Criticism

Mark Bernstein

Eastgate Systems, Inc.

134 Main Street

Watertown MA 02472 USA

+1 617 924 9044

Bernstein@eastgate.com

ABSTRACT

Our methods for accumulating and testing evidence of a hypertext's successes and shortcomings are numerous but poorly understood. This paper surveys the most influential approaches to evaluating hypertexts and considers their impact on crafting a new literary economy.

Categories and Subject Descriptors

H5.4 [**Hypertext/Hypermedia**]: Theory. I7.2 [**Document Preparation**]: hypertext/hypermedia. J5 [**Computer Applications**]: Arts and Humanities. *Literature*.

General Terms

Documentation, Design, Human Factors,

Keywords

Hypertext narrative, criticism, economics, publishing, fiction,

1. CRITICISM

> *Poets are partial to their wit, 'tis true,*
> *But are not critics to their judgment too?* [76]

How do we know that a hypertext is a *good* hypertext? How do we know that a hypertext system – a software environment for writing and reading hypertexts – is a good hypertext system?

Students of hypertext naturally want to assess the success or failure of hypertexts. First, by understanding what makes one hypertext effective, we may improve our future efforts. Knowing where hypertexts fail can guide us to avoid future missteps or to design new systems which prevent or ameliorate the newly identified problem. All readers, have limited time and most have scarce resources; they naturally want to know which hypertexts they need to read and which they might ignore with little loss.

Publishers, too, need to judge a hypertext's quality and appeal,

since publishing organizations naturally wish to concentrate their efforts on the most promising and significant titles. Instructors must judge quality when grading student assignments, and must do so (and must be *seen* to do so) by applying standards that are sound and reasonable, or at least neither arbitrary nor partial.

When researchers report on novel hypertext systems and their features, similarly, critical readers want to see evidence that the new software tools excel (or fail) in terms of a clear and reproducible standard. Implementers are naturally inclined to believe that the systems they have built, and on which they have frequently lavished many months or years of effort, are good. Their degrees or careers frequently depend on the report's reception, on whether peer reviewers accept the system as successful or find the work unconvincing. Before we ourselves set out to replicate the researchers' latest accomplishments in our own systems, we naturally seek evidence of their utility.

Our effort to marshal evidence of a hypertext's successes and shortcomings is called "evaluation" in Computer Science, "criticism" in the humanities, and "literary theory" in cultural studies. These are not merely efforts to allocate money, to know which book to buy, which grant to fund, or which associate professor to tenure. Indeed, our claim to participation in the discipline of science or the profession of engineering depends on our ability to discriminate between competing results, to measure success or failure.

We cannot be satisfied with simply estimating a work's merit. We want to know how things work and why they fail. Often enough, failure might reflect inattention or foolishness; hypertext writers are human and Homer nods. More interesting to us, though, are those occasions where we can identify a writer's or a designer's aspirations and show how these were not realized or – better – demonstrate how they could be achieved.

For twenty years, we have read hypertexts – shared, original, and interlinked creations available to anyone and readable anywhere [42] – and have enjoyed the widespread use of hypertext systems from GUIDE [12] and Storyspace[6] to Microcosm [32] and the Web[4]. In this paper, we examine some evaluative and critical strategies that have been advanced over the years, hoping to identify fruitful new methods and approaches.

In practice, *evaluation* of systems and their features has most often been performed and reported by the original research team, frequently as a conclusion to a report presenting the system[1].

---

[1] Critical writing about systems sometimes appears in newspapers and trade magazines in the form of product reviews and business news, and occasionally in weblogs, course handouts, and other informally-published venues. Few of these efforts

Criticism, on the other hand, is more often applied by scholars to the work of others. This uneven distribution has deep roots in disciplinary customs and constraints, and prevents a head-to-head comparison of evaluative and critical approaches. We do not, in any case, aspire to argue that one approach is better, but rather to examine their operation and development.

2. AN ECONOMY OF JUDGMENT

Whoever thinks a faultless piece to see
Thinks what ne're was, nor is, nor ne'er shall be. [76]

Hypertexts and their systems – what Ted Nelson termed *Literary Machines* [72] – inhabit a literary economy. In speaking of an economy, we not concerned with profitability or price tags, but with broader systems of exchange which includes, but is not limited to, money and goods. Because the literary economy shapes what hypertexts can expect to achieve and how they can expect to be received, and because the hypertext economy is itself a subject of engineering, design, and criticism (Section 3), it behooves us to briefly review this economy as it is currently constituted[9].

To begin, we may recall that published hypertext is intrinsically political [35][25]. The topic of a hypertext might be anything: Victorian literature, perhaps, or a manual of programming style, or the imagined delights of a book tour. These are not political subjects, but in publishing them a writer is seeking to convince the reader or, at any rate, to bring about some sort of state of mind. By writing for publication, we surely are trying to improve the lot of our fellow creatures, whether by bringing them knowledge or wisdom, by amusing them on a cloudy afternoon or explaining how to assemble a crib. Perhaps no man but a blockhead ever wrote, save for money, but few hacks ever set out to annoy, persecute, or afflict their audience. The overarching motivation for hypertext research – to improve communication, to spread knowledge and understanding – is implicitly political, and in practice the most urgent needs for hypertext, in such areas as policy analysis, education, and research repositories, are explicitly so.

Much discussion of hypertext and its most popular forms – home pages, weblogs, social software, Twitter – focuses on the observation that hypertext (or, strictly speaking, electronic text) makes publishing less costly than printing books. In cyberspace, *anyone* can publish. This observation obscures the most salient fact about the book world as it stood at the dawn of hypertext: books are numerous, and for many years it has been possible for just about anyone to publish a book [93]. This is to say, the cost of creating and publishing a book is roughly commensurate with the resources of a middle-class individual (perhaps with some assistance from friends or family or fans) residing in Europe, North America, and much of the rest of the world. To make a Hollywood feature film requires access to millions of dollars. To build an innovative new house, an aspiring architect might require far more money than he could raise. To start a new manufacturing business, or to start a new school, we must have investors or grants. But to publish a book, we need a perhaps a year or two for writing it and a few thousand dollars for printing. The expense of

publication, moreover, has been roughly commensurate with private means for a century[2].

Because books are comparatively inexpensive to write and to manufacture, they can be produced for the needs of very modest audiences. We cannot make feature films about vertebrate paleontology or test-driven software development; too few people are interested. The same audiences profitably support numerous books.

