital-native methods that take advantage of the nature of digital media in order to further our understanding of how and why connections are built between digital texts; these methods are designed to help develop an ecological view of digital circulation. This ecological view situates the digital relationships uncovered via circulation analysis within the disciplinary context of digital rhetoric by extending the purview of rhetorical activity beyond initial production and into the distribution and circulation of digital texts.

The methods I have proposed can be used to trace and map connections between digital texts, and although these methods are related to and sometimes derived from methods used in informetrics (including bibliometrics and webometrics), circulation analysis is *not* a "citation study," nor is it a bibliometric analysis. The formal study of citations and citation networks uses mathematical algorithms to produce quantifiable data about citations (in bibliometrics) or links (in webometrics); circulation analysis instead uses qualitative, rhetorical evaluation techniques not to map formalized bibliographic networks, but to discover and outline emergent ecosystems whose contours and boundaries are revealed through the structures made by textual relationships (additionally, circulation analysis looks at *all* references and links, not just those represented through formal citation).

I see this dissertation as a offering a proof-of-concept for the development of one particular kind of digital-native analysis: there is much work yet to do to refine this method (and this work is outlined in the final section of this chapter); but other forms of digital-native methods should also be identified and developed. I began with theories of ecologies and economies of circulation, presented the methods of circulation analysis, and provided two case examples to show both possible uses and limitations of the methodology. In this chapter, I offer what I believe to be two important outcomes of applying circulation analysis as a method in digital rhetoric: mapping digital/rhetorical ecosystems and utilizing the research capacity of circulation analysis as an aid to discovery. I also provide an account of how this method can be used to complement other rhetorical analysis methods (both well-established and new); this chapter concludes with a description of continuing work on the development of circulation analysis methodology.

Mapping Digital/Rhetorical Ecosystems

One of the primary outcomes of circulation analysis is that this method traces post-production rhetorical activity within digital ecologies. Because circulation analysis is not concerned only with formal measures of rhetorical relationships (e.g. citation), the connections it reveals show both distinct references that engage the source texts as well as links that simply serve as pointers. By taking into account the full range of connections, it is possible to

begin building a picture of both circulation and the ecosystem(s) in which the source texts are circulating. Consider the case of the all of the links and references to the Michael J. Cripps article presented in chapter 6 – using this data, it is clear that there is a kind of pedagogical ecology that is made up of teaching-and-learning based ecosystems – the course syllabi, assignments, and in some cases blog responses, which were themselves assigned to students as coursework – in which this particular text circulates. Similarly, the circulation patterns of the Lapadat article situates it within specific disciplinary ecologies (notably computer-mediated communication, which is a subfield of communication studies, and distance education). The ecosystems in which this article is found tend to be more formalized (scholarly publications and presentations that have been formally rendered in conference proceedings) than the Cripps article, and its presence within these ecosystems provides a picture of a different kind of ecological circulation.

Examining the ecosystems in which these different works circulate, it becomes apparent that they are each part of different digital and rhetorical ecologies. In terms of scholarly evaluation, this kind of analysis can show both formal and informal uses and the authors of these texts can make use-value arguments based on their ecological circumstances – high citation may indicate an important role within scholarly or research ecosystems, but a high degree of linkage and use in pedagogical contexts may indicate an equally important role in shaping how future researchers and scholars approach their work.

Because different disciplinary ecologies engage different kinds of value systems, knowing the ecosystems that are more likely to reference a particular work can help the writer to better understand how to maximize its value within particular ecosystems, whether by explicitly positioning it as such, by engaging specific genres that are taken up more readily within different ecosystems or disciplinary ecologies, by using specific delivery practices to encourage and facilitate circulation (such as including appropriate metadata prior to distribution) or by engaging in practices of rhetorical valuation that are designed to promote the work within ecosystems where it might otherwise be seen as an outside or invasive influence (such as self-citation or using the work as an example of new media, as was the case with the Wysocki text in chapter 6).

While circulation analysis cannot articulate the specific practices that will result in successful placement within target ecosystems, simply knowing how and where one's work is taken up provides the initial step toward discovering what such effective promotional or positioning moves might be.

In other words, although circulation analysis draws on the tradition of using ecology as a metaphor for explaining how particular rhetorical practices of production work, it takes the further step of extending ecology from metaphor to analytic framework and the actual context of rhetorical circulation.

