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The significance of navigation and interactivity design for readers' responses to interactive narrative: Some conclusions from an empirical study of readers' responses

By James Pope

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Abstract

Interactive (or 'hypertext') fiction is a significant new art form because of the highly innovative narrative structures and delivery platforms it embraces, and yet in many extant examples the narrative and the delivery platform, the interface, are not happily wedded. This 'mis-match' can lead to negative experiences for readers. This paper discusses the style and usability of the interface, aiming to offer some guidance to writers. As well as considering the relevant literature, I refer to data from my empirical study of readers' responses to a range of interactive (hypertext) fiction, as supporting evidence for the conclusions offered. I argue that the design of the interface and its navigation systems are of absolutely crucial significance for readers' engagement and absorption with the narrative.

1. Introduction

- *The problem with hypertext fiction.*

One outspoken opponent of hypertext, Laura Miller, declared in 1998 that 'what the laboratory of hyperfiction demonstrates... is how alienated academic literary criticism is from actual readers and their desires'. And it is still the case that, within the literature of the debate around the likely development of hypertext fiction, the reactions of 'ordinary' readers (as opposed to academics or journalists) are significantly under-represented (Gee 2001; Livingstone 2004; Miall 2003). The study reported here sought to begin to address this problem noted by Miller, setting out

with the belief that writers and readers of interactive narratives will benefit from the findings uncovered by a systematic study of readers' responses to the form.

Another trigger for the study is the fact that, despite the initial excited fanfare and discussion, and a dynamic creative output from writers which continues to flourish, interactive fiction appears to be of interest largely only to 'experts', i.e. academics, journalists, and writers themselves (Campbell 2003). Ordinary readers appear to be scarce, and that raises interesting questions. Reading fiction is a pleasurable experience, for many cultural and psychological reasons (Barthes 1973; Brooks 1984; Nell 1988; Turner 1996), and yet reading this particular kind of fiction appears not to give pleasure outside of a specialised community of readers. It is not clear why should this be, given the huge audience enthusiasm for printed fiction, and for computer and console games, which, like interactive fictions, present narrative with interactivity and are delivered via digital media.

A clue might be found in a comment from hypertext pioneer Shelley Jackson:

Most readers are reading for a familiar experience, one that hypertext doesn't provide... A mass conversion to hypertext fiction would mean a mass relinquishing of treasured habits, and that's not going to happen all at once. On the other hand the internet is making the following of links pretty ordinary for a lot of people (Jackson, in Amerika 1998 online).

Despite being around for twenty years, hypertext fiction *is* still in its embryonic stage, both in terms of its relationship to its audience and in the development of its medium. It is a significant new art form because of the highly innovative narrative structures and delivery platforms it embraces (Bolter 2001; Douglas 2000; Landow 1997; Jackson 1997; Kendall and Réty 2000; Murray 1997a, 1997b), and yet in many examples available online or through the only commercial publisher, Eastgate Systems, the narrative and the delivery platform are not happily wedded. It is the look and usability of the delivery platform, the interface, that this paper discusses, using data from the empirical study as supporting evidence for the conclusions offered.

- *Hyper-usability*

In a survey of thirty research studies into hypertext usability Jakob Nielsen (1989) noted, amongst other findings, that online fiction was perceived by readers to 'perform' 24% as well as print fiction.

Nielsen's special interest is in how the human-computer interface organises and delivers navigation tools and desired information to the user, and in this relationship hypertext fiction struggles. Hypertext is indeed often seen to 'perform' badly for readers (Blanton 1996, Birkerts 1997, Miall 1998, Selig 2000), and yet, though there is *some* mention of the interface and related navigation factors, for example in Landow (2004), and in Kendall and Réty (2000), there is only one empirical, case-

specific study of the relationship between interface design and the experience of hypertext reading (Gee 2001). Overall, very little is said in the hypertext literature about interface design and its influence upon narrative structures and the reading experience, a seeming highly significant gap in the current state of the debate which my study sought to address.

A further issue my study explored is the apparent failure in hypertext criticism to bring together previously disparate disciplines, which hypertext fiction itself, by nature, blends.

There is a tradition of empirical 'usability' testing in software and game design, and there is a history of studies of readers in the field of literature studies (e.g Holland 1975); but there is not yet an established reader-response tradition in studies of hypertext fiction. A merging of traditions will help us to understand a new form (Livingstone 2004), and so this study combined theories of reading, theories of narrative forms, and usability testing methods derived from computing design.

It is clear that the physical medium for the delivery of any narrative, in print or in digital form, is influential upon the reading experience (Cavallo and Chartier 1997). In hypertext, the interface is an integral and crucial part of the narrative design, and therefore of the reading and enjoyment process (Barrett 2000; Douglas 1994; Gee 2001; Landow 2004; Miall 2003, Murray 1997b; Nielsen 1990). Again, there is a lack of empirical data available in the literature to help us understand what aspects of interface design enhance or hinder the reader's experience: 'we need more empirically supported guidelines to inform design decisions' (Smart et al 2000). Kendall (1998) points out that

hypertext is a true hybrid of text and software, so we should expect some of the more objective concerns of software development to come to the fore in working with the medium. Yet it may not be obvious how integral these concerns can be to the writer's creative enterprise.

