

The Structure of Hypertext Activity

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ABSTRACT

A framework for discussion of hypertext activity is introduced using the concepts acteme, episode, and session. Acteme is a low-level unit such as link-following; episode is a collection of actemes that cohere in the reader's mind; session is the entirety of contiguous activity. Well known issues in hypertext rhetoric are recast in this framework and generalized to all varieties of acteme. We consider whether the episode is a virtual document, user interface issues pertaining to the episode, multi-episode structure, concurrency issues, and reader-as-writer activity, with a frequent emphasis on hypertext gathering.

KEYWORDS: hypertext, rhetoric, acteme, episode, session, gathering, contour, emergent structure.

INTRODUCTION

A hypertext is a document in which interactive structure operations are intermingled with the text; hypertext structure is usually investigated from the point of view of the "real" structure connecting these operations. E.g. in a classical node-link hypertext, as might be described by the Dexter Hypertext Reference Model ([14]), a graph can be constructed on the set of nodes where each edge is identified with a link; structure discussions typically take place with respect to this graph. This overall structure graph may not be apparent to the reader. Readers *discover* structure through *activities* provided by the hypertext. This paper will present a framework for discussing the structure of these activities, explicitly based on the reader's point of view. We present a three-layer scheme for discussing hypertext activity: Acteme / Episode / Session. The acteme is an extremely low-level unit of activity, such as following a link. Multiple actemes are combined into an intermediate level unit, which we call the episode¹, and at the high end we will investigate a unit called the session. We will focus much of our discussion on the episode, emergence of the episode from the acteme, the structure of multiple episodes, and how these relate to familiar issues of hypertext rhetoric. The primary focus of this paper will be on literary hypertext, but many of the concepts may be applicable to hypertexts generally.

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ACTEMES

This paper takes a broad view of what constitutes hypertext — often narrowly defined as text with embedded links. However, many other structure models have been proposed: sets [29], relations [20], Petri nets [34], etc. We will count as hypertext any kind of system in which text contains embedded interactive structure operations. The lowest level of hypertext activity is to execute such an operation, e.g. following a link. We coin the term 'acteme' to describe this level of activity.

Types of Acteme

The most familiar form of acteme is link-following — clearly a *directional* form of acteme. A link may be followed by (1) clicking on an anchor either graphically visible or inferred by the reader; (2) operating an intermediate interactive device showing all possible links, such as a menu of link names; (3) clicking on an overview map (this is really a special case of (1)) and perhaps others. A link menu may contain other information than a link name; in MacWeb [28], link menus contain type information.

There are other actemes pertaining to links. Nearly every form of link-based hypertext allows the user to *go back*. Hypertext backtracking has been discussed in detail by Bieber, [1]. Bieber asks: "Should backtracking trigger an 'undo' operation or simply reflect the current state of the departure nodes?" This is an important question, with serious implications for hypertext rhetoric. The simple act of going back may have multiple types. One may revisit a lexia simply to read it again, or it may be a genuine "undo": perhaps the reader didn't mean to follow that link at all. These are arguably different actemes, though typically not distinguished by hypertext user interface behavior.

Aquanet [20] uses *relations* rather than links; for a literary example of relations see *Intergrams* [30]. A relation slot is *opened* or *closed*; opening a slot is the acteme analogous to following a link. Closing a relation slot somewhat resembles going back for links, but the situation is much more complex. A relation may be n-ary, i.e. may include an arbitrary number of slots. Thus a relation slot may be closed to open other slots, with a clear connotation of *continuing*

¹Bolter [7] used the term 'episode' the way the term 'lexia' [19] is now conventionally used, but his use of the term episode did not catch on; apologies if this new use of the term episode causes confusion. It was tempting to borrow Douglas's [10] term 'strand' — but this seems to pre-judge the issue of whether the episode is linear and to be more narrowly suited to the specifics of the node-link model.

rather than backtracking. While a link (even a bidirectional one) is clearly *directional*, a relation is non-directional, since the relation slots appear in the substructure as peers. There is a mild sense of directionality to relations in the sense that slot contents are “related together”, with a directionality *inwards* from all slots to a central point — one reason why relational substructuring and spatial hypertext are so closely related. (For more on this point see [32], [24], [22], [21].) Also, to use the terminology of [32], links may be described as *disjunctive* substructuring, in contrast to relations which are *conjunctive*: whereas one may typically choose *any* link out from a lexia (from lexia L one may choose link A *or* link B *or* link C, etc.) a relation exists among *all* of its slots (relation R has slot A *and* slot B *and* slot C, etc.). Disjunctive substructuring is “or-based” but conjunctive substructuring is “and-based”.