In recent years, many book publishing companies have become subsidiaries of multinational corporations, first of diversified conglomerates and more recently of integrated media companies. Book and magazine publishing has increasingly become a very big business, focused on deploying large capital flows in support of blockbuster titles[29; 46]. Booksellers, too, have undergone a radical consolidation leading to chain stores, super-stores, and large internet booksellers[84]. The decline of newspapers – few cities have more than one or two viable newspapers and some will shortly have none – adduces a parallel case in which a diverse collection of media firms have been replaced by one or two national or international outlets.

Though consolidation (and privation) have been the lot of publishing throughout the late age of print, the natural scale of publishing and bookselling was, through much of its history, modest[41][21]. Most writers work alone, through a few might occasionally collaborate and some may avail themselves of the services of a secretary or a research assistant. We call the companies that make books "publishing houses" and most, until quite recently, were housed in buildings that had originally been private residences. Much indispensable work in bookmaking can only be performed by individuals or very small teams, and most of those individual efforts resist automation or commoditization of labor. Important advances in publishing continue to be made by very small firms – Barney Rosset's Grove Press, James Laughlin's New Directions, Dave Eggers' McSweeney's.

Books reach their readers through bookstores (which in the US operate predominantly on a 40% markup) and large online booksellers (who receive the same or somewhat better wholesale prices but frequently discount their wares). Traditionally, readers learned of books through reviews in newspapers and magazines, from bookseller recommendations, and through their friends and colleagues. The past decade has witnessed drastic retrenchment in book reviewing, placing greater emphasis on weblogs, reader reviews at internet booksellers, and personal recommendations of surviving independent booksellers. At the same time, the development of Internet search engines offers readers and booksellers a promising new meeting ground.

The experience of both writers and readers are shaped by the literary economy. Writers, of course, hope to be rewarded for their work, either through direct payment or through indirect rewards such as employment, patronage, status, grants, or invitations to

---

have been much cited by researchers, in part because their intent often appears chiefly to advise readers which products to buy or in which companies to invest. For an analogous situation in art criticism, see [27].

[2] Sylvia Beach published *Ulysses* for her friend James Joyce on the revenues of a small foreign-language bookshop. *Lady Chatterley's Lover* was privately printed, and much of its marketing relied on informal smuggling networks among the author's friends. Subscription publishing, in which a prospective author secured advance sales from among his circle of acquaintance in order to underwrite production costs, was widespread in 18th century England and America.

parties[2]. Trade book writers currently receive a royalty of 5-15% of the cover price, though rates vary widely. A surprisingly small number of writers currently receive the majority of their income from book sales. Though indirect compensation should not be neglected, direct compensation is probably to be preferred.

Writers and editors need to possess a shared aesthetic vocabulary in order usefully to negotiate new projects and to improve works in progress. An editor might, for example, observe that a link that she expected to find is, in fact, absent: is this an accident, a blunder, a technical malfunction, or a deliberate expressive act? In "Patterns of Hypertext" [5] I described some concepts and terms that we have found useful in such discussions.

We might assume that the chief economic concern of readers would be the cost of books. Moretti [65] has demonstrated that the size of the book economy – the rate at which books are published and purchased – has enormous impact on the way people read. In times when new books were rare, readers necessarily pored over the same texts. The same reading pattern also applies to communities of readers who could only afford to purchase a volume or two; Welsh miners and Midlands machinists read their Bunyan much as Elizabethans read their Livy [79]. The point at which a book world, or a genre, can offer new volumes every week presents an important inflection point in reading behavior, a transition to a literary world in which there is always something new to read, to read about, and to discuss.

This is the literary economy into which hypertexts shouldered their way in the 1980's and 1990's. It is an economy of judgment: at every boundary of this system, we observe that someone needs to assess the merits of each work. The writer needs to understand why she is composing the hypertext and to judge whether the work meets the task for which it is intended. The publisher must deduce what the author is trying to accomplish, judge whether or not it does what it intends, and simultaneously sense whether an audience requires what the work offers and whether this particular publisher can successfully convince that audience of their need. The bookseller, in turn, must find the right readers, and readers need to find the right works – and then, ideally, the readers need to be able to explain to their friends (and their bookseller) what they liked or disliked, so that they may in the future receive more useful recommendations.

The literary economy alone cannot guide our judgment: we cannot rely on box office receipts to tell us whether a new monograph on the Diels-Alder Reaction is sound. But judgment is at the core of the literary economy. That economy cannot function without judgment, and it cannot function well with poor judgment.

3. NEOVICTORIAN: DESIGNING A LITERARY ECONOMY

Das Endziel aller bildnerischen Tätigkeit ist der Bau!
The ultimate end of all creative work is the Web site!
(Walter Gropius, Bauhaus Manifesto, 1919)

The chief innovation of the Arts and Crafts movement and its subsequent tradition was not a visual style or the mere mixing of media, but rather the intentional design of a new economy of creative work. Arts And Crafts argues that we need not accept the economy as it is, or acquiesce in the logic of the factory. Economies change; we can design a new economy that conforms more closely to our sense of beauty and of justice [31]. Writing in *The Stones of Venice,* John Ruskin pauses from a discussion of

Venetian Gothic architecture to offer buying advice to Victorian consumers of glass beads, cups, and jewelry[83]:

> So the rule is simple: always look for invention first, and after that, for such execution as will help the invention and as the inventor is capable without painful effort, and *no more*. Above all, demand no refinement of execution where there is no thought, for that is slaves' work, unredeemed.

Ruskin argues that a prime consideration for the purchaser must be that their bauble not be the fruit of slave labor, and that mindless work is wrong, just as the African slave trade is wrong. Most significantly, he argues that changing the economy of art need not await a revolution, but that change can be effected by creating a better workshop and by cultivating better taste.

Intentional design of a literary economy is never far from the foreground in Ted Nelson's early writing about hypertext. Indeed, hypertext's founding document[3], *Computer Lib/Dream Machines,* [73] begins with the declaration that "You can (and must) understand computers now!" The concerns of Nelson's Xanadu are economic, from safeguarding the copyrights of authors to finding appropriate and just ways to divide the revenue and for exploiting subsidiary revenue streams such as Xandles, now known as internet domain names.

Though Landow is concerned with rights and revenues, his discussion of hypertext – especially its role in literary education – is shaped by a desire to disrupt and improve the intellectual commerce of the classroom [49], the marketplace of ideas[58]. By assigning students to read and to contribute to a growing space of interlinked essays, Landow establishes their role as participants in a critical community and, at the same time, demonstrates that their work has value. It is not merely written at the professor's command and for the professor's sole use, but a contribution to an ongoing scholarly discourse [61].