The study looked at other aspects of the hypertext reader's experience, not reported here (to do with multi-linear narrative structures, reader expectations, reading behaviours, and the ergonomics of new media): these will be reported in forthcoming papers. For this paper, covering only the interface, I argue that the design of the interface and its navigation systems are of absolutely crucial significance for readers' engagement and absorption with the narrative.

- *A brief note on the empirical study's method*

The empirical study from which the data and discussion in this paper derive was conducted during 2006/7: it recorded and analysed the responses of 36 readers to a range of hypertext narratives. Readers were monitored during initial 'think-aloud' encounters with the selected pieces, then questionaired, and finally involved in focussed discussion groups. The seven hypertexts investigated were *afternoon, a*

story (Joyce 1987), *These Waves of Girls* (Fisher 2001), *LOveOne* (Molloy 1994), *253* (Ryman 1996), *The Virtual Disappearance of Miriam* (Bedford and Campbell 2000), *Amelie* (Ansutegui 2005), and *Of Day, Of Night* (Heyward 2004). A more detailed description of the method used for the study can be found in 'A Future for Hypertext Fiction' (Pope 2006).

We now consider, in two categories, the findings and conclusions from the empirical study: interactivity and navigation overlap in theory and practice, but the separation here makes for a more coherent discussion of their respective features.

2. Interactivity design

- *Expectations and usability*

It is clear that reader expectation plays an important part in the response to these pieces, no matter whether the hypertext is the text-only format of *afternoon* or the graphics and video form of Megan Heyward's *Of Day, Of Night*. Every reader brings a 'mindset' or a preconception, and this affects their behaviour with the interface, and their attitude to the effort required to find out how that interface works.

Aarseth's (1997) concept of non-trivial effort seems highly significant here, especially when that effort interrupts absorption (Nell 1988) in the narrative. For the readers in my study, hypertext interfaces appear to disrupt expectation more than an equally idiosyncratic interface in an information-based space or a game would, because of the clash of media and text forms, reflecting Douglas and Hargadon's (2001) theorising around schemas. In hypertext, reading and narrative expectations clash with interface expectations, setting up awkwardness, uncertainty, unwelcome effort, and ultimately some reported high levels of frustration and negativity.

Thus, in the case of *afternoon*, *a story*, *LOveOne*, and *These Waves of Girls* the readers were all trying to reconcile their expectations of narrative and reading behaviours, with their expectations of usability for a screen-based medium; essentially they were looking for a reading activity and simultaneously a web-style interactivity. The two behaviours rarely lived comfortably together.

Where the interface design was more overtly visual and thus web-like, there were fewer reported difficulties with interactivity itself: readers offered positive reactions to many aspects of interactivity in the cases of *253*, *The Virtual Disappearance of Miriam*, *Amelie*, and *Of Day Of Night*. The reason for this would seem to be that these pieces used a design schema that more fully met design expectations for web and other interactive media.

253 seemed to sit between the two ends of the text-visual continuum, and the responses were similarly mid-way between an acceptance of web-style design and a reasonably comfortable reaction to reading small chunks of linked text. Readers did comment that the design of 253 could have been more attractive, but in terms of usability, it was seen as satisfactory, employing web-standards in a simple and mostly clear way.

But, even if the interface was attractive and easy to use, and even if interactivity was perceived as enjoyable in itself, the interface could not be considered effective if the interactivity design did not facilitate the apprehension of an engaging story. This was clearly seen in the responses to *Amelie* and *Of Day, Of Night*, where, although the readers liked the interface design and enjoyed exploring, nonetheless a coherent story did not readily emerge, and overall reactions to those pieces were not entirely positive.

The one piece which seemed to 'succeed' more than it failed was *The Virtual Disappearance of Miriam*. This appeared to be well received by its readers because its interactivity was mainly clearly indicated, easy to find and use, enjoyable in itself, and crucially, developed the story, not distracting from the reading of the story.

On the basis of the data, it seems reasonable to suggest that *interface design should use web design conventions for interactivity as far as possible, in order to minimise the levels of non-trivial effort required, and thus making access to the narrative as straightforward as possible for the reader*. This is not to suggest that writers cannot experiment with design and/or narrative form, but they must be aware that hypertext, in its newness and unfamiliarity to the great majority of readers, places heavy demands on a reader's attention already, without unnecessary work being added by sloppy design.

Furthermore, the data makes it clear that *design needs to be integral to the narrative*. The design now *is* the narrative: words, images, interactivity, typefaces, colours, the visibility of hotspots and links are all signifying elements in the storytelling process in hypertext fiction, as Landow (1997) suggests. The empirical evidence of this study reinforces Landow's point, and indeed makes it an absolutely essential requirement of hypertext narrative design, in conception and delivery.