Circulation analysis can also be applied to within different kinds of ecosystems and ecologies in order to answer a range of research questions beyond those presented in chapters 5 and 6:

- In an institutional ecosystem (such as a university, government agency, or corporation), circulation analysis can trace the appropriation and use of specific texts that are generated at an individual or departmental level and then used across the institution. For example, suppose a committee writes a report about, say, the use of technology in writing courses. Circulation analysis can help to show whether (or how) the recommendations or the actual text of the report is used at the departmental level or at different administrative levels within the institution. Seeing which language or arguments are taken up and re-used at higher levels can help the committee to shape future work that uses successful circulation strategies and drops unsuccessful strategies.
- Circulation analysis similar to that used in the electronic portfolio in chapter 5 can also be used to map the relationships of texts created within specific departments or units. For example, a research group or an academic department can trace the intersections and divergences of the scholarship produced by its members; once that map has been created, it is then possible to see where there may be areas of deficiency that could be addressed through hiring new members (in the case of the department) or taking on additional collaborators (in the case of a research group).
- Circulation analysis can also examine larger ecological structures, such as media ecologies (like blogging or video-sharing and rating sites). However, in order to engage these larger structures, better circulation analysis *tools*

will have to be developed (see below for more on this point).

Circulation Analysis and Discovery

Circulation analysis methods can also be used as tools for discovery – of scholarly resources, including people who are working in similar areas (but who may be in different disciplines), inter/cross/trans disciplinary research pathways, and new and emergent genre systems. These methods can also uncover cases of plagiarism and software-agent driven information collecting and aggregating mechanisms, although these issues are not the purpose of circulation analysis.

The most obvious form of discovery supported by circulation analysis is that of resources. When I examined how people who linked to my work used it for their own purposes, I found a rich source of relevant materials from other disciplines and other cultures that either related directly to the work that I had done or was used to frame similar questions from different approaches or traditions. (For example, Paul Aitken cited my 1996 *Kairos* article in his 2006 presentation on "Dialogic and Discursive Elements in Online Music Promotion"; scholars in drama, philosophy, and theology have also linked to that article, as have scholars writing in French, German, Icelandic, Bulgarian, and Spanish. This article also appeared in the bibliography for "Los Libros de Arena: Antecedentes literarios latinoamericanos de la narrativa hipertextual," which included a great deal of scholarship on hypertext from Europe and Latin America that I had not previously been aware of, despite doing a good deal of my early research on the

writing of hypertext). In some cases, these resources were the result of self-citation on the part of those linking to or quoting my work, thus, there is also a social-networking form of discovery that can help scholars connect to other people doing similar work in other fields or in other countries.

In the same way that resources and people are discovered through circulation analysis, it is possible to trace interdisciplinary research paths through the connections of those works in other fields that site the original digital text (if it is in a separate field). This seems particularly true for the kinds of work that are addressed in the articles presented in chapter 6 because there are several relatively new interdisciplinary fields (such as webometrics, computer-mediated communication, and internet research) that are present in the ecosystems where these works circulate.

Examining the different sources that link to or reference the digital text being studied can also lead to the discovery of new and emerging genres. Some of the links to the articles in chapter 6, for instance, included references from blogs, wikis, and social-bookmarking sites (e.g. del.icio.us). While blogs have certainly been around for a long while (in Internet years), it has only recently been argued that blogs might have the ethos to compete with print analogs such as newspapers and magazines; aside from journalism, though, there is also the rapid rise of the academic blogger as public intellectual (see, for example, Collin Brooke's blog on rhetoric and new media work, Rhetorworks [http://collinvsblog.net/rhetwork/], and David Kellog's "Paralepsis,"

[http://paralepsis.blogspot.com/] which has been crossposted to the high-visibility political blog, DailyKos [http://www.dailykos.com/storyonly/2007/4/27/22955/4969]) . The analyses presented in chapter 6 show bloggers to be more consistently engaged with the source texts at a deeper rhetorical level than any other genre. And examining that finding alongside calls to see academic blogging as a form of publication and the rise in awards for such blogging[12] shows *academic* blogging as an emerging scholarly genre. Wikis are also becoming more prevalent as they find a place in digital economies: wikis are often used by technical writers to develop documentation; they are also used to provide spaces of textual interaction between information providers and consumers. There is not yet a push to view wiki-based work as valued academic enterprise, but the uses of wikis for academic texts[13] is relatively rare[14].