Other writers affect to be astonished to learn that hypertext is implicated in late capitalist economics. Golumbia [34] worries, for example, that if corporations could charge for internet access, that payment would contradict the democratic notion of a free press. This is surely wordplay – he doubtless knows that the American Founders expected and encouraged printing businesses and publishers – but he is deeply suspicious that packet-switching is a capitalist snare. Amerika, conversely, sees access to the internet as an opportunity for anybody (or everybody?) to be a star [2]. Rather than efforts to shape the literary economy, these seek to guide our attitude toward it, to lead us to deplore its role in the military-entertainment complex [70] or to exult in our opportunities to subvert it to new ends.

4. LATE MODERNISM: USABILITY AND THE VITRUVIAN VIRTUES

Trust not yourself; but your defects to know,
Make use of ev'ry friend – and ev'ry foe. [76]

Since literary machines operate within the economy, one natural approach to judging them is to assess their efficiency productivity, to measure how much useful work they perform for each unit of

---

3 I remain unconvinced that Bush's "As We May Think" [14] exerted significant influence unmediated by Nelson and Engelbart, though the question deserves more study. For Bush, see also [13].

energy invested, to measure the product they produce and the labor and materials they need. In this view, a good hypertext, like Vitruvius' Roman farmhouse, is good because it serves its office and performs its task. It offers commodity, firmness, and delight.

In a classic 1989 metastudy, Jakob Nielsen enumerated "The Matters That Really Matter" for hypertext usability, which is to say those usability studies that succeeded in obtaining statistically significant and meaningful results[75]. More recently, Marshall [52] carefully examines how people use books, both paper and electronic. We learn, for example, that typography is significant (but probably less so than graphic designers believe), and that unresponsive systems are distracting. Theory suggests – and Marshall demonstrates – that the activities of readers are more diverse than an instrumental view, in which reading is merely information transfer, might suggest.

These experiments provide useful information to the designer who needs to select a typeface for a book or a display for an eBook reader. But they do not address a core concern: do hypertexts work? Specifically, are hypertexts better than books, or is the codex a superior literary machine?

Testing this proposition seems a straightforward task. Miall and Dobson [59], for example, asked students to "read a simulated literary hypertext or the same text in linear form." Taking conventional short stories (Elizabeth Bowen's "The Demon Lover" and Sean O'Faolain's "The Trout"), they divided the text into 24 nodes and either linked the nodes in sequence or as a complex hypertext. The students reading the hypertext took about 10% longer per node and reported that they felt more confused.

This result hardly seems surprising, since neither story was intended to be read as a hypertext. Nor would be surprised if, performing a Mozart sonata with its measures permuted by a frankly hostile investigator, we learned that students thought it more confusing than the same sonata performed as its author imagined.

> To require hypertext to function like a book is a bit like expecting a jetliner to behave like a locomotive: yes it's very fast, but the blasted thing won't stay on the rails [68]

It should also be remembered that the ills Miall observes – slower reading, fragmented and unpredictable reading sequence, even confusion – may be seen as beneficial. Instructors sometimes long to teach students to read more slowly and with greater care, and writers and teachers alike seek to surprise and baffle novices in order to make them more receptive to new ideas [49].

We should be wary, too, of privileging a first encounter over rereading; many texts (and all hypertexts) are meant to be reread [43] and expert reading practices have, since the enlightenment, favored nonsequential excursions through multiple texts over prolonged immersion in a single narrative stream [21]. Complex patterns of reading are especially important when we are ourselves writing:

> The writer rereads and unreads in the same scan, sometimes looking for the place which needs attention, other times seeking surprising instances of unnoticed eloquence which her attention now confirms in a process of authorship. [43]

Though Michael Joyce observes here that rereading is the essence of hypertext – how, without rereading, would we know that our link choices are consequential? – early investigators often assumed that revisiting a previously-read page was a sign of disorientation and that a successful hypertext would eliminate such wasteful expenditure of time [22].

These measures – the amount of time spent reading, the number of pages visited – seek to assess the efficiency of the hypertext experience. Other studies attempt to measure productivity, comparing the amount of work that the hypertext-assisted reader can produce in a unit of time to the work produced with more conventional tools [81]. The tasks measure short-term information finding, reading comprehension and retention strategies; students read a (hyper)text and either take a quiz or write an essay on its subject, or are required to locate information in pursuit of a contrived clerical task[91].

Though these studies can provide useful information to system designers, the tasks they study have little relationship to our most important reading work. Much attention has been paid, for example, to helping people locate facts in a complex document, presumably in the belief that this is what knowledge workers do. I am skeptical that this assumption is valid even for clerical work. Researchers may do this when checking footnotes or confirming statistics, but no one receives tenure for their speed at locating a reference or dexterity at finding the population of Montenegro in 1912.

A further difficulty arises when we chiefly rely on measuring the mean performance and average opinions of large groups. The impact of reading is inherently individual (though Marshall observes[52] that reading itself is surprisingly social) and its impact may vary greatly from one to another; a text is not worthless that inspires one reader in a hundred to achieve something difficult and wondrous. The distinctive economics of the book[93] make reliance on the exceptional reaction possible and even usual; we could not make a Hollywood movie that depended on the audience's familiarity with C^{13} NMR or the challenges of finding the renal artery in the operating room, but books that make these demands flourish and play an essential role in our discourse and society. Qualitative methods (as, for example, in [53]) address this in part, or at least need not necessarily wash out the impact of the exceptional, but the investigator must be prepared to recognize the exception and not dismiss it as an outlier.

Conklin's pioneering survey of early hypertext systems [17] postulated that hypertexts imposed *cognitive overhead*. Readers, he assumed, would need to invest additional thinking into the hypertext and its mechanism, and so the hypertext would need to be sufficiently superior to print that this overhead would be overcome. Many investigators have sought to measure this overhead. Morozov, for example, [66] constructs miniature hypertexts from a linear 39-paragraph biology text and compares whether various graphic overviews helped undergraduates answer 37 multiple-choice questions after spending about 15 minutes with the hypertext. The students were also asked if they felt disoriented.

These results are not without interest, but we do not, in fact, ask students to read biology textbooks in order for them to answer multiple-choice tests. The goal, surely, is to instill understanding of biology, to learn how biologists reason, what evidence they adduce, what arguments they accept. In designing a kiosk about the Holocaust in Austria[85], it might be desirable to improve

legibility or shorten reading time, but surely the primary goal is, simply, never again.