- *Balance between stimulus and distraction*

Campbell (2003) has argued that a risk for writers of interactive fiction is that the pleasures or other distractions of an interface may detract from the act of reading. Some readers in the study did indeed say that there can be too much happening on a screen, so that reading becomes pushed back to a secondary activity, simply because there are so many interactive features to 'check out'. This will result in the loss of narrative grasp and ultimately a fatal loss of interest in the unfolding narrative; this problem will clearly be amplified if the narrative structure is also

fractured and difficult to apprehend. This study did not look specifically at optimum levels of interactivity related to optimum reading absorption, but the data suggest that *interactivity should be kept at a level which enhances and does not impede reading absorption*.

The data showed how some readers slipped into a kind of play mode either because the story was hard to find because of poor interface design (e.g. *afternoon, These Waves Of Girls, LOveOne*) or because the interface was very busy (e.g. *Miriam, Amelie*), or difficult to use (*Of Day, Of Night*). Some readers reported that they were distracted from reading by *playing* with the interface to see what it would do, because they actually enjoyed *that* activity, as in the case of *Amelie*. If we wish readers of hypertext fictions to be audiences rather than game-players, the data in this study suggest that authors must strive to achieve a balance between an interface that is visually and operationally appealing, and a reading experience that is absorbing.

We are seeing that concepts from previously un-associated disciplines are all coming into play in the act of reading hypertext. Balance between interface-playing and reading absorption seems to depend on the optimum mix of interface usability, (see for example the work of Campbell 2003; Gee 2001; Murray 1997b; and Nielsen 1989,1990), the psychological effort/reward balance (spoken of by amongst others Aarseth 1997; Conklin 1987; Csikszentmihalyi 1975, 2002; and Nell 1988), and the interplay between reader and narrative structure (where we might utilise the work of 'traditional' reading theory, e.g. Iser 1976; Fish 1970,1980; Brooks 1984; and new-media theorists such as Douglas 2000; Miall 1999; Miall and Dobson 2001; Miall and Kuiken 1994, 1995; and Murray 1997a, b).

The data suggest that *the interface must be simultaneously appealing and non-distracting*. There is very little in the reviewed literature, apart from Campbell's comments, to predict this difficult issue for writers and so the data from my study must be seen as only the beginning of a potentially fruitful future research area. It is nonetheless clear that effective design can counter the problems associated with interface overload or interface distraction.

The first and most obvious step for writers is to make sure that interactive areas, whether those are links to other parts of the story, or menu options for chapters, or simply interactions such as switching sound on and off, should be clearly identified as such. It is again obvious that extant web conventions could be used, but there is nothing in the data to suggest that readers could not cope with newness, as long as it is clear what on the screen is hyper-active. This would have removed several negative comments about *LOveOne, Miriam, Amelie*, and *Of Day, Of Night*.

If interactivity is clearly presented, then the interface has a chance of being simultaneously engaging and cognitively (in terms of the effort/reward balance) invisible.

- *Reader- versus author-control*

Although advocates of hypertext narrative (Bolter 2001, Jackson 1996, Landow 1997, for example) have enthusiastically argued that it offers the reader more creative input, the difficult *balance* between the positive rewards of creative control and the negative effects of unwanted effort, is an aspect barely discussed in the literature, though Murray (1997b) and Ryan (2006) acknowledge the issue.

Whereas agency (Murray 1997b), i.e. the user's ability to affect the development of the narrative, is taken for granted as a game-playing essential, in hypertext it seems that there is a potential conflict between the offer of control and the reader's desire to be taken along in the author's created world. The data showed that once control is offered it opens a Pandora's box of desire for more control and ever more narrative-directing input from the reader-user, which the hypertexts in this study did not provide. Even if hypertext did provide to the reader full control of the narrative, this may clash with the generation of reading absorption, along the same lines of the tension as we have seen above on usability and on stimulus versus distraction.

The data strongly supports Murray's (1997b) contention that authorial control and reader agency must be carefully balanced. What appeared to be happening for the readers in this study is that the presence of interactivity promised something that hypertext in its current form could not deliver, i.e. a game-like level of user control combined with a novel-like level of audience subordination to authorial leadership. The two experiences seemed to clash destructively in many readers' minds.

Miall in several of his papers (1998, 1999, Miall and Dobson 2001) has suggested that interactivity disrupts the act of imaginative reading necessary for literary pleasure; Birkerts (1997) has also argued that interactivity and narrative art cannot co-exist; Ryan (2006) doubts if we can expect to find familiar narrative pleasures in hypertext. There is evidence to show how poor interface design can create this tension between agency and absorption. However, the solution to this problem is suggested in the nature of the comments from my readers.