A final example of an emergent genre is the social bookmarking site, which combines bibliographic references with a mechanism for annotating the references and also sharing them with other users (examples include furl, simpy, spurl, del.icio.us, and citeulike). More often than not, links in the social bookmarking sites do not have annotations, nor do they engage the source texts in a scholarly way. However, they do offer a measure of how many other

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[12] Such as the *Kairos* sponsored John Lovas Memorial Academic Blog Award.

[13] I am using "academic text" in a very limited sense here, meaning peer-review scholarship. However, wikis are being used for *pedagogical* academic texts, including syllabi, assignments, and online courses.

[14] I am aware of only two such wiki-based scholarly publications, both published in *Kairos*: Garza and Hern's (2005) "Collaborative Writing Tools: Something Wiki This Way Comes--Or Not!" and Brooks and Mara's (2007) "The Classical Trivium: A Heuristic and Heuretic for New Media and Digital Communication Studies."

individuals found the source text valuable (although there are at least two drawbacks to using social bookmarking sites for circulation analysis: the same text may appear one than once in any given application because different names and naming conventions are applied by the users of these services, the same problem occurs on a different scale as well because there are a great many different social bookmarking sites, which adds to the labor overhead of the method). And like the methods described above for finding people with similar interests, it is possible to find individuals who have similar interests by reviewing the list of individuals who have marked the same entry in any given social bookmarking site. Links to social bookmarking sites are also beginning to appear alongside the articles of many online journals and newspapers (see Figure 30 for an example); a move that I would characterize as a push for what Ridolfo (2007b) calls "rhetorical valuation," or the mechanisms that can be employed to continue delivery after the initial distribution of a text.

Figure 30. Links to social bookmarking sites are increasingly appended to online texts.

Finally, circulation analysis methods can also find instances of plagiarism (indeed, in the case of my article in *Kairos*, which I use in chapter 5, I did find an example of the wholesale appropriation and reuse of my work—uses that did not

included any attribution or indication that the text in question was not original). These analysis methods can also help uncover cases where software agents are making decisions about and re-circulating the information found in the source text. The discovery of this kind of agent-driven circulation has implications for the economics of digital circulation as it is fueled by both human and nonhuman actors.

Rhetorical Analysis and Digital-Native Methods

While circulation analysis can be useful for answering the kinds of research questions presented in chapters 5 and 6 and in the examples above, it can also serve as a complementary method that can be used in conjunction with other forms of rhetorical analysis to develop a more comprehensive picture of rhetorical activities and practices that take place in digital environments.

What circulation analysis does not do is allow the researcher access to the intentions or purposes that drive the establishment of links and references or that motivate appropriation: in order to provide information about the initial rhetorical production as well as post-production circulation, more direct methods (such as interviewing and real-time observation) would need to be deployed. However, one of the purposes of circulation analysis is to promote the notion that rhetorical production *does not end with delivery*; rather, after distribution, there are still rhetorical forces at work both on ecological and economic scales.

Combining circulation analysis with a deeper rhetorical analysis of how

and why the references and links are being used is one obvious way to expand upon the results thus far presented; this might incorporate either an analysis based on how the formal citations play specific roles in the citing document (although this approach becomes problematic with the less-formal references because they may be completely decontextualized), or it might take the form of interviews with the citers to find out why the citations or references were used in these particular cases (see Thelwall, 2003, for an example of researching motivations for linking; for discussions of the rhetorical applications of citation, see Cozzens, 1989, Connors, 1999 & Rose, 1999; for a taxonomy of rhetorical uses of citation and reference, see Robillard, 2006).

Circulation analysis also complements recent work on rhetorical delivery by my colleague Jim Ridolfo. Ridolfo is developing a theoretical framework of delivery that takes into account both network-based circulation and the rhetorical actions that drive and support specific forms of circulation. Whereas my work is aimed at articulating an ecological approach to digital circulation, Ridolfo is framing delivery in terms of specific actions and has developed terminology for describing these actions: he describes activities designed to promote the distribution of a specific message as "rhetorical velocity," the obfuscation of authority for purposes of circulation as "rhetorical mystification," working from only textual evidence to determine the strategic rhetorical considerations of delivery in a specific case is "rhetorical reconstruction," and (as mentioned earlier), the process of managing the continued strategic worth and function of a