Similar to relations, [30] and [31] use a concept called *simultaneities*, which have unnamed structurally equal slots ([32]); the acteme consists of moving the mouse cursor among different no-click hot-spots, each of which opens a different slot, or moving the mouse cursor out of all of these hot-spots, which closes the simultaneity. VIKI ([23]) includes spatial aggregates (i.e. piles). The acteme here is to click on a partially obscured element of a spatial aggregate, bringing it forward where the whole object is visible. Both spatial aggregates and simultaneities are conjunctive and non-directional.

Storyspace ([6]) offers, in addition to conventional links, spatial placement of “spaces” in a map view; when opened a space may reveal a lexia or a further map. Spaces used in this way resemble piles; the acteme is opening a space. A space can be closed by clicking on an icon from a floating palette. (For a literary example of spaces used this way, see Gess [12].)

Another form of hypertext substructure is the set. HyperSet [29] used an explicit formal set paradigm, and VIKI incorporates sets (collections) as a substructuring method.² Set-based actemes include choosing a superset (possibly closing the current element) or opening one of the elements of a set. Sets offer a quite complicated picture. There is a clear notion of “up” and “down” (up to superset, down from set to element) making sets somewhat directional. Choosing a superset is arguably disjunctive; whether opening an element is conjunctive or disjunctive will depend on the specific hypertext.

Is the Acteme Indivisible?

Kathryn Cramer [9] asks the haunting question, “What’s inside a link?” Following a link is usually so effortless that it seems nearly automatic. If indeed a link has content then perhaps this calls into question whether link-following

should always be considered an acteme. This issue becomes considerably more thorny where links are chosen from a menu. Arguably here the actual acteme is menu-choice, and link-following is a higher-level unit of activity. A menu of possible link names is itself a display of text. A completely open attitude toward text and linking in hypertext would hold that one should be able to make a link to any form of text anywhere text is visible. What if a menu of link names itself contains an anchor? What about links to links? Similar issues have been raised in the past concerning dematerialization of the lexia. (See [26], [32]).

Acteme “Boundary Cases”

What shall we do, in this analysis, with the lexia? Does linear reading inside the lexia contain / consist of actemes? Should we consider reading a lexia a single unitary acteme? Should perusing the lexia be considered the “null acteme”? (See [32] on the lexia as the “null navigation choice”.) Whether the lexia must be linear is controversial ([25] and [32].) A lexia can contain numerous user interface devices (e.g. scroll-bars). Behaviorally, operating a scroll-bar is as complicated as following a link. However, a link is an explicitly *structural* device in a way that the within-component scroll-bar is not.³ We will leave the issue of within-lexia actemes open. Reading the lexia might be considered a single acteme, or the lexia might be considered devoid of “internal” actemes.

At the opposite extreme, hypertext may be used to carry the very infrastructure of language itself, e.g. syntax. ([30], [31]). In this case the parallel acteme \leftrightarrow morpheme becomes exact.

THE HYPERTEXT EPISODE

Multiple actemes may combined into a higher-level unit which we call the *episode*. An episode is simply whatever group of actemes cohere in the reader’s mind as a tangible entity. In a node-link hypertext, the episode will probably consist of all or part of a trail or path. Whereas the acteme typically has an identity which is clear from the hypertext’s user interface, the identity of the episode may not be so clear. The user may follow a chain of links as part of a process of *exploration* that may or may not prove fruitful. Simply following a chain of links does not necessarily make these visitations *cohere* into a tangible entity. The episode is not simply a unit of hypertext history — where any act is necessarily part of *some* episode; rather, the hypertext experience consists of executing multiple actemes, some collections of which will resolve into episodes, and some of which may not be part of any episode at all. Indeed, part of the hypertext experience may be described as *foraging for episodes*.