The readers who commented on this issue all talked about the need for control to be given such that it progressed the narrative at all times. Whether that control is the offer of hyper-linked words, or animated images, whatever the reader does to the screen should develop the story or the interactivity quickly becomes game-playing and/or the story is lost. In the same way that too much activity on screen can push reading to the background, inappropriate or inadequate control can lead to reading being pushed out. Either of these poor design characteristics will spoil or even terminate the reading experience.

For example, the video clips in *Of Day, Of Night* would be considered inappropriate, despite the fact that they clearly were part of the narrative, because they could not be controlled easily and quickly. The point here is that an element of control has

been offered in order for the reader to access the video and watch it, but inadequate control has been offered in order for the reader to stop or maybe rewind the video. If a reader is obliged to watch every video in full every time the piece is run, then inadequate control has been provided, because every reader will expect to be able to control a video's playback.

There is also the suggestion within the data that there is an optimum amount of *choice* to be given if the narrative experience is to be maintained. In *These Waves of Girls*, for example, too many links on text simply led to choice overload and the perception in my reader-participants that there was no story at all. In *afternoon*, the links were too hard to find, thus the opposite problem was occurring, but leading to the same result for the readers – a narrative that was too difficult to generate, and a story that was too difficult to discover. *The Virtual Disappearance of Miriam* and *Of Day, Of Night* seemed to be reaching a satisfactory balance: both of those pieces only offered choices that took the reader to consequential and sequentially logical parts of the narrative.

Narrative development is the key concern for the readers in this study, and should drive all design decisions, whether of visual or multimedia effects, screen layout, availability of menus, placement of links on text, or use of images as hotspots. *Control must only be offered where it is helpful for navigation or essential for the development of the narrative.* It might even be that authors will have to rein in their narrative ambitions for the time being until they have mastered the art of offering agency within a tightly organised narrative in a way that readers can cope with. A good example of this balance, beginning to emerge in new interactive fiction online, is Kate Pullinger's *Inanimate Alice*: plentiful interaction does not take the reader away from an emerging story.

- *The functionality of links*

The data from my study demonstrates that *the functionality of links in hypertext fiction is of a different nature from its equivalent in information web-spaces*, creating new potential problems of two kinds, adding new definition to previously published discussions (Bernstein 2000; Calvi 1999; Landow 1997):

Firstly, in 'conventional' web spaces, links are clearly identifiable, by either the web-standard underlining of an active word, or highlighting; or, if an icon or image serves as a link, by a clear visual change to the cursor, usually to a hand symbol. In information space, if a link were to be obscure or even hidden it would be rendered totally pointless and useless. However, my readers' responses showed that, because hypertext narrative artists are attempting to be original and innovative, they are not necessarily using such recognisable hyper-linking signals.

The evidence from the data is conclusive here: for screen-based fiction, *screen-conventional linking iconography must be used, if the reader is not to be overcome*

with too many convention-breaking demands on their attention. This is predicted by work from usability studies (e.g. Pace 2003, Thimbleby 2000), from Conklin's (1987) conceptualising of cognitive overload, Nell's (1988) theory of the effort-reward relationship in ludic reading, and Csikszentmihalyi's flow concept (1975): these theoretical explanations are borne out strongly by the evidence of this study, and would appear to refute Landow's (1997) contention that the indeterminacy and challenge of hypertext narrative offers *the* natural and preferable form of reading.

Where links were not clearly indicated, readers not only reacted as they might in an information-space, i.e. with confusion and frustration, but they also were likely to give up their reading because the narrative failed to develop. In an information-seeking activity, a reader will look for alternative links until the desired information has been found – the desire to find out is the driver; but in the reading of hypertext fiction, the motivation to keep reading has to be generated by what each link delivers when it is followed. The desired 'information' is the unfolding narrative and if that does not emerge as each link is chosen, then the desire to 'find out' is killed off.

Secondly, and inextricably connected to the first point, links are, as some writers (e.g. Calvi 1999, Landow 2004, Kendall and Réty 2000) have argued, highly significant in the telling of the story, and so to discuss the design and functionality of links is also to discuss their role and effectiveness in allowing the reader to 'navigate' the plot. *It is impossible to separate links as navigation tool from links as story-telling device.* The data show that links need to take readers to places in the narrative that makes sense to them, in terms of an unfolding story. Figure 1 below shows that across all the hypertexts studied, readers use linking as a part of the story reading experience:

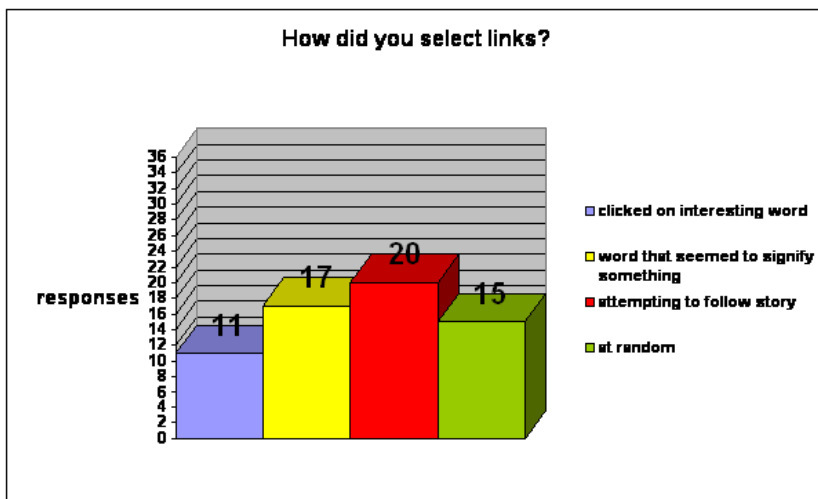


Figure 1: questionnaire item asking readers how they chose links

We see from the data in Figure 1 that readers are mostly searching for the story when they choose which links to follow, and it therefore would seem highly desirable for writers to design links with that specific desire in mind. Future research in this area might well use this data alongside Miall's work on literary foregrounding (Miall 2000, Miall and Kuiken 1999,) to support writers in understanding how links may be chosen and reacted to by readers. It is important to note also that the visual hotspot as link in examples such as *Of Day, Of Night, Amelie* and *Miriam*, as distinct from words as links, must still signify story association and development: images in hypertext fiction are part of foregrounding, to use Miall's term, because *the reader will assume that every hyper-active element is in some way relevant to the developing narrative*. Interface design must take this assumption into account.

3. Navigation

- *Nielsen's principles in action*

Jakob Nielsen's (1990) navigation principles still hold good across a wide range of interactive media; and so, below, Nielsen's key navigational 'rules' are applied to the hypertext fictions examined, in part to ascertain how far interactive narratives deploy effective navigation tools, and in part to begin to understand how hypertext narratives are different from other interactive media so far studied by the web design community; I argue that hypertext fiction has particular features which require 'special' thinking in regard to navigation.

- *Free movement, and backtrack facilities*

Clear and easily accessed backtracking is required, as Nielsen says: the reader needs to be able to go back in step-by-step order (a trail), and out of order (using a map for example) to anywhere in the narrative that they have so far experienced. None of the hypertexts studied offered a truly flexible backtrack facility: for example, *afternoon* had its 'history' menu, but this did not allow readers to go freely to any section at any time; *These Waves of Girls* relied on the web browser alone, limiting movement therefore to a step-by-step backtrack rather than free access to any section. The analogues to this are obvious: with a print book, the reader can easily go to any page forward or backward; and of course in the case of a book, spatial orientation and narrative orientation are the same thing, assuming the reader reads the book in page-numerical order. In the hypertext environment, where habits from reading now must co-exist with habits from browsing, a backtrack facility should offer a reading trail and a map, both easily accessed.

Nielsen (1990) talks about free movement being appropriate to need. In a web browsing scenario, the need is typically to find information; in a narrative context the

need is to achieve a familiarity with the fictional world, to gain sympathy or antipathy with characters, to build a consistency of apprehension of the concepts and events of the fictional world. *Effective free movement (including backtracking) in hypertext therefore would ideally enable the reader to go anywhere they wanted in the site, but more importantly, the data suggest, to go wherever they want to in the narrative.*

However, there is a tricky balance to be achieved: the data suggest that free movement is not a facility to be offered without careful consideration of its effect on the aesthetic appreciation of narrative structure. *A limited range of choices for movement will reduce the reader's cognitive overload, allow for more easy movement, which in turn will lead to more satisfying grasp of the narrative.* To illustrate this point, we can refer to *These Waves Of Girls*, which was considered by my readers to present a baffling range of choices for movement which actually led to a stifling of movement altogether: once easy movement around the 'book' is blocked, it is clear that readers quite quickly lose interest in the story, whether that be one that Fisher has designed, or indeed one which the readers create via their interaction with the work.