Investigators frequently study the reading experience of undergraduates. Undergraduates are plentiful and inexpensive test subjects, but it is important that our literary machines serve our most difficult research endeavors as well as helping students complete their homework. Emphasis on inexperienced readers who are asked to perform comparatively brief and superficial reading tasks can distort our picture of reading.

Indeed, our understanding of how people read today is far from complete, and while we know even less about the reading practices of the past, we now know that they differed from our own[21]. We frequently encounter claims that young people today have different reading practices, that they are distracted by links and bored in the absence of immersively sensual multimedia[15]. It is not clear that these claims are true – we see the same concerns raised in Augustan Rome – but our own ways of reading differ from the habits of Jefferson, and his differed from the reading of 19th century Welsh coal miners[79]. This is not to argue that approaches to reading will not change[21], but to remind ourselves that new ways of reading may in fact be superior to our own[90].

Measuring observable behaviors (such as reading time) seems unlikely to illuminate the uses of literature we value most, and gauging performance on contrived tasks casts but a feeble light on the intellectual and emotional processes that make our most important works compel attention.

5. MODERNISM: READING CLOSELY

Who to a friend his faults can freely show,
And gladly praise the merit of a foe. [76]

Instead of studying superficial encounters with undergraduates, we might instead look closely at the hypertext, its construction and meaning. Robert Coover's influential "End of Books" [18] and "Hyperfiction" [19] reason from readings of hypertexts, both published work and student efforts, to make a broad argument about hypertext and metanarrative.

> Writing students are notoriously conservative creatures. They write stubbornly and hopefully within the tradition of what they have read. Getting them to try out alternative or innovative forms is harder than talking them into chastity as a life style. But confronted with hyperspace, they have no choice: all the comforting structures have been erased. It's improvise or go home. Some frantically rebuild those old structures, some just get lost and drift out of sight, most leap in fearlessly without even asking how deep it is (infinitely deep) and admit, even as they paddle for dear life, that this new arena is indeed an exciting, provocative if frequently frustrating medium for the creation of new narratives, a potentially revolutionary space, capable, exactly as advertised, of transforming the very art of fiction, even if it now remains somewhat at the fringe, remote still, in these very early days, from the mainstream. [19]

This is anecdotal evidence, to be sure, but it is a telling anecdote, providing more insight than we would gain if, instead, he had reported that students in his workshop had written 5% more words per semester.

Douglas [23] and Aarseth [1] each provide detailed and convincing readings of *afternoon*, in each case situating Joyce's

hypertext in a theory of interactive narrative. Gaggi's snapshot of postmodern art, *From Text to Hypertext* [33]*,* cleverly uses a detailed reading of *Victory Garden* [69] to bridge "The Arnolfini Wedding" and Cindy Sherman's *Untitled Film Stills.* David Ciccoricco uses Joyce's *Twilight* to demonstrate arrival and departure and flow in network fiction [16], while both Landow [49] and Hayles [37] read *Patchwork Girl* [39]*,* one to demonstrate its relationship to literary theory and the other to illuminate the artifactuality of the (hyper)text. Each critic, one suspects, knows their destination in advance, but each reads the hypertext with sensitivity and sympathy and so guides the reader.

Landow's various editions of *Hypertext* [48] set out to reconcile hypertext technology and literary theory, His readings of individual hypertexts are informed by this over-arching mission, but he is careful to observe closely what each hypertext does (and from what it turns aside [36]) rather than fitting all hypertexts into a grand framework or condemning those that will not fit.

Part of Coover's 1993 mission [19] was to survey almost all the published hypertext while it was still possible for an individual to read everything. More than a decade later, Astrid Ensslin [28] could not attempt that feat but was not deterred from discussing a vast range of the most widely-read hypertexts, both independent and on the Web, in an examination of the formation of a hypertext canon. Her goal here combines judgment and description, seeking to identify what each work seeks to accomplish and what each of its critics is trying to say.

I argue below that Robert Coover's 1999 vision of a hypertextual "golden age" was illusory, but the late 1990's and early 2000's were a golden age for European and Commonwealth hypertext critics, a period in which a number of scholars published intelligent and sensitive assessments of electronic work. Especially notable were Susana Pajares Tosca [87; 88], Anja Rau [77; 78], Espen Aarseth [1], David Ciccoricco[16], Adrian Miles [60], and Raine Koskimaa [47], among many others. Many of these writers were seeking first to judge the merit of specific works, but all did so by close observation of what the works attempted to do and how they worked.

6. ESSENTIALISM

Most critics, fond of some subservient art,
Stil make the whole depend upon a part. [76]

Sensing the limits of clinical observation for explaining the literary experience of hypertext, several writers start instead by identifying an essence of electronic text. This essence, once understood, could offer a valuable key for understanding specific works and their strategies for exploiting or resisting the natural inclinations of the medium.

Michael Joyce's difficult but insightful "Nonce Upon Some Times" [43] demonstrates the potential of careful formal reasoning. Joyce observes that a nontrivial hypertext narrative must contain cycles, and then looks closely at what narrative structures could follow recurrence: recursus (in which the story repeats – though perhaps it might be told differently), timeshift, and renewal (in which recurrence opens an entirely new story). This exhaustive catalog of transitions offers abundant narrative possibilities [8].

Janet Murray identifies "the four essential properties of digital environments." [71]

> When we stop thinking of the computer as a multimedia telephone link, we can identify its four principal

properties, which separately and collectively make it a powerful vehicle for literary creation. Digital environments are procedural, participatory, spatial, and encyclopedic.

These are all plausible candidates for distinguishing digital literature from codex books, and the framework helps reconcile deliberately literary creations like *afternoon* with work like ELIZA and *Adventure* that, though they might have different aspirations, are also literary machines [63].

Where Murray envisions her four essential properties as the foundation of the future of narrative in cyberspace, Lev Manovich argues [51] that the computer transcends narrative.

> After the novel, and subsequently cinema privileged narrative as the key form of cultural expression of the modern age, the computer age introduces its correlate – database. Many new media objects do not tell stories; they don't have beginning or end; in fact, they don't have any development, thematically, formally or otherwise which would organize their elements into a sequence.

This, too, seems both plausible and useful as a critical position for interpreting specific works and as a source of further questions.