²This author knows of no literary hypertexts explicitly based on sets as a substructuring method. The complete absence of set-based literary hypertext is both striking and hard to explain (though set-based substructuring is not usually present as an off-the-shelf abstraction in commercially available hypertext software.)

³Trellis ([34], [11]) provides a formal basis for dealing with such questions. For a Trellis hypertext one may describe an acteme as any form of hypertext activity which causes the Petri net to fire. If within-component scroll-bars are devices maintained entirely by a client which does not fire the net when they are operated, they would not be considered actemes.

Whether an instance of backtracking is really an “undo” may be rephrased: Does backtracking *revoke* membership of actemes in an episode? It depends on the circumstances, both of the hypertext and the reader’s frame of mind. The reader might revisit a previous lexia to read it again — perhaps for a sheerly “musical” repetition, or to reread a prior lexia based on some resonance or reference in the present lexia. Here one might argue that all of the backtracking history is part of the episode. Or, the reader may be backtracking to undo having arrived at the current lexia by mistake — backtracking to *remove* from the episode the acteme that caused arrival at the current lexia. The episode is thus a combination of history through the hypertext, the reader’s intention, and the reader’s impression of what “hangs together”. Of course the reader may arrive at a previously read lexia via a different pathway than simple backtracking; in this case most likely arrival at this lexia should be part of the episode.

An episode is obtained from the *composition* of actemes. For hypertexts using n-ary relations, the nature of the episode can become quite complex. If the slots of a relation do not themselves contain further actemes then the opening of all of the slots of a relation in turn may constitute or be part of one episode. However, more typically a relational slot will contain further actemes, perhaps nested several layers deep. For a highly nested relational structure with a single root relation, shall we say that traversing the entire structure must necessarily constitute a single episode? That seems arbitrary. We may have relations where visitation of the slots in that relation belong to different episodes. Relational structures inherently lend themselves to a *hierarchical episode structure*.

For set-based hypertexts the episode is likely to consist of both closing elements to open a superset and opening elements of a set. Similarly, where a Storyspace author has chosen to allow the map view to be visible, the episode may be very heterogeneous indeed, consisting of link traversals, space openings and space closings.

Identity / Integrity of the Episode

Numerous well known issues in hypertext rhetoric can be rephrased as issues pertaining to determining the identity and maintaining the integrity of the episode. Take for instance the infamous “lost in hyperspace” issue. Disorientation in a hypertext may be described as having “lost (irrecoverably) the thread” of the episode. Even though, as Bernstein argues in [3], it may be explicitly part of an author’s artistic purpose *not* to provide a ready “geographic” form of navigation, (indeed, discovery of the geography without “help” from the author may be a deliberate intended effect,) one may still speak of a reader’s discomfort in having suddenly *lost all episodes*. Although even this may be part of the author’s intended purpose, most authors are likely to consider it a flaw if “the spell becomes broken”. If a reader has “lost track” of an episode but another readily comes to hand, yielding to the new episode and

resisting the temptation to “possess” the former episode is one aspect of what the hypertext experience has to offer. One is in some difficulty as a reader, however, if no episode at all comes to hand. The reader is then likely to begin foraging for an episode. Foraging will be a worthy aesthetic experience *if* (and only if) it succeeds.

Integrity of the episode is also an issue for conjunctive hypertext. Becoming lost in a nested spatially substructured space may not be an issue; the nesting may provide a clear enough orientation that it is virtually impossible to “get (navigationally) lost”. Still, the reader here may be subject to a problem parallel to the disjunctive difficulty of losing all episodes: the integrity of the conjunctive episode may fail if the reader is unable to resolve into a single whole “the components of the and” — i.e. if the conjunction fails to come off. This is particularly a danger with heavily nested structures.

In [17], George Landow appeals to the hypertext author not to link the reader into a place where no inviting links will take the reader out. This may be rephrased as the injunction: Don’t leave the reader stranded without an episode. A more open-minded approach to the idea of an “episode vortex” would be to appeal to authors to: (1) be conscious of where these places are; (2) be aesthetically comfortable with them; (3) understand how you expect episode foraging experiences to work when the reader hits them; (4) understand how the reader might come out of the episode foraging experience.

Is the Episode a Virtual Document?