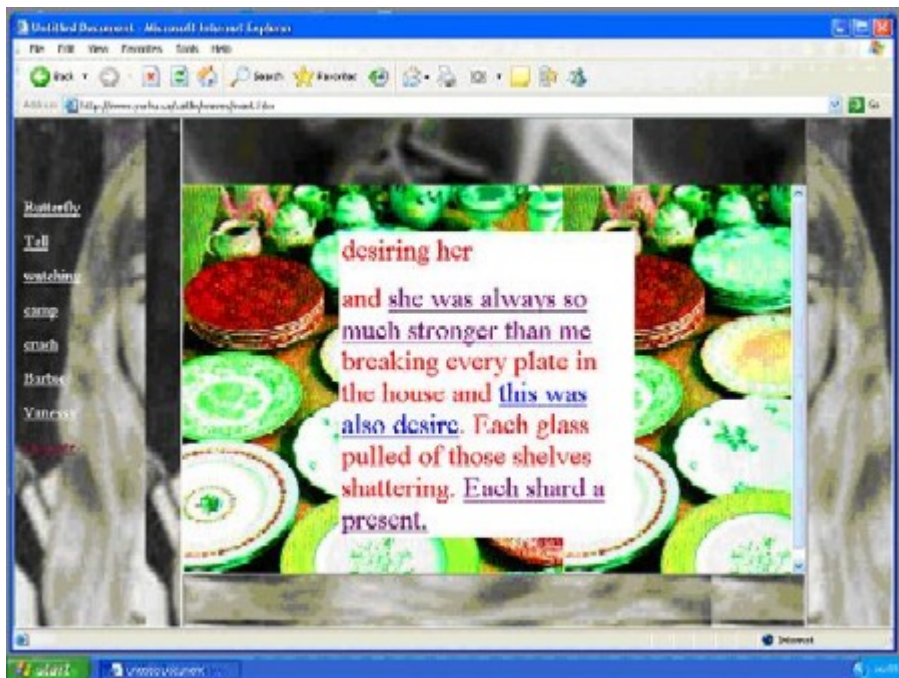


Figure 2: screen from *These Waves of Girls*, showing too much choice for the reader, with eleven links

- *Recognise present location (orientation)*

The data in this study uncover a feature of the hypertext experience that has not been covered in any depth in the literature so far. *Site location is not necessarily the same as narrative location.* The extra facility (demand) of interactivity and the intangibility of the virtual book-space change this equation, so well-established in print, between 'site' location and narrative location. In hypertext, *site orientation and narrative orientation must be considered as a unity in the design of the navigation system.*

A navigation system in an information-giving website need not concern itself with this correlation because the user creates his or her own 'narrative' as they search for information. In the case of fiction however, there is, certainly for the readers in my study, still the assumption and desire for an author-created narrative, delivering the underlying story, which the reader will eventually be able to discern. Despite what many advocates of the post-structuralist/postmodern view of the author-reader relationship argue, the readers in this study *all* wanted the author's design to eventually be accessible, since that is what they see as a core pleasure.

So, navigation must allow the reader to know where he is in the site (the book) and in the narrative, and these two orientations in turn allow the reader to apprehend the story. If one or both of these orientations is hard to gain, or conversely, easy to lose, the reader's sense of narrative and thus story is also disrupted. Whereas Miall (1998, 1999, and with Dobson 2001) has argued that interactivity itself is the cause of disruption to imaginative engagement with the narrative, my data suggest that interactivity need not be a problem of this kind, if orientation is not threatened. Navigation systems are clearly at the heart of this issue.

Figure 3 below illustrates the interesting relationship between orientation factors and apprehension of the story. Participants were asked if they knew where they were in the site at all times, if they knew where they were in the story, and if they would be able to summarise the story to a friend (an indication of story apprehension).

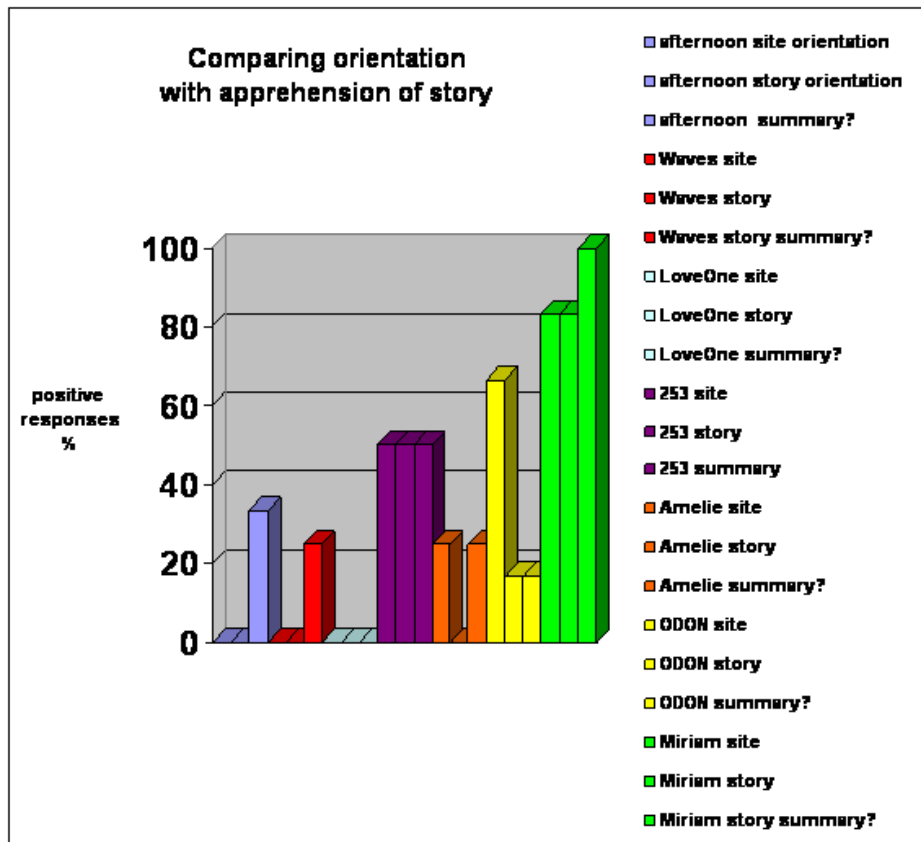


Figure 3: questionnaire item asking readers if they knew where they were in the site, and the story, and if they could summarise the story to a friend