In practice, arguments based on the essential properties of hypertext or digital environments have proved problematic. First, is the identification of these essences actually correct? Manovich, for example, postulates a separation of data and procedure that poorly fits modern software practice and the general acceptance of object-oriented and functional programming. Murray's emphasis on the procedural fits uneasily into a world of declarative programming, the spatial metaphor has been far from ubiquitous in the development of the Web (and is not uncharacteristic of print [89]), and the contemporary critical theory has shown that reading and interpretation of conventional texts are far more participatory than they once seemed.

These arguments from the essence face a further difficulty when applied to specific hypertexts. Actual hypertexts seem to adhere poorly to the prescription. *Afternoon* is not very procedural, and Moulthrop [67], a sympathetic reader, suggests that it is excessively so. "Lust," with its 37 nodes, is hardly encyclopedic[3]. None of these are databases, and all tell stories. Montfort [64] concludes that these simply are not very good, preferring the forgotten detective game *Deadline,* but his critical approach yields no hint of where *afternoon* goes wrong or how the obstinately ambiguous "Lust", always turning away – in sorrow? Or shame? And from what? – would be improved if it had used pushdown automata and not finite state machines.

Though in his indispensable *New York Times* reviews Robert Coover was informed by insightful readings of real hypertexts, his "Literary Hypertext: The Passing Of The Golden Age" [20] operates chiefly from an essentialist observation – not of the essence of the medium, indeed, but of the essence of the literary economy of the Web.

> In terms of new serious literature, the Web has not been very hospitable. It tends to be a noisy, restless, opportunistic, superficial, e-commerce-driven, chaotic realm, dominated by hacks, pitchmen and pretenders, in which the quiet voice of literature cannot easily be heard or, if heard by chance, attended to for more than a moment or two.

"Writing consumes one entirely." he writes. "But learning these new applications also consumes one entirely, and they keep changing." The distractions, noise, the bustle of the Web now seemed to Coover to preclude the quieter literary pursuits of a vanished age while encouraging kinetic poetry and immersive visuals. But Shakespeare wrote for money [38], managed (and on occasion rebuilt) a theater, settled his landlord's family disputes, and cultivated informants and collaborators from the court to the brothel[74]. Medieval Italian is more difficult to learn than Dreamweaver, yet poets read Dante. Even a superficial familiarity with 19th and 20th century literature demands a reading list far longer than the entire body of Web design. Writers overcome obstacles.

Finally, a significant strain of essentialist criticism begins from a conviction that hypertext must be claptrap[62]. These critics find that the essence of computational media is that they are pernicious[15]. Believing hypertext to be disgusting or harmful, they read very little [45] or almost none [10].

7. POSTMODERNISM: WHAT PEOPLE LIKE

> *Our sons their fathers' failing language see,*
> *And such that Chaucer is, shall Dryden be.* [76]

Some of the venom directed at hypertext by its essentialist critics is intended not so much for new media as for postmodernism. Many of the early hypertext writers flew postmodern colors (though Aarseth reminds us some, at least, were modernists), and Landow's convincing demonstration of the convergence of contemporary critical theory and hypertext technology [48] tempted some who despised Theory to attack Hypertext. Today, the essentialist foundation has itself been largely abandoned. In an appreciation of film critic Pauline Kael, Louis Menand writes [57]:

> It was Kael's therapeutic advice to the overcultivated that if they just concentrated on responding to the stimulus, the aesthetics would take care of themselves. What good is form if the content leaves you cold?

> The academic term for the kind of antiformalism Kael promoted is "postmodernism." Postmodernism in the arts simply is anti-essentialism. It is a reaction against the idea, associated by academic critics in the postwar years with modernist literature, painting, and architecture, that the various arts have their own essential qualities – that poetry is essentially a matter of the organization of language, that painting is essentially a matter of composition, that architecture is essentially a matter of space and light.

The rejection of essentialism gets us past one shortcoming of the essentialist stance: its frequent failure to describe or explain the hypertexts we currently possess. "Lust" is not encyclopedic, *Patchwork Girl* is not a database, Google has not made you or I stupid, and the book world's perpetual crisis staggers on. Instead of wrestling with these contradictions, an anti-essentialist can simply enjoy what we have and try to figure out how it works and how it might work better.

In a fascinating series of studies, Cathy Marshall closely examines specific aspects of how actual readers use both paper and electronic books. She finds that reading, both in theory and in practice, is far more complex than is often supposed [25]. Much of the engineering literature, and many of the rubrics of

Information Architecture and Web Design (e.g. [80]) assumes that business reading, at least, is fundamentally a question of locating and transferring information, but observation and introspection each demonstrate that reading is far more complex, and depends on the knowledge and understanding of the reader.

In [54], for example, Marshall investigates annotation by studying the markings inside 410 used textbooks on sale in a university's book store and then observing how purchasers chose a copy. She finds that annotations practices are far more playful and far less instrumental than we might expect, that readers – even college freshmen – have strong beliefs about the sorts of annotation they desire and dislike, and that these preferences vary radically. In theory, annotations are (or should be) functional; in practice, people annotate for fun, to reflect their current temperament, or to enter into a dialogue with the author [55], their employers[21], or with their future selves. Similarly, observation of actual readers reveals that their use of even ostensibly linear, printed texts is far from sequential; real readers constantly look ahead and glance behind. They like to move with their reading, around the room or around town. [52].

If Marshall and her collaborators are ethnographers of reading, Jane Douglas pioneers autoethnography; a central feature of her original research involved reflective study of her detailed notes of preliminary encounters with *afternoon* [24]. Similarly, Efimova examines the use of constructive hypertext for developing research ideas (see [44]) by reflecting on her own use of a weblog during the composition of her dissertation [26], and Ericson uses similar techniques to evaluate his own note-taking system [30].

Reflective evaluation is subject to a host of distortions; we are bound to want our own work to appear well, and to present ourselves in the best light. Yet we have already seen that disinterested evaluation through brief sessions with uninterested students also presents many opportunities for distortion. A diarist cannot present an entirely complete and authentic representation of every aspect of their experience, yet we often find journals and diaries informative and, significantly, we are frequently capable of allowing for their lapses and distortions [50].

Jill Walker's "Tearing Apart And Piecing Together" [92] is launched from two encounters with *afternoon*. At first, she approaches the text carelessly, and find only frustration. Several months later, she tries again and, adopting a more careful reading strategy, she finds herself enjoying the work.