Various hypertext systems — e.g. MacWeb [27], (see also [13]), have provided for the possibility of *virtual documents*: documents which are generated “on the fly” by the operation of the hypertext. Here we ask whether we should not consider the episode to be a kind of virtual document. Despite the vast amount of discussion about linkage, there is still a strong temptation to be “lexia-centric” concerning what constitutes “the document”. By contrast, consider a common unit of discourse which may span many paragraphs: the argument. Argumentation structure has been a popular topic for hypertext researchers; (e.g. gIBIS [8], Aquanet [20], Sepia [35]). One of the early uses of Aquanet was to interactively implement Toulmin structures [36] to model argumentation. In laying out such an argument, numerous relations are likely to be required; i.e. “the argument” spans many lexia. Likewise in laying out a Sepia Argumentation Space, numerous links are likely to be required. To fully visit an argument is to carry out hypertext activity at least at the level of the episode, and perhaps even beyond to the session. If operating multiple actemes is necessary to fully visit an argumentation structure, we may truly say *meaning* is derived through operation of these actemes. I.e. meaning cannot be confined to the within-component Dexter layer (the lexia); meaning derives from *hypertext activity in the large*. In node-link hypertext, meaning happens *through* links. (At its most extreme, even

the sentence itself can transcend the lexia [32]).

Figure 1 illustrates the episode as a virtual document⁴. This concept poses some obvious questions: What structures the episode? Should it have a title? Should it have parts? Should *the user* be able to give it a title? Shouldn't the user be able to *save* it? (Saving is what we normally do in software with documents we want to keep ...) (User interface questions will be considered in detail below.)

One possibility for how to structure the episode as a virtual document is creation of an explicit *gathering interface*. [24] illustrates the use of the hypertext system VIKI as a WWW gathering interface. (VIKI is especially suited to this purpose by the richness of its implicit and spatial structuring methods.) Numerous hypertext systems save "global history lists" in which are recorded all lexia traversed; for a true gathering interface this facility needs to be expanded significantly to allow the reader to edit and mark the history for episodes, provide graphical collection of episodes, and so on. At its simplest, such a gathering interface would have commands "begin episode" and "end episode" similar to "record" and "stop" commands common in numerous application program macro recorders. "Playing back" the episode would inject the results into a graphical hypertext browser.⁵

The availability and characteristics of a gathering interface are directly related to a major question: What is the structure of the episode? Is it in fact *linear*? With no gathering interface, there is an unfortunate tendency for the episode to linearize — by default — but there is no reason in principle to suppose that the structure of the episode is any less general than the possible structure of hypertext as a whole: the structure of the episode is what the user makes of it given the available tools of the gathering interface. Absent an explicit formal gathering interface, the main tool used in structuring the episode is simply the user's memory.

FROM ACTEME TO EPISODE

In [17] (or see also [18]), George Landow initiated the study of the relationship among episode, acteme and lexia (though not using that terminology) particularly in regard to such questions as: How does the episode emerge from the actemes? How should the lexia and/or acteme be *coded* for episodes? Landow introduced his "rhetoric of arrival and departure" with reference to the specific acteme of following a hypertext link. Here we generalize these questions to all forms of acteme.

Relational or spatial actemes call for a different terminology than arrival and departure, but the general questions pertaining to episode/acteme/lexia remain. Consider n-ary relations. Does opening each of the slots of a relation in turn

⁴Figure 1 as drawn implies that the lexia is "atomic" with respect to episodes — i.e. a lexia is either entirely in or entirely out of an episode. Of course an episode may include only part of a lexia; there is no guarantee the reader will read the whole thing.

⁵Zellweger [37] discusses implementation of a similar concept, though her *paths* are constructed by the author rather than the reader.