We see that there is some interesting and tantalising correlation between the orientation factors and story apprehension: in the case of *afternoon*, zero orientation in site and story was reflected in only a third of the readers saying they could summarise the story; similarly in the case of *Amelie* and *These Waves of Girls*, poor story orientation was reflected by only one of either group saying they could summarise the story. For *LOveOne* none of the readers knew where they were in the site, or the story, and none of them could summarise the story. In the case of *Of Day, Of Night*, though four of the six participants (66.6%) knew where they were in the site, only one (16.6%) knew where he was in the story, and only one could summarise the story.

For *253* we see that site and story orientation are exactly matched by story apprehension (50% positive response). Finally, comparison with *Miriam* further demonstrates the emerging principle that orientation factors and story apprehension are interlinked: in *Miriam* high site and story orientation were matched by high ability to summarise the story. Significant for future writers and designers is the indication in the data that *good site orientation does not inevitably lead to good story orientation, but poor site orientation will always lead to poor story orientation, and in turn poor grasp of story.*

The latter point is demonstrated in the response of readers of *These Waves of Girls* and *Amelie*: although the navigation systems allow free and easy movement around the site, they do not provide sufficient tools for the reader to keep track of where he/she is, has been or can go, or where he/she is in relation to material already seen or yet to be seen. Thus a sense of place in the site was not created, and a consequent loss of narrative place ensued also. The influence of the hyper-link applies here also – but in terms of navigation alone, it is apparent that navigation tools need to provide both linear movement and non-linear movement, and provide a total command of the space, combined with a continual ‘update’ of the narrative context.

The most positive, though not perfect, exemplar for this requirement would be *The Virtual Disappearance Of Miriam*, which combines a relatively straightforward and linear plot, with web-familiar navigation, including clear book-like chapter menus, and a simple ‘back to home’ link. These features enabled readers to trace their path through the story and around the whole site without becoming lost in the negative sense: this in turn enhanced the experience of becoming lost in the positive sense!

The data suggest that for readers to enjoy the experience of free movement (interactivity at its best according to Nielsen) and of narrative absorption (pleasurable reading at its best according to Nell), both aspects of orientation should be satisfied.

Apart from a very small number of exceptions, the ability of readers to grasp the story will only be seen where both site and story orientation needs are satisfied.

Good navigation design can provide security of place; good narrative design, facilitated by good navigation design, can create imaginative security. Several critics talk about this possibility as something for a somewhat distant future (Murray 1997b, Douglas and Hargadon 2001, Miall 2003), but the data here suggest it is possible now, given an understanding of the reading experience.

- *Overview in large virtual spaces*

Closely connected to orientation issues is Nielsen’s view that overview facilities should be offered.

Several comments were made by readers to the effect that they would like to know not only where they are in the context of the site and the story, but that they would like to know the size of the reading commitment. Overview options of various kinds could offer this, but the data shows that, in the case of the hypertexts studied at least, (and in very few, if any, examples currently available on the web) these were not provided with effective functionality, and we can see that this lack only added to the sense of displacement the majority of readers felt.

Of the seven hypertexts studied, *afternoon* and *Amelie* did not provide any single overview (sometimes referred by readers to as a home page), and this was seen by the respective readers as a deficit.

LOveOne and *These Waves of Girls* did offer a 'contents' page but these failed to impress because either those contents pages were hard to access once navigated away from, or because the narrative was so fractured by the navigation system that readers could not make productive use of the contents page even if they could find it.

In the case of *253* there was an overview map, and accordingly this piece was seen as relatively easy to move around. *Of Day, Of Night* actually *relied* on the reader returning regularly to the homepage map (because otherwise the narrative did not progress), and readers here were aware of how much there was to see; but the author designed the 'return to map' link to be hidden unless scrolled over, a design mistake that could be easily rectified.

Once again, the only piece in this study that fulfilled the overview requirement adequately was *Miriam*, which provided a simple link to the chapter menu from any screen anywhere in the whole piece. On the other hand, *Miriam* does not offer a link to individual chapters *except* from the home page, and once the home page is returned to, each chapter must be read from the beginning again. This means that the overview is less useful in practice than it might be, a weakness that was noted by the study participants.

