

Reading Spatial Hypertext

Catherine C. Marshall
Microsoft Corporation

Introduction

Critics of hypertext have expressed skepticism about whether people could or indeed would sit down at a screen and read hypertexts. They may cite the more general problems of reading from the computer screen (see, for example, [15]) or they may place the blame partially at the feet of the authors (see, for example, Birkerts' indictment of hypertext fiction [3]). They may even make usability arguments, that it's simply more efficient to use paper texts (see, for example, [14]), avoiding the problematic idea of reading altogether.

In spite of their lack of consensus on the whys and wherefores of why hypertext is not a good vehicle for reading, critics of hypertext usually agree on how it all turns out: hypertext does not represent how *they themselves* want to read anything. At all. Not a novel, not a reference manual, not a magazine. On this point, they're emphatic, and they will not attend to the hypertext theorists as they wax enthusiastic in their postmodern embrace of the medium. One can picture them with their eyes squinched shut, hands over their ears, saying, "Neener, neener, neener. I can't HEAR you!"

Evaluation of hypertext for reading has been sparse; generally this evaluation has relied on controlled lab studies that use metrics related to effectiveness (speed, comprehension, and the like). Because reading is so difficult to observe in practice (it's considered almost creepy to watch someone read), few detailed field studies of reading hypertexts have been performed. Most of those have been more focused on other kinds of documents (see, for example, [1]) and have looked to taxonomies of types of reading and the activities that surround reading, such as annotation or note-taking.

What might we start to see if we looked in greater detail at real people reading real hypertexts? It's a worthwhile endeavor that still has yet to be done. Moreover, we might learn quite a lot about spatial hypertext if we looked at it from a reader's viewpoint. Some studies have been done in this area, but they've been more directed at how people structure spatial hypertext (see, for example, [18]), and trade-offs in different kinds of structuring functionality. Understanding how people read hypertexts and spatial hypertexts, given the inherent invisibility of reading and how complex these everyday activities are, may yield some important new conceptual and technological directions for us.

In this short paper, I'm going to "follow my nose" and apply intuitions gathered from several other ethnographic projects, my own informal and undocumented observations, and some other studies to the controversial act of reading spatial hypertext. I have two main things I want to bring up. One comes from watching people read and navigate; the other comes from watching people not read and not navigate.

Navigation, anticipation, and compulsion

I never quite understood what I saw when I watched people read hypertexts. They'd click on a link before they were quite ready to leave where they were and they'd go merrily on their way, without completing the lexia they'd just left. It wasn't for lack of rhetoric of

arrival and departure [9]; there was something less conscious (and less self-conscious) going on. What was it?

Readers complained about fragmentation, yet it seemed to be their own damned fault. They'd click reflexively, not bothering to gather the context from the text that followed. Some even characterized this fragmentation (and the attendant anxiety) as a symptom of our interruption-prone lives [10]. We're moving too fast, they seemed to say. We just need to slow down.

In fact, when we started talking about spatial hypertext, it was partly a reaction to the all-or-nothing nature of the click. Relationships between lexia – and the action of moving among them – seemed too binary, too unambiguous. Surely the relationships authors and readers perceived were not that cut-and-dried. So spatial hypertext gave us the ability to play with juxtaposition, emergence, and simultaneity [16]. It gave us a forum for arguing about the meaning of proximity and the semantics of space [8]. And it didn't demand that readers hop around from one place to go to another.

This was all fine in theory, but it still didn't explain what I saw when I watched people read hypertexts (both as a surreptitious onlooker and as an authorized observer with signed consent forms clutched in my hand). They'd click before they were ready to go. Jane Yellowlees Douglas had a compelling explanation of people's relationships with hypertexts in terms of immersion, engagement, and flow [6], but I what I saw still didn't fit.

Then I watched two other – seemingly unrelated – kinds of interaction as part of ethnographic projects. One project centered on observations of gamblers playing video poker (which is now a fully electronic experience) and the second on observations of people reading magazines (specifically, the *New Yorker*), both on paper and on a tablet computer. These were detailed observations of human interaction with the two different forms of engagement.

What did they have to do with each other? Moreover, what did they have to do with reading hypertexts?

When people read works on paper, they engage in a variety of anticipatory gestures. The act of turning the page is more subtle than moving paper through air (as the simulation presented by [4] would suggest). Readers have many ways of getting ready to turn a page without actually doing so, and will often pause midway through the action in an unconscious bid for continuity. Or they can be momentarily distracted (say, in the case of the *New Yorker*, by a cartoon in the upper left corner or an ad along the side of the page), but seem to be able to resume reading without even noticing the distraction.