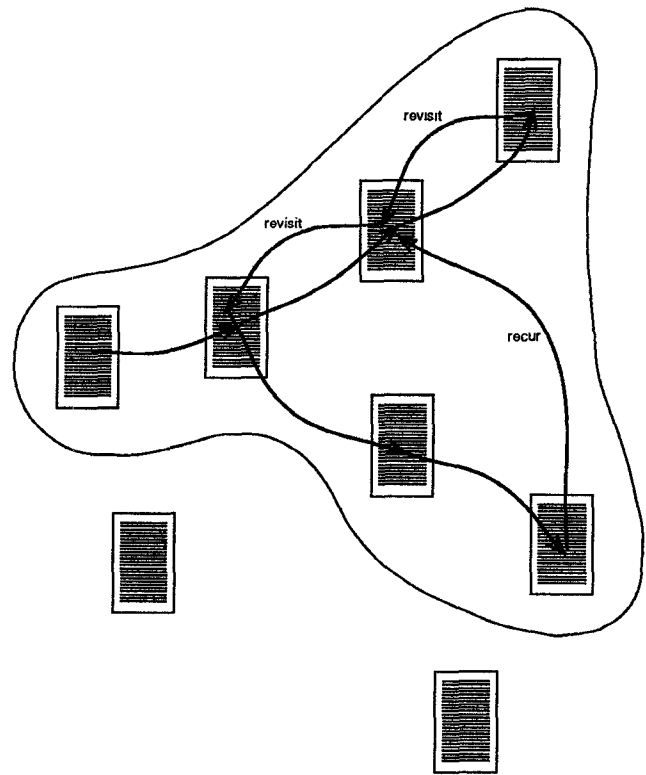


Figure 1: The episode as a virtual document.

In this illustration each lexia is depicted as linear; the actemes are familiar link-followings. Lexia outside of the curve are not part of the episode. Links marked "revisit" are backtrackings for the purpose of reading the lexia again, and are thus part of the episode; the link marked "recur" is a new path that happens to arrive at a previously visited lexia.

belong to the same episode? Where relational structures are nested, the logical way to read them might be by depth-first traversal. The degree to which different slots of the same relation would belong to different episodes would tend to depend on the complexity of the structure of the slots. If each slot is a lexia with no internal structure, opening all of the slots might naturally fall into one episode. If two slots each have highly complex nested substructure they might fall into separate episodes. Should a hypertext be *coded* for this difference? When an acteme involves opening a space, should the reader be given a clear graphical cue as to how complex that space is?⁶ This may be implemented using icons which are miniature graphics of their entire nested structure. (See Figure 2.) Such a miniature prepares the reader for what will happen when the slot is opened.

For spatial hypertext, spatial proximity is one way actemes may be coded for grouping into an episode — if this use of spatial proximity is not preempted by some other structural

⁶At the Spatial Metaphors Workshop at ECHT'94, Mark Bernstein raised the question of how the user of a hypertext might be able to *estimate the cost* of following a link. Should actemes be coded so that the reader can estimate the *cost* of activating them?

purpose. Regions containing spatial actemes can be *enclosed* in a graphic device, such as VIKI's collection frame. Where a node-link hypertext offers a graphical view, links can be coded for episode, either graphically, through names, or both. However, where hybrid methods are used the situation is much more complicated. Consider a Storyspace hypertext in which the "map" view is enabled. Coding for an episode that visits multiple spaces is now much more difficult. Likewise, in set based hypertext the episode is likely to consist of multiple transitions between "up" navigation and "down" navigation. How should an author code for episode in this case?

Given that the episode is really *the reader's* structure, to what extent should the writer code for episode at all? This is an aesthetic issue, likely to yield a variety of points of view. (And even a single writer in the context of one work might choose to vary the extent to which episodes are coded.)

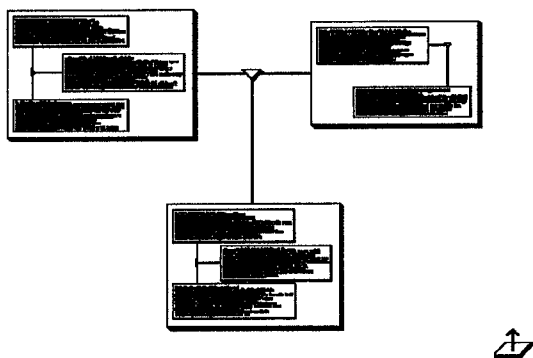


Figure 2: Nested relational structure from "Intergram 8", [30].

This is a ternary relation in which each slot is itself a relation, shown iconographically. The button at the right closes the relation slot.

MULTI-EPISEDE STRUCTURE

In most cases, reading a hypertext will result in several episodes. We now pursue the question of what type of structure might relate some of these episodes.