> So for me to enjoy reading *afternoon*, I needed to give up my reader's choice and instead follow the author's arranged default reading, which was structured in the most conventional way a story can be told: chronologically. But after grasping a minimal version of the story, which the default reading gave me, I could fit new nodes into my constantly changing picture of the story.

This frank confession of failure and enjoyment leads in turn to an exemplary discussion of the narratology of hypertexts which are necessarily folded across time and place [11].

It is not enough to know that Walker enjoyed *afternoon* or that Efimova found her weblog a congenial "personal thinking space", but the articulated evidence of enjoyment (and failure) is crucial. Just as a writer may know that a particular turn of phrase is good without being able to prove it, a system or feature may sometimes be interesting even though we cannot immediately demonstrate its desirability. Detail, candor, and critical reflection are essential here; we need reasons and reactions, not merely a hasty rating on a scale of one to ten.

An extreme case of autoethnography is Shelley Jackson's "Stitch Bitch," a performance piece that reads (and in some ways reimagines) *Patchwork Girl* [40]. Writers seldom publish critical readings or interpretations of their own work (although visual artists often do [27]), but the intertextuality of hypertext – and Jackson's ironic performativity – make reflexive commentary more useful, and less intrusive and partial, than we might expect.

The late 20th century study of reading, reception and interpretation led to a broad understanding that the construction of meaning depends critically on culture, on what the reader already knows, expects, and believes [25]. This realization informs the development of hypertext and its embrace of polyvocality and intertextuality, its distrust of conventional narrative closure, and its aspiration to address subtle realms of experience. Knowing that meaning is indeterminate, however, has sometimes led critics to espouse advantageous or attention-getting positions that are defensible but (perhaps) untrue.

A further risk, moreover, is the lure of the crowd. Menand observes that

> Although people sometimes have a hard time deciding whether or not something is art, they are rarely fooled into thinking they are having a good time when they are not. [57]

But the conditions for such self-deception are best when a work is popular and profitable, when everyone admires it. This has not been lost on critics, of course, and every Literature major now acquires a ready facility for arguing that any admired or beloved work is, in fact, dull or pernicious or complicit [86].

8. THE NEOVICTORIAN CRITIC

> *In ev'ry work regard the writer's end,*
> *Since none can compass more then they intend;*
> *And if the means be just, the conduct true,*
> *Applause, in spite of trivial faults, is due.* [76]

Evaluating hypertexts and hypertext systems is critical to both the literary economy we know and to any better economy to which we might aspire. We want to be able to grade student hypertexts with confidence, and to justify those grades with authority. Editors want to feel confident when they identify flaws in hypertexts that their judgments are sounds and that writers – whether they agree with the editor or not – understand what the editor is proposing. Publishers want to select the most promising hypertexts. Booksellers and bloggers want to discuss the most interesting new work and introduce it to those readers who need it most.

Quantitative evaluation is currently the preferred tool for testing interactive software, but it is often silent or misleading on those topics in which we are most interested. Brief, contrived, and casual encounters are neither typical nor desirable spheres in which to meet literature. The outstanding characteristic of the book, moreover, is that it is economically feasible for a book to address a small and specific audience, and hypertext (with its ability to adapt to new readers and with its attractive economics of distribution) should permit even tighter focus. A first encounter between an arbitrary text and an indifferent undergraduate may tell us little.

If we turn to the humanities, we find a range of critical practices based, in the end, on the reported encounter of a single reader and the hypertext. Each critic is bound to differ, but here I have divided some of the most influential early hypertext critics into three groups: those that set out to explain what we find in the hypertext; those who align the hypertext with an abstract explanatory structure; and those who reflect on (and report) their experience of the hypertext. At their best, these reflections provide information and insight we cannot hope to gain from clinical studies.

At their worst, however, critical reflections can be both wrong and dishonest. In empirical studies, we may hope to detect the imprint of bias or error through careful examination of statistics and procedures, but here neither error or fraud leaves a mark. Nor can we fully compensate for the risk through the law of large numbers: one enthusiastic disciple (or violent dissent) may be more convincing than a hundred tepid considerations. How can the risks of critical reflection be minimized?

I believe an answer may be found in some of the artistic and political practices of the late 19th and early 20th century radicals from Ruskin to the early Bauhaus, practices I call (without regard to nationality) NeoVictorian. The key concept that runs throughout these disparate movements is the integrity of the artist and of the work. In reconciling criticism to computer science, this means:

Willingness to get your hands dirty. Whether the critics admire or deplore a work, you should experience it directly and form an opinion. Defer to the critic's expertise when it exceeds your own, but confirm that their experience coincides with, or can be reconciled with, yours.

Consequences for being wrong. At present, since we cannot prove that any particular reading is false or unreasonable, writers may attract attention and rewards by adopting a pose of striking dissent. One predicts that the most desirable and popular new computational products will fail disastrously, another declares that beloved classics are dull, a third denounces the stale literature of an exhausted era in favor of a new and unknown genre. Arguing this case is commendable if you are right, but we should remember mistakes and punish intentional errors.

Indifference to persons and their occupation. Our ancestors believed that the rich were better than the poor, the famous more blessed than the obscure, that teachers knew better than students, that gentlemen (and professors) were more noble than artisans. We now understand this is pernicious, but old habits remain and it is easier for the critic to pin a fault to a student than to a respected colleague. It is easier to find merit where we expect it; we should especially reward (and regard) criticism that finds merit where we do not.

Rigor and detail remain crucial. Convincing critical appreciations approach the hypertext in detail, yet draw on myriad sources and ideas just as the intelligent reader pays attention to the text yet also considers what she already knows. Much hypertext depends, for example, on the experience of what the text withholds, omits, or turns from[7; 36; 56]; looking for everything that is not to be found is a fool's errand, but sympathetic reporting of what was missed (and why) can help establish the critic's position – and candor.

Observations against interest are compelling. An incisive example of a system's failures can be more revealing than a catalog of its successes. No system, and no hypertext, does everything; a candid view of the boundaries is invaluable,

Humility. The critic may be wrong. On one occasion, I was invited to help judge a dissertation proposal workshop, and one of the papers discussed the experience of teaching a hypertext that, as it happened, I had edited, and which I thought I knew quite well. The student quoted, as an example of their class discussion, one of their own student's explanation of the hypertext.

That student's student had an interpretation that was clearly better than my own. I had not distorted the work to make a case or to fit a theory, and my own interpretation was defensible, but that student's interpretation – though completely different – was right.