In a traditional node-link hypertext, the gesture is compressed into a single action, clicking. We might also predict that spatial hypertext systems that use reduced document representations (like VIKI or VKB) might suffer the same fate, but spatial hypertext (like Intergrams) with gestural interfaces might not. Interestingly, a magazine layout is somewhat hypertextual, even if a single article is linear. Insets, sidebars, photos, interleaved ads, cartoons, and other page design elements make it unlikely that a reader will approach linear text in a strictly linear manner. In fact, readers will jump ahead or back in a linear text, so reading is seldom completely linear, the idealized immersive or active experience suggested by [13] or [2]. We don't need eye-tracking to see that a

reader's attention shifts and returns, or that they jump over or return to text they've already read. Interviews with these readers later make us realize that these hypertextual shifts are not notable to (or sometimes even noticed by) the reader.

Let's look at the flip side, video poker. By contrast to reading complexly organized material on paper, when people play video poker, the action may be physically compulsive. You can observe a player at a machine engaging in stylized card-playing gestures at regular intervals, but the intervals are very short. It's clear that the cards aren't on the screen long enough for the player to "take in" what's been dealt. Yet, the player goes ahead with game.

In this case, the gesture has taken precedence over the results. Anticipatory motions are not encouraged (or indeed possible) when a player is using a video poker machine. In much the same way, page-turning buttons (as one would see in e-book devices) or link-clicking screen presentations are subject to all-or-nothing, compulsion-prone actions. Even in the case where link-clicking opens a new window, it is still a relatively significant action compared to the subtle motions people use when they are shifting among paper pages.

Not reading and not navigating

Spatial hypertext goes a long way to remedying the tyranny of the click. But it still might cause inadvertent fragmentation as readers seek to minimize interruptive context switching. Here's how.

Frank Shipman's group has performed controlled studies on study participants performing information triage tasks using, in one condition, the VKB spatial hypertext system [18]. Although the original task was designed to further our previous investigation of spatial hypertext's role in the triage task [12] and to examine participants' use of different kinds of information resources, a look at the screen-capture data suggests two other areas of further investigation as well: (1) readers expend much time and effort on managing the switches between the VKB space and the presentation of Web pages in the browser and, in fact, seem to tire of doing this; and (2) readers are willing (or gradually become willing) to work from metadata-only reduced document representations, even if the data seems less than adequate to meet the needs of the task at hand.

The first observation, that readers grow frustrated with the management of screen real-estate, seems hardly surprising and readily solvable. Bigger higher-resolution displays, multiple monitors, and secondary displays all address this as simply a real estate problem. Furthermore, people who don't have the capital equipment budgets to spend on more display horsepower can also resort to that old-fashioned solution, a print copy of what they can't see on the screen. When they're not in the controlled study situation, it seems very likely that they'd find a workaround.

Yet I'm proposing – as Levy and others before him (most notably Thorngate [19] and James [7]) have suggested – that it's an attention problem. Attention is really what both the reader and the hypertext system are trying to manage.

And what of the second observation, that people resort to metadata-only approaches to doing work? Is this necessarily a problem? After all, most of us read a large portion of

our email just this way: We warily examine the metadata that our email application shows us, and then we may delete multiple messages without even looking at them. While many of us may recall inadvertently deleting important messages from our friends and colleagues, most of us hasten to add that the sender then alerted us to our mistake.

But good metadata is unusual. In fact, our wary examination of email metadata is tuned to look for bad metadata, metadata that signals deception, rather than judging the content by using the metadata at face value. We can usually tell when people have been driven by metadata-only approaches. Upon reflection, most of us can name an instance in which one of our papers has been cited based on its title alone; the paper itself hasn't been read.

So spatial hypertext may not be the whole solution to the perils of clicking.

Finding a better solution:

Reading surfaces and new modes of interacting with them

The hardware and software requirements of a computer for reading have been noted by many researchers (for example, the XLibris project had this as its focus [17]). But a focus on page-based reading isn't enough; reading – especially reading hypertexts – is more complicated than that. At least four other factors come into play:

- anticipatory gestures and partial actions we observe when we watch people read complicated paper forms like magazines;
- the compulsive nature of apparently simple physical actions like clicking or button-pushing;
- the fact that human attention is difficult to manage in the absence of fixity; and
- the observed situation that metadata often isn't rich enough, right enough, or sufficiently trustworthy to act upon.

We need to begin to look at a range of spatial hypertext solutions that incorporate both the physicality of the act of reading and the realities of human attention. One way may be to provide the reader with a reading surface, a stable display that is dedicated to presenting the material that corresponds to the metadata presented on another display surface; such a reading-oriented display would use the principles that drove the creation of systems like XLibris (e.g. mobility) and Microsoft Reader (in particular, readability). Another may involve investigating new modes of interacting with these reading surfaces that would acknowledge anticipatory gestures and the potential breakdown of binary actions.

Reading spatial hypertext need not continue to be invisible and secondary to structuring and manipulating spatial hypertext.

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