document, after the basic technical act of rhetorical delivery is "rhetorical valuation" (Ridolfo 2005, 2006, 2007a, 2007b). Ridolfo's work focuses on actions in the world: he shows how his framework can help activists get their message out to mainstream media through the construction of press releases that take advantage of the principles of rhetorical velocity (such as understanding and leveraging the labor economics of mainstream media producers), and his examples of rhetorical mystification and valuation come from humans acting in specific social milieu (such as the production and circulation of a political ad that appropriates Apple's 1984 advertisement [Ridolfo, 2007b]). Examining rhetorical activity that takes place as a component of delivery can be placed within ecological contexts: combining Ridolfo's approach with circulation analysis as I have articulated it here provides a more complete picture of both textual circulation and the human actions that motivate, promote, or complicate such circulation as it takes place both within digital networks and in larger social networks. Aligning circulation analysis with Ridolfo's theoretical approach and methods remains an important aspect of continuing and future work on this project.

Developing Digital Rhetoric Methods and Tools

One of the most serious drawbacks of this form of analysis is that it is significantly labor-intensive to collect and analyze the data: working with just the first example in chapter 6 (the Lapadat article) required well over 40 hours of

work to collect, evaluate and analyze all of the links and references to the source. If circulation analysis is to become a useful method for investigating research questions in digital rhetoric, there will need to be a serious effort undertaken to develop data collection and analysis tools.

As I began to work on the case study presented in chapter 6, I also began developing specifications for a system that would support circulation analysis. This system would take the source document as its primary input; it would read in this document, convert it to xml and perform a text analysis that produces the keyword list and text cloud described in chapter 5. The user would enter the basic metadata about the source, but the system would then perform the three main search functions (multiple search engine basic search; backlink search; full-text search and comparison). There will need to be a mechanism that would allow the system to flag potential propagated links and disinclude them from the net results. During the search process, the system should harvest metadata from each linking or referencing text. The user will still need to view and evaluate each link or reference and record the information about genre, link type, and degree of engagement.

In addition to a data collection tool, data visualization tools that can show the maps of the ecosystems engaged by the source texts will need to be created. I used GraphViz to create the network maps (based on the social network analysis concept of sociograms), but this is not an ideal representation of the complexity of relationships uncovered through circulation analysis. The data

visualization tool I plan to develop will be able to trace out the ecological boundaries and ecosystems the source text is interacting with, but it will also show different views based on the kinds of questions to be answered (e.g. some views would focus on genre, others on degree of engagement, and still other views would focus on link type). An interactive data visualization tool that allows for manipulation of the environment by the user would be ideal because the user could refine the ecological map based on the discoveries made when analyzing the initial text and its relationships (one model for how such a system would work is TouchGraph, http://www.touchgraph.com).

Once the analysis and visualization tools have been built, it will be beneficial to run formal usability tests; these tests will evaluate not only the usefulness and usability of the tools themselves, but will also serve as a text of the usability of the method as well.

Building the data collection and analysis tools will also support further work that extends the case presented in chapter 6: applying the same methods to a much larger sample of digital texts from each level of remediation can lead from hypothesis-building to hypothesis-testing and the possibilities of generalization. If time and labor resource issues can be mitigated, circulation analysis can move from heuristic/discovery method to a method that can be used to test hypotheses about digital rhetoric – at least for digital texts (and, perhaps, in the future, for multimedia/new media work as well).

A Caveat: Methods for Working with New Media

One of the pressing needs for digital rhetoric research is the development of tools and systems capable of dealing with new media works: the main reason that most of the examples of circulation analysis in this dissertation deal with text qua text is that there are currently no tools that can do the equivalent kinds of searches with images, audio, video, or a combination of modes and media. In the case of Anne Wysocki's "A Bookling Monument," I focused on links and references to the work, but I could not see if any part of the whole (or the entirety of the work) had been appropriated, reused, remixed, or repurposed. Many audio and visual search engines are available, but these engines only return results based on titles, tags, or annotations of the media rather than based on the content of the media itself. There is a push to create tools that will allow users to search *within* multimedia works, but the tools are still fairly limited. Podzinger (http://podzinger.com/) offers a search engine that will find spoken words within (a limited set of) online videos, including YouTube videos; blinkx (http://blinkx.com/) also offers similar functionality, but does not provide as detailed search results as does Podzinger. Although these tools are in a relatively early stage of development, it is this kind of tool that most needs development for the use of digital rhetoric researchers.