Commitment to criticism. Recent dislocations to the economies of newspapers, magazines, and libraries have extinguished many traditional venues for criticism [58] [21]. Instead of viewing criticism as an exceptional activity, conducted by a few experts or performed to demonstrate the author's eligibility for a degree, it should be the expectation that hypertext researchers read hypertexts and that they record their reaction. Weblogs and repositories make this economically feasible, and the consequent development of discourse and dialogue would itself present may new opportunities for study. To insist on this is no more than Ruskin's insistence that masters ought to make their own work, or the Bauhaus expectation that instructors should paint their walls.

Art in the service of the potato. Michael Ruhlman [82] thus distinguishes the craft of placing skill and knowledge in the service of bringing out the best properties of simple ingredients. We urgently need better hypertexts – hypertexts that can reach broad audiences and help them understand and resolve the many pressing problems we face. The most effective path to that end, I propose, is to use all our tools, critical and clinical, to understand and elicit the writer's end – and the reader's.

9. ACKNOWLEDGMENTS

10. REFERENCES
[1] Aarseth, E. J. 1997 *Cybertext: Perspectives on Ergodic Literature*. Johns Hopkins University Press.

[2] Amerika, M. 2002 *How To Be an Internet Artist*. Alt-X Press.

[3] Arnold, M.-K. 1993. Lust. *Eastgate Quarterly Review of Hypertext*. 1, 2.

[4] Berners-Lee, T., Cailliau, R., Luotonen, A., Nielsen, H. F., and Secret, A. 1994. The World-Wide Web. *Communications of the ACM*. 37, 8, 76-82.

[5] Bernstein, M. 1998. Patterns of Hypertext. *Hypertext '98*. 21-29.

[6] Bernstein, M. 2002. Storyspace 1. *Proceedings of the 13th ACM Hypertext Conference*. 172-181.

[7] Bernstein, M. 2004. Lust, Touch, Metadata. *Proceedings of the fifteenth ACM Conference on Hypertext and Hypermedia*.

[8] Bernstein, M. 2009. On Hypertext Narrative. *ACM Hypertext 2009*.

[9] Bernstein, M. and Greco, D. Designing A New Media Economy. *Genre*. in press.

[10] Birkerts, S. 1994 *The Gutenberg Elegies*. Faber and Faber.

[11] Bolter, J. D. 1991 *Writing Space*. Lawrence Erlbaum Associates.

[12] Brown, P. J. 1987. Turning Ideas Into Products: The Guide System. *Proceedings of the ACM Conference on Hypertext*. 33-40.

[13] Buckland, M. 2006 *Emanuel Goldberg and his Knowledge Machine: Information, Invention, and Political Forces*. Libraries Unlimited.

[14] Bush, V. 1945. As we may think. *Atlantic Monthly*. July 1945, 101-108.

[15] Carr, N. 2008. Is Google Making Us Stupid. *The Atlantic Monthly*. 301, 6.

[16] Ciccoricco, D. 2007 *Reading Network Fiction*. University of Alabama Press.

[17] Conklin, J. 1987. Hypertext: An Introduction and Survey. *IEEE Computer*. 1987, September, 17-41.

[18] Coover, R. 1992. The End of Books. *New York Times Book Review*. 1.

[19] Coover, R. 1993. Hyperfiction: Novels for Computer. *New York Times Book Review*. 1.

[20] Coover, R. 2000. Literary Hypertext: Passing of the Golden Age. *Feed Magazine*.

[21] Darnton, R. 2009 *The case for books : past, present, future*. PublicAffairs.

[22] De Young, L. 1990 *Linking Considered Harmful*. In Hypertext: Concepts, Systems and Applications, N. Streitz, A. Rizk, and J. André,Eds Cambridge University Press.

[23] Douglas, J. Y. 2009 *How Do I Stop This Thing?: closure and indeterminacy in interactive narratives*. In Reading Hypertext, D. G. Mark Bernstein,Ed Eastgate Systems, Inc.

[24] Douglas, J. Y. 1992. "Print Pathways and Interactive Labyrinths: How Hypertext Narratives Affect the Act of Reading.".

[25] Eagleton, T. 2003 *After theory*. Basic Books.

[26] Efimova, L. 2009. Weblog as a personal thinking space. *Proceedings of the 20th ACM conference on Hypertext and hypermedia*. 289–298. DOI=http://doi.acm.org/10.1145/1557914.1557963.

[27] Elkins, J. 2003 *What Happened To Art Criticism?* Prickly Paradigm Press.

[28] Ensslin, A. 2007 *Canonizing Hypertext: Explorations and Constructions*. Continuum.

[29] Epstein, J. 2002 *Book Business: Publishing Past, Present, and Future*. W.W. Norton & Co.

[30] Erickson, T. 1996. The Design and Long-Term Use of a Personal Electronic Notebook: A Reflective Analysis. *CHI'96*. 11-18.

[31] Faulkner, P. 1980 *Against The Age: An Introduction to William Morris*. Unwin Hyman.

[32] Fountain, A. M., Hall, W., Heath, I., and Davis, H. C. 1990 *MICROCOSM: An Open Model for Hypermedia With Dynamic Linking*. In Hypertext: Concepts, Systems and Applications (Proceedings of ECHT'90), N. S. A. Rizk, and J. André,Ed Cambridge University Press.

[33] Gaggi, S. 1997 *From Text To Hypertext: Decentering the Subject in Fiction, Film, the Visual Arts, and Electronic Media*. The University of Pennsylvania Press.

[34] Golumbia, D. 1996. Hypercapital. *Postmodern Culture*. 7, 1.

[35] Greco, D. 1996. Hypertext with Consequences: Recovering a Politics of Hypertext. *Hypertext '96*. 85-92.

[36] Harpold, T. 1991 *Threnody: Psychoanalytic Digressions on the Subject of Hypertexts*. In Hypermedia and Literary Criticism, Paul Delany and G. P. Landow,Eds MIT Press.

[37] Hayles, N. K. 2005 *My mother was a computer : digital subjects and literary texts*. University of Chicago Press.

[38] Hornby, N. 2008 *Shakespeare Wrote for Money*. McSweeney's.

[39] Jackson, S. 1996. Patchwork Girl: by Mary/Shelley/and Herself.

[40] Jackson, S. 1998. Stitch Bitch. *Paradoxa*. 4, 526-538.

[41] Johns, A. 1999 *The Nature of the Book: Print and Knowledge In The Making*. University of Chicago Press.

[42] Joyce, M. 1990. afternoon, a story.