Multi-Episode Structure is Emergent

The episode itself *emerges* from reading activity; although the writer may employ coding devices or hints to guide the reader in forming an episode, ultimately the episode is more the reader's structure than the writer's. Structure among multiple episodes is even more likely to be emergent, and is most likely *not* specifically embodied in formal structural devices of the kind articulated in the Dexter Hypertext Reference Model. Hypertext systems for expressing emergent structure have been studied in detail by Marshall and her colleagues. ([22], [23], [24].) They have found consis-

tently that where a gatherer is unsure about final structure, spatial methods tend to be preferred — often even when more formal structures, such as relations, are available. Even if the formal structure underlying a hypertext uses the familiar node-link model, and is completely disjunctive (as in the section "Types of Acteme" above), where multiple episodes are being gathered using (say) spatial methods, the structure that results from this gathering may be conjunctive rather than disjunctive, or may be a complex combination of conjunctive and disjunctive substructures. I.e.: Even assuming that purely disjunctive methods are sufficient for the author's purpose, the availability of a richer structure palette — specifically including conjunctive substructuring methods — may be of serious benefit to the reader. The appeal for a *gathering interface* issued above must be reissued in even stronger terms as we consider how the reader is to work out the structure among episodes.

Contour and Gap: The Geography of Episode

Michael Joyce has written frequently about hypertext *contours* ([4], [16]). Contour is a multifaceted concept ([33]). Some aspects of contour may be rephrased as questions: How does the reader perceive the episode density of the lexia? How does the reader associate multiple episodes with a map view of the hypertext? How does the reader locate lexia which are particularly rich "hinge points" joining multiple episodes? Fascinatingly, in [15], Terence Harpold investigates what may be described as the "skew-symmetrically opposite" concept. He describes a model of a hypertext as knotted threads; in a kind of counterpoint to Joyce's contour, he describes a concept of *gap* which we might paraphrase as a void around which episodes may bend but into which no episode reaches. Both concepts concern the geography of episode: in the case of contour, where the episodes *are*; in the case of gap, where they are *not*. Where a node-link hypertext has a strong geographical map view interface, the episode yields a trace on this map. Visually associating multiple such traces is an obvious method of structuring multiple episodes.

There may be no map view at all in the hypertext system in which a document is read. Should the reader then create such a map — at least conceptually? Should a gathering interface *provide* a map display for the reader's gathering activities, even if the "original" hypertext system in question doesn't? Where a map display is available, it is likely to show the *writer's* "inherent" underlying structure, e.g. for node-link hypertext the node-link map itself.⁷ How is the trace of episode to be made visible on this map? Bread crumbs ([21]) are a standard device for exhibiting hypertext *history* on a map view (MacWeb does this, for instance) — but history and episode are two different things altogether. Clearly the reader could use some help here.

⁷In [10] Douglas refers to such maps as "cognitive maps". To call the "actual" map of the node-link structure a "cognitive" map is a serious confusion. The map may be structural more than it is cognitive. One might in some cases call a *reader's* map in the context of an overt gathering interface cognitive; whether the writer's structure map is cognitive or not depends on the circumstances.

What of the geography of episode for non-link hypertexts? Both sets and relations may give the reader a three-dimensional feeling: as a set or relation slot is opened, the region of hypertext thereby made visible may appear — conceptually at least — in a different plane behind or in front of the plane where the user was. The episode may be a kind of tube that transcends multiple planes — possibly zigzagging “forward” and “backward” (or “up” and “down” in the case of set navigation) multiple times. As in the case of the node-link model, episodes may intersect. A particular lexia may be very rich in episodes, or they may be planes that are strangely bypassed. For relational hypertext where the relation slots are visited in separate episodes, the relation structure itself may be said to relate these episodes; Harpold’s metaphor of hypertext as knots seems particularly apt — though the knots may be nested, like layers of an onion.