Conclusion

In a knowledge economy, understanding the interactions of texts and

contexts can yield a more comprehensive picture of interaction than the traditional approach of rhetorical invention, composition, and delivery; it can also provide a map of the relationships that co-construct digital ecosystems because we have not yet developed appropriate methods for doing so. It is my hope that by developing a digital-native method in circulation analysis I will have provided a model that others may use to consider developing other digital-native methods and that these methods can be profitably employed to further the research agenda of scholarship in digital rhetoric.

Appendix A: Evaluating Degree of Remediation

The following rubric can be used to evaluate digital texts in terms of their *degree of remediation*: the remediation continuum developed by Eyman and Reilly (in-press) includes four designations for electronic texts: highly transparent, moderately transparent, moderately hypermediated, and highly hypermediated.

The theoretical foundation for assessment in terms of remediation comes from Bolter and Grusin's (1999) *Remediation: Understanding New Media*. Bolter and Grusin posit that new media genres are either transparent or hypermediated: *transparency* describes electronic texts that allow us to forget or see through their electronic mediation and view the text as we expect it to be: linear, straightforward, hierarchical, and accessible, like a page from a printed book or journal but delivered online. Readers are not challenged by the structural aspects of transparent electronic texts; years of reading printed books and journals prepare them for reading these texts. The same holds true for examples from other media, such as video (the videos available on YouTube, for instance, are transparent with regard to mediation – they look like the videos available on television, albeit in a somewhat wider range of genres and content).

In contrast, *hypermediated* electronic texts draw attention to their own mediation, flaunting their differences from print and defamiliarizing and challenging readers to make their own meanings, or in Yancey's (2004) terms, achieving a measure of coherence, through navigating the hyperlinks, exploring

interwoven graphics and text, and experiencing the multiple media, including audio and video, that comprise them. As Bolter and Grusin (1999) explain, "contemporary hypermediacy offers a heterogeneous space, in which representation is conceived of not as a window on to the world, but rather as 'windowed' itself—with windows that open on to other representations or other media...In every manifestation, hypermediacy makes us aware of the medium or media" (p. 34) – often because of this media enactment is required for the use of the digital text.

The key elements evaluated when determining degree of remediation include clear relationships to extant non-networked genres (such as print journals, encyclopedias, television sit-coms, etc); use of design elements such as color, typography, iconography, moving and still images; hypertext linking structure; number of genres or media interacting within the digital text; and requirement of explicit interactivity (beyond reading and navigating).

For evaluating the hypertext linking structure, the rubric uses the taxonomy of structures from the Yale C/AIM Web Style Guide (Lynch & Horton, 1997),