It appears obvious that *a simple solution to this problem would be to ensure that the home page or overview menu is available at any point in the reader's 'journey' through the hypertext.*

A further aspect of overview raised by the data is that some visual representation of how much has been read of the whole was asked for several times across all the seven hypertexts. None of the pieces studied offered this facility, and again it seems obvious to say that here is another very simple solution to an important issue. The only example this researcher has so far found of an hypertext with an always-available home page, *and* a progressive bookmark is *The Mobius Case*, an unpublished Masters project by Rutger Van Dijk (2005) at Bournemouth University. I have previously cited this piece as an excellent example of a good navigation

system (Pope 2006), in that it shows, as a permanent feature of the screen layout, which sections of the piece have been read, and which have yet to be read.



Figure 4: *The Mobius Case*, showing timeline overview at top of screen

- *Avoid book metaphor?*

Though Nielsen argues that the book metaphor should be avoided, there is no evidence from this study to support his view. The book metaphor seems only to be problematic when it is superficially imposed over a poorly designed navigation system. On the other hand, there is no evidence either to suggest that the book metaphor is essential for readers to be able to make the transition from print book to digital 'book'. The data supports Landow (2004) who argues that the spatial (navigation) metaphor should be fused to the narrative metaphor.

A lack of metaphor-fusion was seen at its most awkward in the case of *afternoon*, which used literary references within the fiction, hyper-linked texts and elements of visual design, alongside a nearly-but-not-quite web-style navigation system. Schema-clash ensued, as a result of which readers could not find their way around the site or around the narrative without experiencing high levels of disorientation.

Similarly, *These Waves Of Girls* suffered from an apparent mismatch between its highly literary, text-led content, which suggested 'book' to the readers, and its disjointed navigation system, which offered too many and too-unclear choices of movement with no anchor places such as chapter heading, home page, overview etc. to help readers feel secure. Again, one might speculate, a more defined

structure, one in which at least chapters were offered in coherent, defined chunks as in a book, would have helped readers grasp character development and therefore apprehend a narrative overall.

In the case of *253*, *Miriam*, and *Of Day, Of Night*, the book was almost completely absent from the textual and visual language, and there was little or no reported problem for the readers with navigation or *site* orientation. The reason for this, the data suggest, is that these pieces followed the conventions for navigation that would apply to the great majority of web sites and other interactive media. There was thus no confusion or clash between book conventions and screen-based navigation behaviour.

The data again show how important to readers are their expectations: the readers of *afternoon* saw the hypertext as a literary novel presented on screen with interactivity, and this affected their perceptions of how they would move around in its space and its narrative; by contrast, the *Of Day, Of Night* readers saw immediately, apparently prompted by the central map graphic, that this was not a book-like story, and thus their criticisms and suggestion were not about its lack of bookness, but simply about its functionality in terms of finding an appealing story.

4. Conclusion

Whilst the intensity of debate around the joys and pains of hypertext fiction appears to have subsided somewhat, the continued availability of interactive fiction online suggest that it is a form not likely to disappear anytime soon. It is hoped that the findings outlined above will give writers useful 'tools' for the creation of interactive fictions that will appeal to readers; it is believed furthermore that theorists and critics may understand the nature of hypertext fiction better by allowing their analyses to include knowledge and understandings from the previously not-connected disciplines used in the study reported here. Literary theory, reader-response research, multi-media design practice, and human-computer interface usability studies are all highly relevant in the understanding and creation of hypertext fiction, and as Murray (1997b p274) has already said, the writer of fiction in the era of interactive media is now 'half hacker, half bard'.

Below is a reiteration of the key 'guidelines' for writers, derived from my data:

- *web design conventions for interactivity should be used as far as possible, in order to minimise the levels of non-trivial effort required, and thus making access to the narrative as straightforward as possible for the reader*
- *interface design needs to be integral to the narrative at an operational and metaphorical level*
- *interactivity should be kept at a level which enhances and does not impede reading absorption*
- *the interface must be simultaneously appealing and non-distracting*
- *interactivity should be clearly presented, so that the interface has a chance of being simultaneously engaging and 'invisible'*
- *control and choice must only be offered where they are helpful for navigation or essential for the development of the narrative*
- *it is impossible to separate links as navigation tool from links as story-telling device*
- *the reader will assume that every hyper-active element is in some way relevant to the developing narrative*
- *effective free movement (including backtracking) in hypertext should enable the reader to go anywhere they want in the site, but more importantly to go wherever they want to in the narrative; however, a limited range of choices for movement will reduce the reader's cognitive overload, allow for more easy movement, which in turn will lead to more satisfying grasp of the narrative*
- *a home page or overview menu should be available at any point in the reader's 'journey' through the hypertext.*
- *site location is not necessarily the same as narrative location*
- *site orientation and story orientation must be considered as a unity in the design of the navigation system*
- *navigation must allow the reader to know where he is in the site (the fiction space) and in the narrative*
- *poor site orientation always leads to poor story orientation which leads to poor story apprehension*

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