[43] Joyce, M. 2009 *Nonce Upon Some Times: Rereading Hypertext Fiction*. In M. Bernstein and D. Greco,Eds Eastgate Systems, Inc.

[44] Joyce, M. 1988. Siren Shapes: Exploratory and Constructive Hypertext. *Academic Computing*. 11 ff.

[45] Kakutani, M. 1997. Never-Ending Saga. *The New York Times Magazine*. 40-41.

[46] Korda, M. 1999 *Another life : a memoir of other people*. Random House.

[47] Koskimaa, R. 2000. Digital Literatur: from text to hypertext and beyond. Doctoral Dissertation.

[48] Landow, G. P. 1992 *Hypertext : the convergence of contemporary critical theory and technology*. Johns Hopkins University Press.

[49] Landow, G. P. 2006 *Hypertext 3.0: Critical Theory and New Media in an Era of Globalization,*. Johns Hopkins Press.

[50] Mallon, T. 1984 *A Book Of One's Own: People and Their Diaries*. Hungry Mind Press.

[51] Manovich, L. 2001 *The Language of New Media*. MIT Press.

[52] Marshall, C. C. 2009 *Reading and Writing the Electronic Book (Synthesis Lectures on Information Concepts, Retrieval, and Services)*. Morgan and Claypool Publishers.

[53] Marshall, C. C. and Ruotolo, C. 2002. Reading-in-the-Small: a study of reading on small form factor devices. *Joint Conference on Digital Libraries*.

[54] Marshall, C. C. 1998. Toward an ecology of hypertext annotation. Proceedings of the ninth ACM conference on Hypertext and hypermedia, 40-49.

[55] Mason, W. 2007. Among The Reviewers: John Updike and the book-review bugaboo. *Harper's Magazine*. 97-101.

[56] Menand, L. 2002. Cat People: what Dr. Seuss really taught us. *The New Yorker*.

[57] Menand, L. 1995. Finding It At The Movies. *The New Yorker*. 42, 5.

[58] Menand, L. 2010 *The Marketplace of Ideas*. W.W. Norton.

[59] Miall, D. S. and Dobson, T. Reading Hypertext and the Experience of Literature. *Journal of Digital Information*. 2, 1.

[60] Miles, A. 1999. Cinematic Paradigms for Hypertext. *Continuum: Journal of Media & Cultural Studies*. 13, 2, 217-225.

[61] Miles, A. 2009 *Hypertext Teaching*. In Reading Hypertext, M. Bernstein and D. Greco,Eds Eastgate Systems, Inc.

[62] Miller, L. 1998. www.claptrap.com. *New York Times Book Review*. 43.

[63] Montfort, N. 2003 *Twisty little passages : an approach to interactive fiction*. MIT Press.

[64] Montfort, N. 2000. Cybertext Killed the Hypertext Star. *Electronic Book Review*.

[65] Moretti, F. 2007 *Graphs, Maps, Trees: Abstract Models for a Literary History*. Verso.

[66] Morozov, A. 2009. The Effects of Spatial Ability and Graphical Navigational Aids on Cognitive Load and Learning From Web Based Instruction. *Journal of Educational Multimedia and Hypermedia*.

[67] Moulthrop, S. 1989. Hypertext and 'the Hyperreal'. *Hypertext '89*. 291-298.

[68] Moulthrop, S. 1991. Beyond the Electronic Book: A Critique of Hypertext Rhetoric. *Hypertext'91*. 291-298.

[69] Moulthrop, S. 1991. Victory Garden.

[70] Moulthrop, S. 1991. You Say You Want A Revolution? *Postmodern Culture*. 1, 3.

[71] Murray, J. 1997 *Hamlet On The Holodeck: The Future of Narrative in Cyberspace*. The Free Press.

[72] Nelson, T. 1982 *Literary Machines*. Mindscape Press.

[73] Nelson, T. H. 1976 *Computer Lib/Dream Machines*. Ted Nelson.

[74] Nicholl, C. 2008 *The Lodger Shakespeare: His Life on Silver Street*. Viking.

[75] Nielsen, J. 1989. The Matters that Really Matter for Hypertext Usability. *Hypertext'89*. 239-248.

[76] Pope, A. 1711 *An Essay On Criticism*. In The Poetical Works of Alexander Pope, A. L. Burt.

[77] Rau, A. 2000. Wreader's Digest: How To Appreciate Hyperfiction. *Journal of Digital Information*. 1, 7.

[78] Rau, A. 2009 *These Waves Of Bugs*. In Reading Hypertext, M. Bernstein and D. Greco,Eds Eastgate Systems, Inc.

[79] Rose, J. 2001 *The intellectual life of the British working classes*. Yale University Press.

[80] Rosenfeld, L. and Morville, P. 1998 *Information Architecture for the World Wide Web*. O'Reilly & Associates, Inc.

[81] Rouet, J.-F. 1992. Cognitive Processing of Hyperdocuments: When Does Nonlinearity Help? *Hypertext 2002*. 131-140.

[82] Ruhlman, M. 2009 *The making of a chef : mastering heat at the Culinary Institute of America*. Henry Holt and Co.

[83] Ruskin, J. 1873 *The Stones of Venice*. Smith, Elder & Co.

[84] Shatzkin, L. 1982 *In Cold Type*. Houghton Mifflin Company.

[85] Shneiderman, B. 1987 *User Interface Design and Evaluation for an Electronic Encyclopedia*. In Cognitive Engineering in the Design of Human-Computer Interaction and Expert Systems, G.Salvendy,Ed Elsevier Science Publishers.

[86] Smith, Z. 2005 *On beauty : a novel*. Hamish Hamilton.

[87] Tosca, S. P. 2002. Hipertulia.

[88] Tosca, S. P. 2009 *The Lyrical Qualities of Links*. In Reading Hypertext, D. G. Mark Bernstein,Ed Eastgate Systems, Inc.

[89] Turchi, P. 2004 *Maps of the imagination : the writer as cartographer*. Trinity University Press.

[90] Ulmer, G. L. 1989 *Teletheory : grammatology in the age of video*. Routledge.

[91] Utting, K. and Yankelovich, N. 1989. Context and orientation in hypermedia networks. *ACM Transactions on Office Information Systems*. 7, 1, 58-84.

[92] Walker, J. 1999. Piecing together and tearing apart: finding the story in *afternoon*. *Hypertext '99*. 111-118.

[93] Zaid, G. 2003 *So many books : reading and publishing in an age of abundance*. Paul Dry Books.