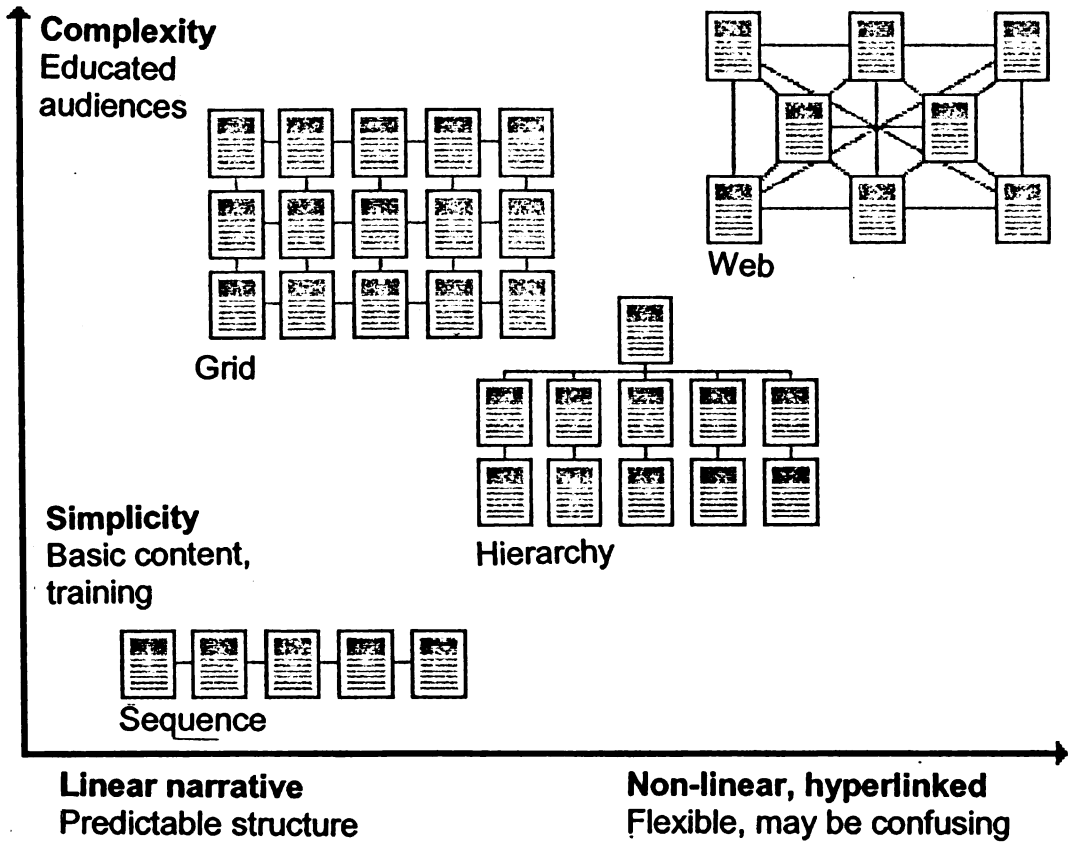

Figure 31. Yale C/AIM Link Structures.

Degree of Remediation Rubric

Genre

Is this genre clearly identifiable?

If Yes, go to the next question in this section; if no, continue on to Design.

Is this genre clearly replicating an extant genre without adding any additional functionality or incorporation of other media?

If Yes then this work is "Highly Transparent." If No then continue below.

Interactivity

Does this work require interactivity (beyond typical reading/navigating activities) in order for it to be meaningful? (Tip: A flash-based text that requires the user to navigate through buttons labeled 'next' and 'previous' would constituted typical navigation, not interactivity).

If Yes then this text is "Highly Hypermediated." If No, then continue below.

Design
assign a point value of 0 to 3:
0 = none or N/A, 1 = single instance, 2 = several instances, 3 = many instances

Typography
- Rhetorical use of multiple fonts
- Use of "artistic" fonts

Iconography
- Use of icons for symbolic representation of concepts or ideas
- Use of icons to demark structural divisions
- Use of icons as aesthetic design element

Color
- Use of color to convey meaning
- Use of color to structure navigation
- Aesthetic use of color (e.g. background design)

Still images
- Inclusion of black & white drawings
- Inclusion of color drawings
- Inclusion of black & white photographs
- Inclusion of color photographs
- Inclusion of black & white digital images
- Inclusion of color digital images
- Inclusion of clearly manipulated images

Moving Images
- Inclusion of animated images
- Inclusion of digital video

Audio
- Inclusion of speech recording
- Inclusion of music
- Inclusion of incidental/background audio

Structure

Sequence = 1
Hierarchy = 2
Grid = 3
Web = 4

Multiple Modes or Media
Add 1 point for each additional mode or media beyond 1.

Score:

0 – 5	Highly Transparent
6 – 10	Moderately Transparent
11 – 15	Moderately Hypermediated
15 or higher	Highly Hypermediated

Appendix B: A Taxonomy of Digital and Digitized Genres (Cited in Rhetoric/Composition Print Scholarship)

Although the following list is not by any means comprehensive, I have found it helpful in establishing the genre of the digital texts that are circulation in various network ecosystems. The list itself is based on a qualitative evaluation of digital documents encountered during an earlier research project that examined how print journals in rhetoric/composition cited or referenced digital sources[15]. The development of this list is related to the assessment of the degree of remediation exhibited by digital documents (see Appendix A); in many cases, the genre of a digital text is related to a precursor genre (or genres), so the challenge has been to establish to what degree the digital work has sufficiently changed purpose or form to be considered a new genre.

It's important to note that identification of genre is not based solely on visual or structural attributes. When developing the taxonomy below, I examined both form and function, structure and rhetorical purpose. The definition of "genre" that I have used to guide my assessment is that of Swales (1990), "A genre comprises a class of communicative events, the members of which share some set of communicative purposes. These purposes are recognized by the expert members of the parent discourse community and thereby constitute the rationale for the genre. This rationale shapes the schematic structure of the discourse and

[15] The answer thus far, after examining the major print journals in rhet/comp from 1996-2003, is "not very much" and "not very well." This research is still ongoing however, and I am hoping to see greater use over time as the database is updated to 2007.

influences and constrains choice of content and style" (p. 58).