Narration — A Logic Structure of Episode

Narration is an immense issue; a discussion of narration as a whole is beyond the scope of this paper. We only note a few issues here. In attempting to put a narrative structure to a hypertext, surely the reader is attempting to relate not just lexia, but episodes as well. Indeed, the whole concept that a sequence of hypertext activities works together as a single story fragment may be one of the ways by which the reader constructs a concept of episode in the first place. (See [10] for examples.) Whereas above we were concerned with the geographical relationship among episodes, here we are concerned with a logical relationship. (These may or may not be the same.) An emerging logical or narrative schema may have a great deal to do with how the reader forages for episode; as Douglas observes, an emerging narrative picture may have gaps; it is precisely to fill those gaps that the reader may forage for more episodes. (And as Harpold observes, not only is there no guarantee of success, the writer may intentionally make it impossible to find such a “missing key”.)

USER INTERFACE ISSUES PERTAINING TO THE EPISODE

The user interface implications of the concept of episode range from very small-scale (e.g. minor details concerning how bread crumbs should work) all the way to a full-scale gathering interface. Consider bread crumbs. A typical bread crumb device shows only *history*. It is typically oblivious to the question raised above of whether backtracking is an undo; it treats every lexia visited equally, whether the reader is in the midst of a very intense episode or has lost the thread completely and is foraging for a new episode. Clearly it would be useful for bread crumbs to be *typed*. Just as MacWeb allows links to be typed, the reader may need typing as well: visitations may need to be typed. Visually this could be indicated in many ways: color coding, icons, etc. A related issue: does the reader need the ability to *name* the episode? Surely in some cases this would be useful. For named episodes, a bread crumb could be a fully clickable icon which would expand to show (or accept) the episode

name.

The *go back* command found in almost every hypertext system should allow for qualification: Whether backtracking is an “undo” or not must be answered by *the user*! Likewise, the user must determine whether backtracking should or shouldn’t be recorded in the trace of the episode.

The typical *save* command needs considerable enhancement. In most hypertext systems, the only things which can be saved are: (1) References to particular lexia (bookmarks); (2) the state of the entire hypertext session. We argued above that the episode may function as a virtual document; if so then the reader should have the ability to save it. It is ironic in the extreme that despite all the emphasis on linkage over decades of hypertext research, it is the lexia which is typically saved, not the linkage! The ability to save an episode provides an opportunity to name it, of course.

More elaborately, *gathering* must be regarded as an important aspect of the hypertext act. Alas, the requirements of a full gathering interface are considerable.

- A gathering interface must provide a rich palette of structuring methods, specifically including spatial structuring methods such as those implemented in VIKI.
- A gathering interface must be at least partially automatic. It should have facilities similar to common macro recorders, so that when the user has indicated that an episode should be started, further activity is automatically assigned to the episode without the user having to do so manually.
- The history mechanism should be available for retroactive editing allowing an episode to be reconstructed after the fact. This is important: just as the episode is emergent structurally and spatially, it is emergent in time as well: you may not realize you are in the midst of an episode until well after it has already begun. The reader must thus be able to edit the history list and gather into an episode actemes already performed.
- A gathering interface is explicitly one hypertext system operating on another; ideally the authors of the hypertext systems at both ends of this transaction would be sensitive to the needs of being plugged into a companion. The writer’s hypertext system should have sufficient hooks that an off-the-shelf third party gathering interface can be plugged into it; the reader’s gathering system should use sufficiently general system mechanisms as to allow for operation of a variety of hypertext systems.

THE HYPERTEXT SESSION

There is a clear break in hypertext activity when the user quits. An excellent discussion of issues pertaining to the hypertext session may be found in [10]. Douglas’s main focus is the issue of *closure*: how does reading a hypertext

“come to an end?” There are all manner of reasons why the hypertext session may end. We examine some of these.⁸

(1) The session may end due to *accident or external circumstance*. Perhaps the phone rings, or the power fails, or the computer crashes. It is tempting to simply dismiss this as a not very interesting null case, but it is precisely by measuring the sense of loss at an artificial termination that we may properly assess what needs to be *saved* from the session. How does the reader recover not only the lexia but the episode as well? *Can* the episode be recovered? If the reader is associating multiple episodes, can that be recovered? *Should* it be recovered?

(2) The reader may simply *give up* after a fruitless search for episode. Similarly the reader may suffer sheer *episode fatigue*: episodes are at hand, but they seem so similar to episodes already undertaken that the reader simply quits for want of “something fresh”.