There has been quite a bit of work done on developing an understanding of digital genres and attempts to classify those genres into taxonomies similar to the one below (Yates & Orlikowski, 1992 Yates, Orlikowski, & Okamura, 1999; Roussinov et al., 2001; Crowston & Williams, 1997; Ryan et al., 2003; Furuta & Marshall, 1996; Kwasnik, & Crowston, 2004; Askehave & Nielson, 2005; Kwasnik et al., 2005), and most of the researchers working the genre classification admit that there are many challenges that are encountered when attempting to create such a taxonomy. One challenge is understanding the interplay of *medium* and *genre*: Askehave & Nielson, 2005) argue that "media properties influence both the purpose and form of web-mediated genres and should therefore be included in the genre identification" (p.4); they further theorize that the difficulties of understanding and accounting for this interplay are the "uncertainty and confusion" that has accompanied the "shift in genre research from traditional printed genres to genres published in electronic media such as the WWW " (pp. 6-7).

In 1997, Crowston and Williams examined 100 web pages and determined that they were composed of 48 distinct genres and that 80% of the pages in their sample replicated a print genre to a high degree. In 2001, Roussinov et al. used Crowston and Williams's (1997) coding scheme[16] to analyze 1234 web pages,

[16] Crowston and Williams (1997) did not have a coding scheme per se, the method they identified genres "based on the authors' experience with the Web and with other forms of communication. The determination of the genre of each Web page was done by each author separately. The authors then discussed the classification of each page and either agreed on a genre or that the page was unclassifiable" (n.p.)

coming up with a total of 116 genres; they then asked users to classify these pages as belonging to one of the 116 genres. The agreement between the researchers and the respondents about appropriate genre classification for a given page was 49.63% – as Shepherd, Watters, and Kennedy (2004) note, this study shows two things: "firstly, the number of Web genres seems to be growing, secondly, it is often difficult to determine the genre of a Web page" (p. 3).

Shepherd, Watters, and Kennedy (2004) developed their own classification scheme based not on specific genres of individual pages but on a distinction between "extant" and "novel" genres: extant genres are those based on existing genres whereas novel genres are "not like any existing genre in any other medium" (p. 1). These categories are further subdivided into replicated or variant forms of extant genres (which map onto Reilly and Eyman's (2007) remediation continuum as "highly transparent" and "moderately transparent") and emergent or spontaneous forms of novel genres (which do not map as neatly onto the remediation). While Shepherd, Watters, and Kennedy's schema is similar to Reilly and Eyman's remediation continuum (based on Bolter and Grusin's [1999] theories of "remediation"), it's approach to "spontaneous" novel genres does not fit with the rhetorically-based definition and use of genre (that is, all genres are to varying degrees emergent because they have specific communicative requirements and social exegeses).

Although this is very preliminary work, the next step will be to determine whether particular genres are more likely to function within specific ecosystems,

or if they are equally distributed across ecosystems and within and between larger ecological structures (e.g. institutions and disciplines).

This taxonomy is based on data collected from journals in rhetoric/composition from 1996-2003; there are certainly more digital genres than represented here—however, only these genres are cited in the data set.

Home Page
- Home Page: Government
- Home Page: Corporate
- Home Page: Organization
- Home Page: Community
- Home Page: Personal

Link Pages
- Link List
- Bookmark List
- Webliography
- Bibliography

Position Statement
Mission Statement
Strategic Plan

FAQ

Press Release

Advertisement

Whitepaper
- Whitepaper: Product
- Whitepaper: System
- Whitepaper: Concept

Journal Article
- Journal Article: Editorial
- Journal Article: Non-Peer-Reviewed
- Journal Article: Peer-Reviewed

Editorial

Review
- Review: Text
- Review: Software
- Review: Event
- Review: Performance

Response Letter

Conference Presentation
Conference Proceeding

Course Materials
- Course Materials: Syllabus
- Course Materials: Assignment
- Course Materials: Lecture
- Online Course

Library Handout

Student Work
- Course Assignment
- Assigned Blog
- Undergraduate Honors Thesis
- MA Thesis
- PhD Dissertation

Email
- Email: Personal
- Email: Listserv
- Email Archive

Threaded Discussion

Book
Book Chapter

Editor's Introduction
Introduction
Table of Contents

Legal Document

Report
Survey Results

Poem
Short Story

Transcript
    Transcript: Television interview
    Transcript: Radio interview

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