(3) By contrast, the reader may have achieved a complete sense of *episode satiation*. This is not necessarily the same concept as closure, as discussed by Douglas. Particularly in a large poetic work, the reader may have no sense of *completion* in a logical or narrative sense, but may be satiated in a purely imagistic way that makes it seem fruitful to put the work aside for a time. There are some interesting aesthetic issues here. If I have reached episode satiation, I might not want to resume in a subsequent session exactly where I left off, but might instead want to forage “as far away as possible”. (Returning in a subsequent session to the same neighborhood where I left off might actually be overtly disappointing.) How do I as a reader do this?

(4) The reader may have reached a tangible “success point” in gathering. (This is probably the closest concept to Douglas’s description of closure.) Of course, the reader may not have a formal gathering interface; the gathering in question may simply be formation of a mental map. To borrow Michael Joyce’s topographical bent: the reader may quit because of a feeling of having reached a point on the landscape from which the vista seems complete. Or as Douglas puts it, the reader is satisfied that enough logical questions are answered that there is no need to continue. With the luxury of a formal gathering interface, the reader may obtain a sense of *completion about the gatherings*; i.e. the reader’s sense of completion is exactly a writer’s sense of completion: the gathered result “works” artistically as-is, now is a good time to stop.

CONCURRENCY OF EPISODE

Some hypertext systems are explicitly designed for concurrent operation by multiple users. (See e.g. [8], [35], [11].) The study of actual concurrency in literary hypertext is surely a worthy subject of research, but here we will investigate the metaphor of concurrency of episode in the context

⁸This section is heavily indebted to Douglas’s paper. While it should not be taken as simply a restatement of her work, most of the ideas in this section were the direct result of reading her very stimulating discussion.

of activity by a single user. In [5], Bernstein makes the intriguing proposal that we *personify* episodes, endowing a hypertext with what he describes as *characters*. Characters, of course, exist in a narrative space concurrently (as do Bernstein’s). Does it help the reader to imagine episodes as occurring concurrently, even if they are not experienced that way? While this might seem to be stretching a point, consider that as gatherer, the reader may be assembling a new hypertext containing the gathered results. In this case we have not only the episodes in the original hypertext, there may be potential episodes in the gathered product. Concurrency here is quite literally real in that: (1) potential episodes in the gathered result exist concurrently with the episode in the “original” hypertext; (2) a formal gathering interface may make it exceptionally easy to keep multiple potential episodes “open” at once.

THE READER-AS-WRITER’S ACTIVITY STRUCTURE

It is a commonplace in hypertext rhetoric that the reader is also concurrently a writer; we now explore this from the standpoint of activity. The activity of following a link (the *reader’s* link!) we classified above as an acteme — a low-level unit of hypertext activity. What of a link *created* by the reader? Shall we describe creation of a link as an acteme? Creation of a link might consist of: (1) selecting the text in the source lexia to serve as the source anchor; (2) telling the system we want to create a link; (3) navigating to the target lexia; (4) selecting the text to serve as a target anchor; (5) informing the system we are completing the link; (6) choosing a *name* for the link; (7) perhaps choosing a *type* for the link. This is hardly a low-level unit of activity! The supposed symmetry between reading and writing, from the standpoint of activity structure, is completely illusory in the sense that it may take nearly *an order of magnitude* more effort to create as a writer what the reader experiences as a simple acteme. What does it take for the writer to create an episode? What has happened to the reader’s episode while the reader-as-writer is creating a link? This is a most unpleasant question! Is the episode “in suspension”? Is creation of the link simply a part of the episode? What is the risk that creation of the link will “break the spell” of the episode?

In place of reader-as-writer, consider the concept of reader-as-gatherer (given a formal gathering interface). A gathering interface, particularly one that implements spatial methods such as VIKI, may serve as a much more *light-weight* interface than a full-scale authoring environment. For instance, adding a lexia to a *pile* already open in a gathering interface is likely to involve no more activity than dragging the lexia onto the pile; with a gathering interface designed as such it may even be simpler. A true symmetry in complexity between the reader’s acteme and the gatherer’s acteme may in fact be achievable. Given that creation of a simple link may be so much more laborious than following one, one is tempted to ask how much hypertext gathering is actively *discouraged* by asking the reader to use a full heavy-weight hypertext authoring environment instead of lighter-weight gathering tools.

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